

The logo for Scistip, featuring the word "Scistip" in a white serif font. The letter "i" is stylized with a green swoosh that extends from the top of the letter and curves around the "s".

*Scistip*

DST-NRF Centre of Excellence in  
Scientometrics and Science,  
Technology and Innovation Policy

The background of the cover is a dark blue gradient with several overlapping, flowing, light green and yellow-green lines that create a sense of movement and energy.

Annual report  
2016





DST-NRF Centre of Excellence in  
Scientometrics and Science,  
Technology and Innovation Policy

# Annual report 2016



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## List of acronyms

AfricaLics	African Network for the Economics of Learning, Innovation, and Competence Building Systems	OECD	Organisation for Economic Cooperation and Development
ANT	Actor network theory	OpenAIR	Open African Innovation Research and Training
ASIRPA	The French acronym for “socio-economic analysis of the impacts of public agricultural research”	PhD	Doctor of Philosophy
ASSAf	Academy of Science of South Africa	PI	Principal investigator
BoP	Base of the pyramid	R&D	Research and development
BRICS	The acronym for an association of five major emerging national economies: Brazil, Russia, India, China and South Africa	RCA	Research career aspirations
CESM	Classification of educational subject matter	RFA	Research focus area
CHET	Centre for Higher Education Trust	RIA	Research impact assessment
CoE	Centre of Excellence	S&T	Science and technology
CREST	Centre for Research on Evaluation, Science and Technology	SAAIR	Southern African Association for Institutional Research
CSIR	Council for Scientific and Industrial Research	SADC	Southern African Development Community
CUT	Central University of Technology	SAES	School of Agricultural and Environmental Sciences (of the University of Limpopo)
CWTS	Centre for Science and Technology Studies	SAK	SA Knowledgebase
DG	Director-General	SARIMA	Southern African Research and Innovation Management Association
DHET	(South African national) Department of Higher Education and Training	SciCOM	South African Research Chair in Science Communication
DST	Department of Science and Technology	SciELO	Scientific Electronic Library Online
DVC	Deputy Vice-Chancellor	SciSTIP	DST-NRF Centre of Excellence in Scientometrics and Science, Technology and Innovation Policy
EMS	Economic and management sciences	SIAMPI	Social impact assessment methods for research and funding instruments through the study of productive interactions between science and society
FTE	Full-time equivalent	SQL	Structured query language
GIS	Graphic information system	STI	Science, technology and innovation
Globelics	Global network for economics of learning, innovation, and competence building systems	STS	Science and technology studies
HEI	Higher education institution	SU	Stellenbosch University
HER	Higher education research	TUT	Tshwane University of Technology
HERANA	Higher Education and Research Advocacy Network in Africa	UCT	University of Cape Town
HSRC	Human Sciences Research Council	UFS	University of the Free State
I4ID	Innovation for inclusive development	UiO	University of Oslo
IDRC	International Development Research Centre	UKZN	University of KwaZulu-Natal
IERI	Institute for Economic Research on Innovation	UL	University of Limpopo
IP	Intellectual property	UNISA	University of South Africa
IR	Institutional research	Univen	University of Venda
KMU	Knowledge Management Unit	UP	University of Pretoria
KNUST	Kwame Nkrumah University of Science and Technology	USA	United States of America
KTT	Knowledge and technology transfer	UWC	University of the Western Cape
MPhil	Master of Philosophy	VC	Vice-Chancellor
NACI	National Advisory Council on Innovation	WoS	Web of Science
NSI	National system of innovation	YSA	Young Scientists in Africa
NRF	National Research Foundation		
OAU	Obafemi Awolowo University		

Foreword by the Vice-Rector:  
Research, innovation and  
postgraduate studies,  
Stellenbosch University



## Foreword by the Director



# Introduction

This annual report provides an overview of the activities undertaken by the Centre of Excellence (CoE) in 2016. Its general mandate is guided by its research strategy framework, which outlines five research focus areas (RFAs): (1) science in (South) Africa: history, governance, state and trends; (2) human resources for science and

technology: the next generation of scientists, scholars and knowledge professionals; (3) research evaluation: assessing the uptake, utilisation and impact of research; (4) science and technology and innovation studies; and (5) communication in and of science.

## Summary of research funding proposals approved for 2016

Title	PI(s)	Institution(s)	Status
<b>RFA 1: Science in (South) Africa: history, governance, state and trends</b>			
Factors that affect research productivity at universities: policies, incentive schemes and funding regimes and their differentiated effects in universities	N. Cloete, P. Maassen & J. Mouton	CHET & CREST	Continuation
Diversity and differentiation in knowledge production in the South African and HERANA higher education systems	N. Cloete	CHET	Continuation
South African research funding landscapes	R. Costas, J. Mouton & C. Calero-Medina	CWTS & CREST	Continuation
South African Antarctic science: research collaboration and impact	N. Boshoff & H. Prozesky	CREST	Continuation
Trends in research production in South Africa	J. Mouton & R. Tijssen	CREST	Continuation
Institutional research in support of evidence-based decision making in higher education in Southern Africa	J. Botha	CREST	New
<b>RFA 2: Human resources for science and technology: the next generation of scientists, scholars and knowledge professionals</b>			
Young scientists in Africa: factors influencing research performance and career development	C. Beaudry & J. Mouton	CREST	Continuation
<b>RFA 3: Research evaluation: assessing the uptake, utilisation and impact of research</b>			
Productive interactions for societal impact: developing a research information system for agriculture (RIS-Agric) and the social sciences and humanities (RIS-SSH) at two South African universities	N. Boshoff	CREST	Continuation
The use of scientific research in commercial agriculture: case studies of South African grape and soybean producers	N. Boshoff	CREST	Continuation
Capturing the (potential) economic impact of South African science: modelling, measuring, monitoring	R. Tijssen	CREST	Continuation
<b>RFA 4: Science and technology and innovation studies</b>			
Operationalising inclusive innovation: a research programme	S. Grobbelaar	CREST	Continuation
Mapping local innovation and productive systems in South Africa	E. Kraemer-Mbula & L. Ndabeni	IERI	Continuation
Grassroots innovations for sustainable and equitable development	E. Kraemer-Mbula	IERI	Continuation
Rethinking STI and development in Africa: a comparison of African and Latin American development paths	E. Kraemer-Mbula	IERI	Continuation
Regional diversity and inclusive systems of innovation	S. Osha, L. Ndabeni & E. Kraemer-Mbula	IERI	Continuation
<b>RFA 5: Communication in and of science</b>			
A study of scientific journal and book publishing in South Africa: 2005–2014	J. Mouton, R. Tijssen & J. Muller	CREST	Continuation
An investigation of researchers' experiences of scientific authorship in South Africa	J. Botha, L. Schwartz & L. Horn	CREST	Continuation
Social media profile of South African research	R. Costas, Z. Zahedi & C. Calero-Medina	CWTS	Continuation

## Knowledge production

The knowledge output (publications, presentations and graduates) in 2016 is listed in the table below. The results show that SciSTIP surpassed the estimates that were

captured in research funding proposals submitted for the 2016 SciSTIP Business Plan.

Output type	Estimates	Actual output
<b>Books</b>	3	Monographs 1
		Edited collections 3
<b>Peer-reviewed articles</b>	5	23
<b>Book chapters</b>	21	29
<b>Contributions to peer-reviewed conference proceedings</b>	0	13
<b>Research reports</b>	7	5
<b>Working papers / policy briefs</b>	3	4
<b>Presentations at conferences</b>	16	30
<b>MPhil theses</b>	6–8	10
<b>PhD dissertations</b>	0	2

## Capacity building

As far as our formal academic programmes are concerned, we are proud of the fact that, not only has the Centre for Research in Evaluation, Science and Technology (CREST) continued to grow student numbers in the master's and

doctoral programmes in science and technology studies (STS), but have also achieved its transformation goals. As the figure below shows, in 2016, 66% of students were black and 56% were female.



FIGURE 1: RACE AND GENDER OF 2016 STUDENTS

## Outline of report

Our reporting is organised according to the key performance areas of CoEs. The next section reports on our research highlights, followed by our achievement in education and training (Part Two). The following section on knowledge brokerage reports on the dissemination of our research findings to various audiences (Part Three).

The final sections, on networking (Part Four) and service rendering (Part Five), document the various networking activities undertaken and the wide range of professional services rendered by the staff of SciSTIP. Part Six provides more information on the academic and support staff associated with SciSTIP.



# PART ONE: Research highlights and scholarly publications

In this first section of the report we present, under the relevant RFAs, a selection of the current projects of SciSTIP, highlight their results, and list all publications that emanated from these and other projects during 2016.



## Focus area 1: Science in (South) Africa: history, governance, state and trends

The aim of studies in this field is to provide in-depth descriptive and interpretive analyses of the state and dynamics of science in South Africa and Africa. This theme includes analysis of the governance of the science system, the social contract between the state and the science system, and the role of different actors in performing system functions. The thematic area is also devoted to ongoing studies and analyses of the dynamics of scientific research: output studies, collaboration studies and productivity studies. Such studies typically address the sciences in their entirety, but in some cases focus on specific fields and disciplines. Finally, this focus area includes large-scale, long-term research aimed at modelling the overall efficiency of the South African science system and its comparative standing in the world.

A core theme in this focus area is knowledge production and research at universities. South African universities produce the bulk of scientific output on the continent and therefore require special attention. Studies within this thematic area include descriptive and explanatory studies in order to understand commonalities and differences in knowledge production in this sector. These studies focus on the factors that explain differences in the shape of knowledge production, research productivity (also across fields) and research outputs. Studies are also undertaken to address questions of differentiation in output and how these are related to differences in institutional histories, missions, and national and institutional policies and strategies. Given the interest in research performance metrics and indicators (and the associated topic of university rankings), SciSTIP works closely with university research offices and institutional researchers to develop a widely accepted set of credible and appropriate research-performance metrics.

### **Project: Diversity and differentiation in knowledge production in the South African and HERANA higher education systems**

**Principal investigator: Prof N. Cloete (CHET; [ncloete@chet.org.za](mailto:ncloete@chet.org.za))**

The Centre for Higher Education Trust (CHET) has over the past number of years focussed its attention on the issue of diversity in knowledge production at South African institutions, with a view to develop a set of appropriate and robust “performance” indicators. This ongoing interest of CHET has been pursued in close collaboration with research and institutional planning offices at a number of South African universities. The aim of this project is to develop and consolidate core performance indicators further. These indicators are published on the CHET website as South

African higher education data (for 2009 to 2014). In 2016, indicators were revised and expanded (see pp. 81–82 for more detail).

This project also overlaps with the Higher Education and Research Advocacy Network in Africa (HERANA) project on eight African flagship universities in eight countries over a 15-year period. One outcome of the project has been to improve data collection at the universities involved. Another has been to build a first accurate picture of leading universities across the continent, their performances according to key indicators, and their achievements and challenges. In general, the indicators show that African flagship universities are on the rise, with upward trends in a number of areas that are very positive, thereby supporting the notion of “Africa Rising” which has found traction in recent years. However, the ascent is highly uneven.

An important activity that forms part of this project is to hold institutional forums with the leaderships of these universities (see p. 76 for more detail). It was noticeable at the forum meetings that many institutions had adopted strategic plans with a strong emphasis on becoming research-led universities. It was evident that these plans were being shaped by HERANA indicators, such as the ratio of undergraduate to postgraduate enrolments, the proportion of senior staff with doctorates, doctoral enrolments, and graduation and research output. While there has been a considerable improvement in data collection and in the use of data, the institutionalisation of data, particularly the centralisation and analysis of data, still poses considerable challenges.

As the project draws to a close, the Centre for Higher Education Trust (CHET) has been cleaning and consolidating all the HERANA data collected from the universities for the period 2000/2001 to 2014/15. This process was initiated in order to transfer the data from multiple spreadsheets into a structured online database that gives universities ready access to their own data. This process has highlighted the important work done by CHET in introducing common reporting standards across the seven African universities, but has also shown challenges between data collection across universities for comparative purposes (in which case standardisation is critical) and collecting granular data that is of use to the universities (in which case standardisation is less important). Some of the results produced by an analysis of these data are as follows:

A further aspect of this project is a concern with differentiation and the development of an effective framework for monitoring research and development

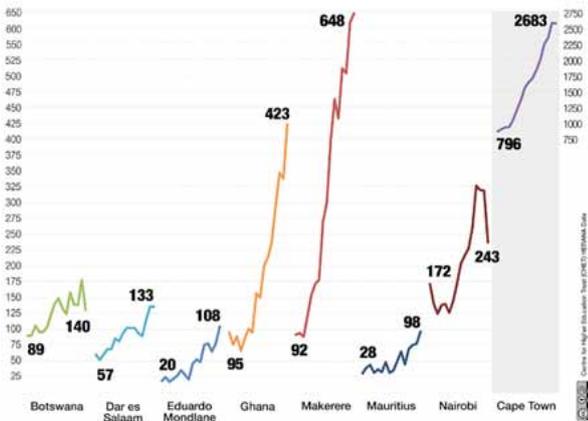


FIGURE 2: JOURNAL ARTICLES PUBLISHED IN WOS, 2000–2015

(R&D). To this aim, CHET hosted a workshop on diversity and differentiation in the South African higher education system in August 2016. The workshop included presentations and discussions on the relationship between performance measurement and differentiation, including a framework for monitoring R&D (see p. 63 for more detail on the presentations).

An effective framework for monitoring R&D should measure investment in research; research capacity (human resources and collaborative networks); research outputs (publications, graduate outputs and innovation outputs); and research impacts (scientific and social impacts). The framework should enable measurement at the appropriate level – in this case at the level of the university. Indicators need to be normalised to be useful. For example, the total number of peer-review journals produced by an institution could be normalised according to the number of academic staff in order to be compared with the output of other institutions in the sector.

It is important to distinguish between indicators for relatively stable states (capturing some property at a specific point in time) and those that describe change (capturing a difference over a specific period of time). For example, the number of publications or doctorate outputs in 2014 constitutes a state indicator. The rate of increase in publication outputs constitutes a change indicator. Both state and change indicators may be used to describe the system in productive, albeit different, ways. For example, the amount of funding provided to universities can be presented through the lens of either state or change indicators.

A range of change indicators has been developed to refer to the university sector as a whole (comparing universities), while other indicators refer to changes within the same university over time.

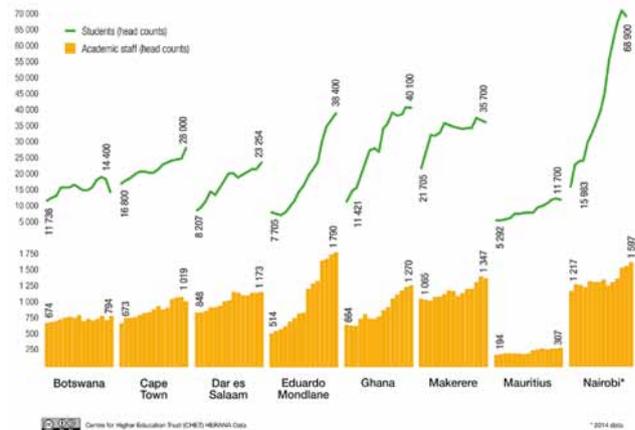


FIGURE 3: STUDENT ENROLMENTS AND ACADEMIC STAFF, 2001–2015

The indicator for research funding is based on the National Research Foundation (NRF) grants awarded to universities between 2013 and 2015. In broad terms, this indicator can reveal the “capability” of a university to secure or attract research funding, and may be seen as an indirect indicator of research activity and/or strength: strong universities will always be able to secure and leverage more research funds than weak ones. In the interest of ensuring comparability of NRF grants to all universities, the indicator was limited to the grants awarded to certain funding categories (levelling the playing field as far as possible between the large, established universities and the rest). It was then normalised according to the number of permanent academic staff members.

The state indicator reveals average per-capita funding for the past three years, with regard to which SU emerges as the top performer with R198 000 per staff member, followed by the University of Cape Town (UCT) at R149 000, the University of the Witwatersrand at R144 000, Rhodes University at R134 000, the University of the Western Cape (UWC) and the University of Pretoria (UP) at R96 000 each and, at the lowest end of the scale, R11 000 at the University of Limpopo (UL). These levels of research funding may be an indirect measure of the efficiency of the research offices. In this regard, factoring in the success rate of applications would be revealing. Notwithstanding such normalisation, the factor difference between the most and least successful universities would persist.

The corresponding change indicator is the average annual growth rate in per capita research funding, showing which universities have constantly increased their NRF allocations. On this measure, UP is the top-ranking university, while the University of Fort Hare (UFH) ranks fourth. The comprehensive universities show low, or in the cases of the University of Venda (Univen), Mangosuthu



University of Technology and the University of Zululand negative, growth on this indicator. However, in terms of absolute value, the universities are actually merely cutting up a cake that is becoming progressively smaller.

The state indicator for published research is the share of research publications from individual universities over the period 2005–2014, showing which universities have produced the most over these 10 years. This league table is headed by UP and the University of KwaZulu-Natal (UKZN). However, the change indicator, which shows the difference in the share of research outputs in 2005–2007, compared with 2012–2014, tells a different story. North-West University (largely due to its Mafikeng campus), UKZN, UFH and Univen have all increased their proportion of outputs. The technical colleges have doubled their share. However, UP has lost a large portion of its share. Another change indicator in this area shows that the top five universities produced 65 per cent of outputs between 2005 and 2007, but only 54 per cent between 2012 and 2014. The findings may indicate that some smaller institutions are accruing benefits from offering greater financial incentives to their researchers to produce published outputs. The scale of outputs at UKZN, which receives relatively little NRF funding, may be attributed to other diverse funding sources for the university.

The state indicator for weighted, normalised knowledge outputs ranked Stellenbosch first in 2014, with each academic staff member producing an average of more than three published outputs each year. The figure for UP, in second place, was 2.78, and so forth down the league table to Mangosuthu, which produced only 0.08. In other words, the average staff member at Mangosuthu publishes once every ten years. However, the fairness of such comparisons is questionable given the wide variation in the individual universities' programme and qualification mix, with some institutions producing almost exclusively undergraduates and very few postgraduates. Nevertheless, interventions designed to change or affirm the roles of institutions within the higher education system in relation to research can take this indicator as a useful starting point.

The change indicator for this output is the variation in ranking, rather than the change in normalised output, between 2010 and 2014. In 2010, the University of South Africa (Unisa) ranked below the University of the Free State (UFS), but it has subsequently improved to outrank (UFS). Most universities have increased their outputs at a rate that exceeds staff growth, but in the case of Unisa this could be at the expense of learning efficiency.

To ascertain the shape of knowledge production, university outputs in internationally indexed journals were measured, with the change indicator measuring shifts in output by journal index from 2006 to 2011. The indicators were used to measure the outputs of UCT and Unisa. In 2011,

90 per cent of the output from UCT was published in internationally recognised journals which shape the Singapore rankings, and much of these were from science research funded by the South African national Department of Higher Education and Training (DHET). By contrast, Unisa stands very little chance of entering the group of top universities in the ShanghaiRanking, since much of its research is published in the 22 internationally unaccredited law periodicals from South Africa, and only about 18 per cent was published in internationally recognised journals in 2011. Such publication patterns reflect institutional research and other policies, as well as the larger funding environment. They may also signal different approaches to academic standards. For example, in-house journals can be used to boost the number, although not necessarily the quality, of outputs. In one case, an editor published 50 articles that he had penned in his own journal.

To measure the extent of collaboration in research, papers published by UKZN-affiliated researchers in Thomson Reuters Web of Science (WoS) journals were disaggregated by collaboration type, with the joint efforts of authors from the same institution at one end of the scale, and the presence of foreigners, indicating international collaboration, at the other (although such measurement needs to account for visiting professors who may have a dual affiliation). Of the 13 854 UKZN papers published in WoS journals between 1990 and 2012, approximately a third involved some international collaboration, with a further 15 per cent co-authored with scientists and scholars elsewhere in South Africa, and the remaining one third representing single-institution papers. The change indicator, which measures the shift in the type of collaboration producing these papers from 1993 to 2012, shows a substantial increase in international collaboration.

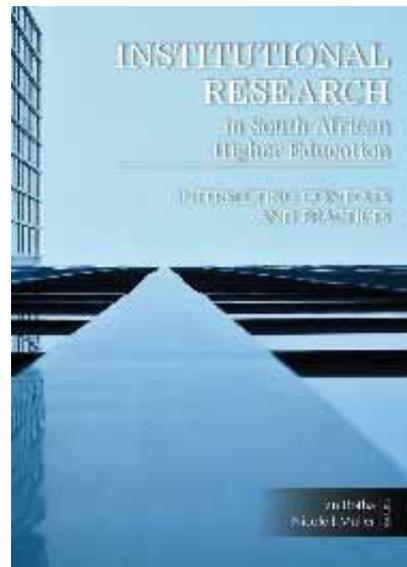
At UFS, the indicators show that, while women are not necessarily publishing as much as men, the women are closing the gap. The contribution of female authors to the total research output at the university more than tripled between 1990 (when they accounted for only 7 per cent of authorship) and 2011, by which year the proportion had risen to 23 per cent. In terms of the age of contributors, older individuals are now publishing more, according to indicators measuring this change between 1990 and 2011, particularly at UP (compared to UCT), where the university has created avenues for more retired people to contribute research after they retired.

The implementation of a comprehensive monitoring and evaluation framework for university offerings can reveal existing strengths and future directions to inform system and intra-institutional differentiation. Such a framework requires evaluative indicators based on high-quality data systems that are fit for purpose. Increasing collaboration between the DST-NRF Centre of Excellence in Scientometrics and Science, Technology and Innovation

Policy (SciSTIP), CHET, DHET and NRF has produced the requisite high-quality data systems, although these need to be refined and expanded further. In addition, the different evaluation contexts and purposes for which indicators are required should be agreed upon, in order for them to be tested and developed accordingly. If the framework is to become part of a national project to measure transformation in university R&D capacities, consensus must be reached on its proper applications and which indicators it should include.

The project produced a chapter in a book, published in 2016:

Cloete, N., Langa, P., Nakayiwa-Mayega, F., Ssembatya, V., Wangenge-Ouma, G. & Moja, T. Rankings in Africa: important, interesting, irritating or irrelevant? In Hazelkorn, E. (ed.). *Global rankings and the geopolitics of higher education: understanding the influence and impact of rankings on higher education, policy and society*. New York: Routledge.



PROF. J. BOTHA &  
MS N. MULLER



## Institutional research in South African higher education – intersecting contexts and practices

**Editors: Prof J. Botha & Ms N. Muller**

**Publisher: AFRICAN SUNMeDIA**

The role of higher education as a public and private good is generally recognised, including its value as one of the most important role-players in the science system. R&D aimed at increasing the stock of knowledge of higher education (in all its manifestations at different levels – globally, nationally, regionally, institutionally) and the use of this stock of knowledge to maintain and enhance higher education provision and knowledge production, is in the interest of a broad range of stakeholders, ranging from global organisations and national governments to private organisations and individual institutions.

Institutional research (IR) as a focus area within the broader field of higher education research (HER) has developed over circa the past 50 years into an established field of scholarship and practice, based in institutions and organised into a network of professionals and academic associations across the world. IR is usually understood as applied and actionable research aimed at decision makers in higher education institutions (HEIs), as well as policy makers in regional and national higher education systems, to inform institutional planning, policy formation and decision making. The application, management and analysis of institutional data and information remain a key concern of IR practitioners, although, given the importance of information in our day and age (“data is the new oil”), the role of IR practitioners as knowledge analysts of the post-secondary industry is expanding into many other roles, including their role as high-level consultants to senior institutional managers and government officials.

In this book, 26 authors representing 13 different universities in South Africa and the United States of



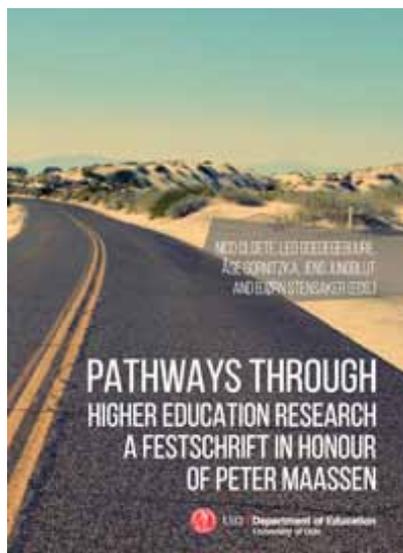
America (USA), as well as DHET, present the results of research projects undertaken specifically for the purpose of this book, namely to analyse and explain the history, current state and possible future directions for IR in South African higher education.

Engaging with and building on leading IR theories, the authors of this book tell the story of IR in South African higher education, highlighting the range of intersecting contexts and practices characterising this field of scholarship and practice in this part of the world. Among the theories considered in this book are Terenzini’s notion that IR should ideally consist of three tiers of institutional intelligence (technical/analytical intelligence, issues intelligence and contextual intelligence), that there is a synergy between the tasks that comprise the “Golden Triangle” of IR and that IR practitioners perform a variety of roles that must be acknowledged and balanced (Volkwein’s “Four Faces of IR”).

The book consists of the following sections: (1) the history and development of IR in South Africa, (2) IR and the national higher-education steering instruments (planning, finance and quality assurance), (3) IR aimed at self-insight and improvement (including chapters on institutional and academic planning, internal and external reporting, business analytics, student engagement and learner analytics, IR to inform learning and teaching policy, IR focused on doctoral education, the management and use of research-related information, and IR focused on engaged research), and (4) possible future directions for IR in South Africa (including a thought-provoking critique of the “truthiness” and orthodoxies of optimism in the assumptions and claims surrounding evidence-based decision making in higher education).

The chapters in the edited collection authored by SciSTIP-funded researchers are as follows:

Botha, J., Muller, N. & Webber, K.	Institutional research in South Africa: framing the contexts and practices
Botha, J. & Hunter-Hüsselmann, M.	The management and use of research-related information by a selection of research-intensive universities in South Africa
Botha, J.	The synergy between the SAAIR Conference Proceedings and South African higher-education policy initiatives during 1994–2015
Webber, K., Muller, N. & Botha, J.	Institutional research in higher education in South Africa: looking ahead



### Pathways through Higher Education Research: A Festschrift in honour of Peter Maassen

**Editors: Profs N. Cloete, L. Goedegebuure & A. Gornitzka; Dr J. Jungblut & Prof B. Stensaker**

This book is a Festschrift for CHET Fellow, Peter Maassen, on his 60th birthday, but it is also about the maturing field of higher education studies, which only started to develop during the 1960s.

It consists of 28 short chapters divided into four themes: higher-education governance and reform; European integration in higher education; higher education in Africa; and education and research on higher education. In total 40 individuals contributed, comprising an assortment of some of the best-known higher education researchers in the world, such as Van Vught, De Boer, Stensaker, Enders, Gornitzka, Teichler and Meek, as well as a number of younger scholars, such as Langa, Wangenge-Ouma, Pinheiro and Jungblut (all of whom were influenced by Maassen in one way or another).

The book makes a number of connections between Center for Higher Education Policy Studies (the first global higher education studies centre), CHET (the most prominent centre in Africa), UiO (Norway) and UWC (South Africa).

The chapters in the edited collection authored by SciSTIP-funded researchers are as follows:

Cloete, N. & Moja, T.	International collaboration, exchange and partnership: Netherlands, Norway and South Africa
Langa, P.V. & Wangenge-Ouma, G.	Strong convictions, weak evidence: the challenge of building research capability in African higher education
Musiige, G.	Dilemmas of researchers at Makerere University



## Other publications

### Peer-reviewed articles

Baumert, S. & Botha, J. Internationalisation at Stellenbosch University during the international academic boycott of the apartheid era (1948–1994). *African Historical Review*, 48(1):117-144

Cloete, N. For sustainable funding and fees, the undergraduate system in South Africa must be restructured. *South African Journal of Science*, 112 (3/4), Art. #a0146, 5 pages

Luruli, N.M. & Mouton, J. The early history of research funding in South Africa: from the Research Grant Board to the FRD. *South African Journal of Science*, 112 (5/6), Art. #2015–0097, 6 pages

Paul-Hus, A., Desrochers, N. & Costas, R. Characterization, description, and considerations for the use of funding acknowledgement data in Web of Science. *Scientometrics*, 108: 167

Van Wilgen, B.W., Boshoff, N., Smit, I.P.J., Solano-Fernandez, S. & Van der Walt, L. A bibliometric analysis to illustrate the role of an embedded research capability in South African National Parks. *Scientometrics*, 107(1):185-212

### Chapters in books

**In Fourie-Malherbe, M., Albertyn, R., Aitchison, E. & Bitzer, E. *Postgraduate supervision: future foci for the knowledge society*. Stellenbosch: SUNMeDIA**

Mouton, J. The doctorate in South Africa: trends, challenges and constraints. 51–82

Fourie-Malherbe, M., Botha, J. & Stevens, D. The rationale, challenges and benefits of joint degrees as a new form of doctoral education. 313–332

### Contributions to peer-reviewed conference proceedings

**In Ràfols, I., Molas-Gallart, J., Castro-Martínez, E. & Woolley, R. *Proceedings of the 21st international conference on science and technology indicators*. València: Editorial Universitat Politècnica de València**

Van Honk, J., Calero-Medina, C. & Costas, R. Funding acknowledgements in the Web of Science: inconsistencies in data collection and standardization of funding organizations. 90–96

Paul-Hus, A., Díaz-Faes, A., Desrochers, N., Costas, R., Sainte-Marie, M., Benoit, M. & Larivière, V. Beyond funding: what can acknowledgements reveal about credit distribution in science? 598–606



## Focus area 2: Human resources for science and technology: the next generation of scientists, scholars and knowledge professionals

This focus area addresses the critical human-resource challenges of the broader South African and African science systems. It aims to address questions such as: Are we producing enough scientists and academics for future science production and the expansion of the science system in South Africa and on the continent? Are we transforming the active human resource base so as to ensure a more inclusive human-resource capability in South Africa? What are the trends in the production of postgraduate students (the university pipeline), and how can we optimally model and understand these trends? What are the migration and mobility trends of African scientists? All of these questions have to be disaggregated.

### Project: Young scientists in Africa

**Principal investigators: Prof J. Mouton (CREST; jm6@sun.ac.za) • Prof C. Beaudry (Polytechnique Montréal; catherine.beaudry@polymtl.ca)**

The main goal of the young scientists in Africa (YSA) research project is to investigate and analyse factors that influence the research performance of young scientists in Africa. These factors include, but are not limited to, national policies, funding, work experience, age and gender. This is a hitherto unstudied field in the African context, and the YSA project will provide exploratory and descriptive analysis that will lead to other more delineated and focused studies.

Research performed within the higher-education system generates knowledge, stimulates international cooperation and increases competitiveness in the global, knowledge-based economy. Young scientists are a powerful resource for change and sustainable development, as they drive innovation and knowledge creation. Comparable findings on young scientists in various countries, especially in Africa and developing regions, are generally sparse. Therefore, research on the state of early-career scientists is critical in order to understand current challenges faced by those

scientists in Africa. The YSA project will fill a crucial gap in knowledge on higher education and science production in Africa and, in doing so, contribute towards increasing the visibility of African science globally. The YSA project is an international collaborative project between CREST at Stellenbosch University and Polytechnique, Montréal. The project is co-funded by the International Development Research Centre (IDRC) in Canada, and the Robert Bosch Foundation in Germany.

The different research phases of the project may be illustrated as below in Figure 4.

The first phase of the project, which was initiated in 2015, required extensive and technically challenging data management and data preparation. The Knowledge Management Unit (KMU) at CREST is responsible for converting raw African bibliometric data, obtained from the WoS, into a relational structured query language (SQL) database.

The second phase of the project, initiated in May 2016, is a web-based survey that was conducted in Burkina Faso, Burundi, Benin, Botswana, Democratic Republic of Congo, Central African Republic, Ivory Coast, Cameroon, Djibouti, Algeria, Egypt, Ethiopia, Gabon, Ghana, Guinea, Kenya, Comoros, Morocco, Madagascar, Mali, Malawi, Niger, Nigeria, Seychelles, Senegal, Chad, Togo, Tunisia, Tanzania, Uganda, South Africa, Zambia and Zimbabwe. The operational definition of the YSA project of a scientist is an individual who has published a peer-reviewed academic article in the WoS or Scopus databases. Only authors with an African affiliation – in the form of a physical address in Africa – were identified as possible respondents, and their email addresses were extracted. The team at CREST extracted 120 888 emails, of which 98 973 email addresses were valid. From this sample, 7 513 completed questionnaires were received.

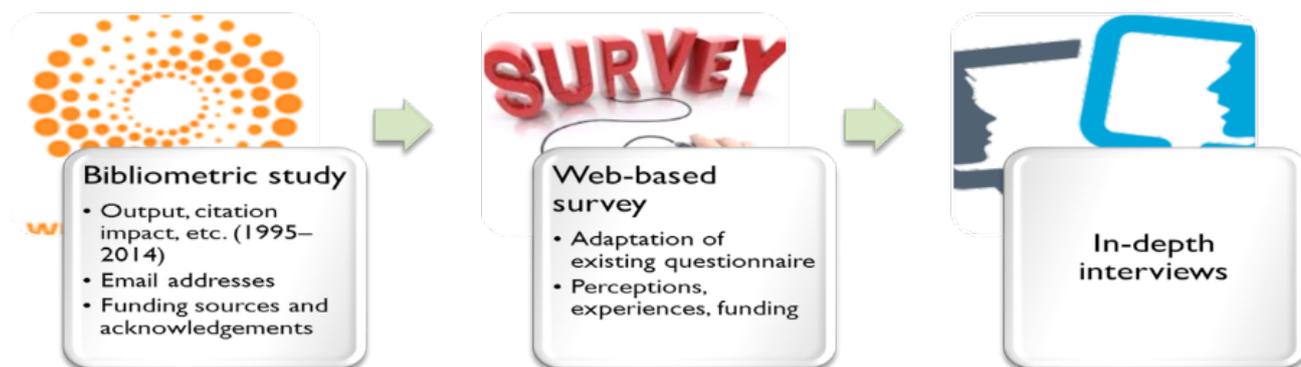


FIGURE 4: THE RESEARCH PHASES OF THE YSA



Figure 5 is an illustration of the distribution across the broad academic fields of the 7 385 respondents who completed the survey.

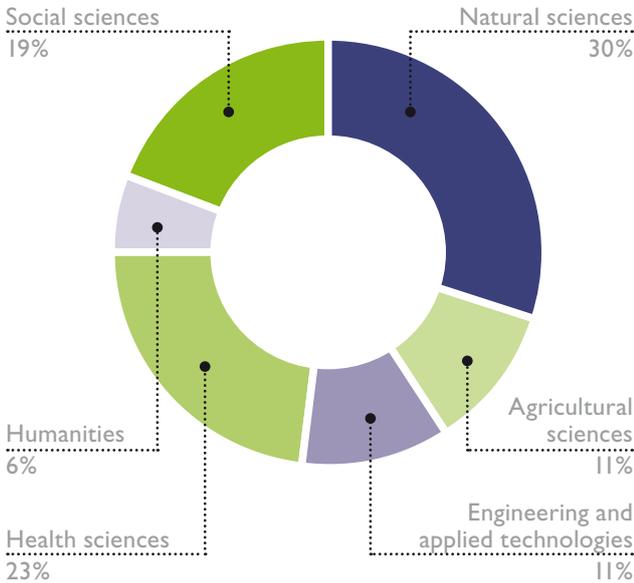


FIGURE 5: BROAD FIELD DISTRIBUTION

The YSA team is currently conducting preliminary statistical analyses of the survey data. A full report will be made public by mid-2017, but interesting results are already emerging from the survey which is arguably the largest ever done on the African continent. We suffice with one example.

We asked our respondents the following question: Has the following impacted negatively on your career as a scientist or scholar?

In the table below we present, in descending order, the percentages of respondents who said that they experienced a specific barrier either to some or a large extent. The results are revealing, as they point not only to the lack of funding in general (two of the three most reported barriers), but also the lack of training

and capacity-building, and the challenge of balancing the demands of work and family (all barriers experienced to some or a large extent by more than 50% of respondents).

Barriers	To some or a large extent (percentages combined)
Lack of research funding	83%
Lack of mentoring and support	79%
Lack of funding for research equipment	75%
Balancing demands of work and family	72%
Lack of training opportunities to develop professional skills	65%
Lack of access to library or information sources	47%
Job insecurity	41%
Limitation of academic freedom	40%
Political instability or war	30%

We then selected six of the barriers and disaggregated these by gender. The results are not entirely unexpected. More women respondents than men respondents indicated that they find balancing the demands of work and family a major barrier. The fact that more men than women indicated that they find it challenging to raise funds for large equipment may be explained by the dominance of men in equipment-intensive fields such as the natural sciences and engineering.

No significant differences were found as far as the challenges around political instability, lack of mentoring opportunities and lack of mobility opportunities are concerned. These are clearly gender-independent challenges that affect all African scientists.

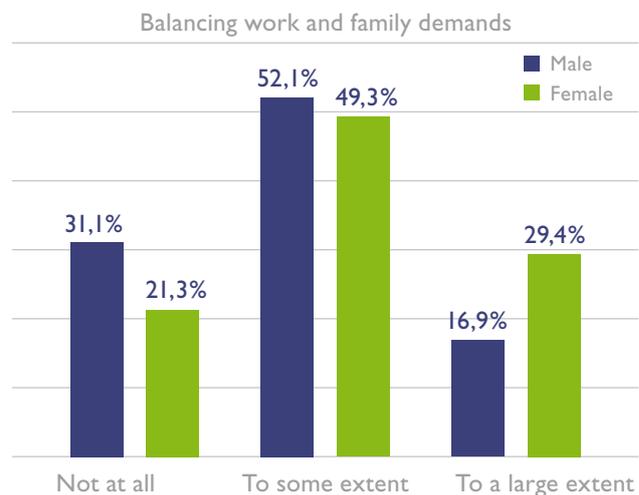
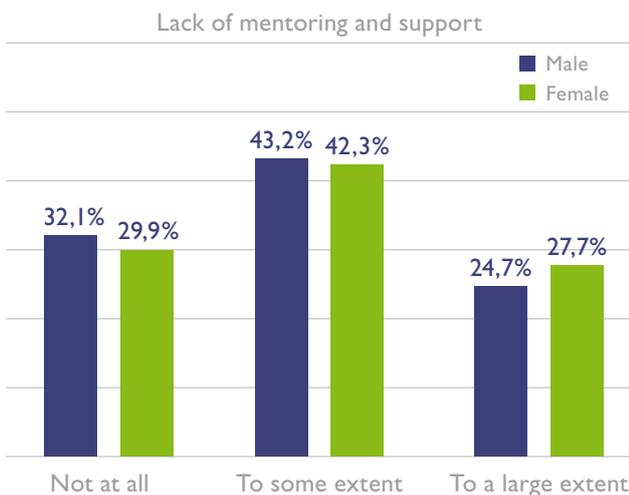


FIGURE 6: A SELECTION OF BARRIERS DISAGGREGATED BY GENDER

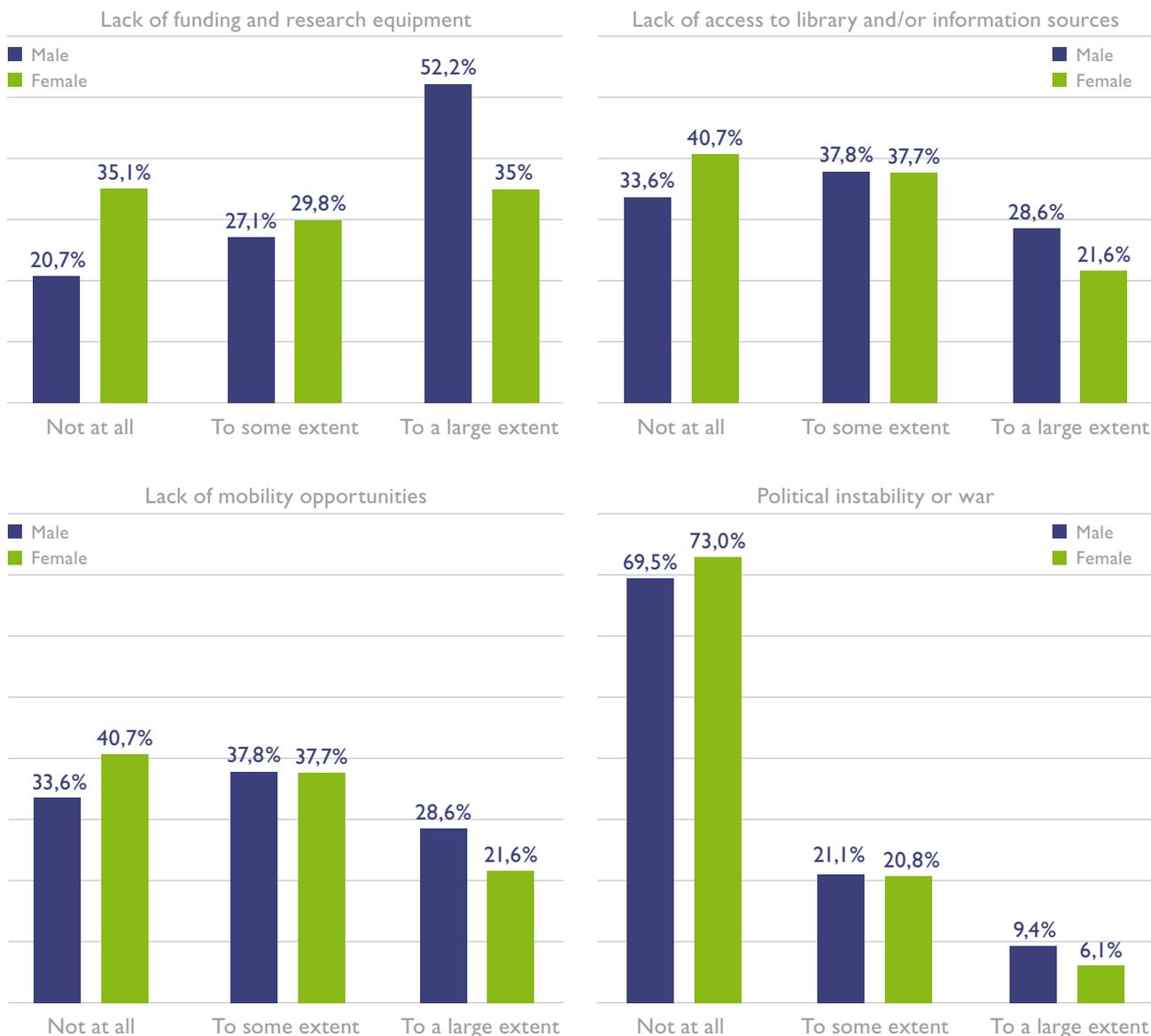


FIGURE 6 (CONT.): A SELECTION OF BARRIERS DISAGGREGATED BY GENDER

### Publication

**Contribution to peer-reviewed conference proceedings**

**In Ràfols, I., Molas-Gallart, J., Castro-Martínez, E. & Woolley, R. *Proceedings of the 21st international conference on science and technology indicators*. València: Editorial Universitat Politècnica de València**

Robinson-García, R., Cañibano, C., Woolley, R. & Costas, R. Scientific mobility of early-career researchers in Spain and the Netherlands through their publications. 644-652



### Focus area 3: Research evaluation: assessing the uptake, utilisation and impact of research

An important feature of contemporary science policy is the focus on governance through performance measures. The past three decades have seen increased interest worldwide in the uptake, use and impact of scientific research. This interest is fuelled by the new accountability regimes of public funders of science, as well as growing calls from civil society and the general public, for science that makes a difference. This has led to the development of new approaches to, and theories about, research uptake, and a resurgence of interest in previous theories (Weiss, Landry, Patton, Rich and others) on the use of research findings. The demand to demonstrate research impact at all levels (systemic, institutional and programme) of the science system has generated a new body of emerging scholarship on frameworks and methodologies to develop relevant and robust quantitative measures and qualitative approaches of social impact (including societal, economic and cultural impact). Research in this area focuses on making a contribution to this growing international body of knowledge, and specifically on developing case studies from the African continent.

#### Some thoughts on research impact and its (many) meanings

**Principal investigator: Dr N. Boshoff  
(CREST; scb@sun.ac.za)**

Is there some shared understanding of what is meant by the notion of “impact”? Maybe only in programme-evaluation studies, where impact assessments are typically designed with claims of attribution in mind, which places attribution at the centre of impact. Attribution means the extent to which observed changes in the long-term outcomes of a programme can be ascribed to the programme intervention. A range of mainly quantitative methods has been developed to do so (Leeuw & Vaessen, 2009). However, alternative methods of “impact” assessment in programme-evaluation studies also exist, and these are starting to separate impact from attribution. One such method is contribution analysis (Mayne, 2001), based on the belief that the assessment of complex programmes, at best, only allows for systematic analyses of contribution.

In many ways research can also be considered a complex endeavour. To provide one example: new research builds on previous research, which means that many research activities could lay claim to the same outcome. It is therefore not surprising that calls for the demonstration of contribution, as opposed to attribution, have surfaced in the evolving field of research impact assessment (RIA), especially in relation to the societal impact of research. Contribution analysis for RIA (Morton, 2015)

and contribution mapping (Kok & Schuit, 2012) are two examples. Although these approaches share many similarities, they have different disciplinary roots. The first is embedded in programme-evaluation studies, and the second in science studies, specifically actor network theory (ANT). The influence of ANT and the sociology of translation in RIA is also evident in the recent work of the French National Institute for Agricultural Research, which developed the so-called ASIRPA<sup>1</sup> approach to RIA. ASIRPA was inspired by a need “to develop new RIA approaches that go beyond traditional methods and are suited to the current interactions between research, innovation and society” (Matt *et al.*, 2017:208). Arguably, an RIA with a primary focus on interactions is much closer to a study of valorisation than it is to evaluation. A valorisation study typically investigates the processes, activities and networks that create impact (a learning approach), whereas evaluation mainly involves an assessment of the impact created (a judging approach).

SIAMPI<sup>2</sup> is another promising approach in RIA that prioritises the interactions between research and society, with a key focus on “productive interactions” (Spaapen & Van Drooge, 2011). According to SIAMPI, impact requires some “interaction” between a researcher and a stakeholder, which could be direct (e.g. meetings), indirect (e.g. publications) or financial interaction. An interaction is deemed “productive” when the stakeholder makes an effort to engage with the research, based on that interaction. Should the productive interaction lead to the stakeholder doing things differently, the research is said to have an impact (Molas-Gallart & Tang, 2011). This unconventional interpretation of impact brings the latter



<sup>1</sup> ASIRPA is the French acronym for “socio-economic analysis of the impacts of public agricultural research”.

<sup>2</sup> SIAMPI stands for “social impact assessment methods for research and funding instruments through the study of productive interactions between science and society”.



much closer to the world of the researcher and her/his research work, and includes effects which, traditionally, would not have been regarded as impact, but rather as instances of research uptake and use. Thus, the boundaries between uptake, use and impact are increasingly blurred when the interactions of researchers are prioritised as the foci of “impact” assessment. It is anticipated that impact will acquire even more alternative meanings, especially as new approaches to RIA emerge and the link with programme evaluation studies weakens and that with science studies (and other kinds of studies) grows.

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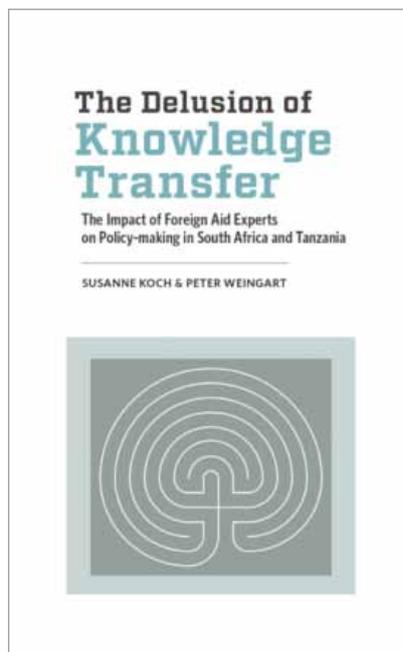
Matt, M., Gaunand, A., Joly, P.-B. & Colinet, L. 2017. Opening the black box of impact: ideal-type impact pathways in a public agricultural research organization. *Research Policy*, 46:207–218.

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Spaapen, J. & Van Drooge, L. 2011. Introducing “productive interactions” in social impact assessment. *Research Evaluation*, 20(3):211–218.



DR S. KOCH & PROF P. WEINGART

**The delusion of knowledge transfer: the impact of foreign aid experts on policy-making in South Africa and Tanzania**

**Authors: Dr S. Koch & Prof P. Weingart**  
**Publisher: African Minds**

With the rise of the “knowledge for development” paradigm, expert advice has become a prime instrument of foreign aid. At the same time, it has been the object of repeated criticism: several studies have documented the chronic failure of “technical assistance” – a notion under which advice is commonly subsumed – in terms of “capacitating” recipients. Nonetheless, international organisations continue to send advisors to developing countries, promising to increase the “effectiveness” of expert support by taking up the technocratic recommendations of evaluation reports.

The book “The delusion of knowledge transfer: the impact of foreign aid experts on policy-making in South Africa and Tanzania” does not provide another study of





this type. Instead, it reveals fundamental problems of expert advice in the context of aid that concern issues of power and legitimacy rather than merely flaws of implementation. Based on empirical evidence from South Africa and Tanzania, the authors show that aid-related advisory processes are inevitably obstructed by colliding interests, political pressures and hierarchical relations that impede knowledge transfer and mutual learning. As a result, recipient governments find themselves caught in a perpetual cycle of dependency, continuously advised by experts who convey the paradigms and agendas of their respective donor governments. For young democracies, the authors argue, the persistent presence of external actors in the policy space is hazardous: it opens up room for external interference and, ultimately, poses a threat to the legitimacy of governments if decision making becomes more responsive to foreign demands than to public preferences.

The authors carried out empirical research in three crucial policy fields, namely health, education and environment. Based on interviews with instrumental actors from governments and aid agencies, a questionnaire survey and a comprehensive body of text sources, the case studies from South Africa and Tanzania document the close involvement of foreign experts in policy processes, but also show that the extent to which they are able to shape agendas varies considerably between sectors and countries. The comparative analysis indicates that recipients' ability to defend their decision-making autonomy and retain control over the policy agendas primarily depends on three structural conditions: financial strength, administrative capacity, and the local knowledge base (i.e., science community) to which they can resort.

Building on an interdisciplinary framework grounded in the sociology of science, the theory of democracy and development studies, the monograph offers far-reaching findings and explanations why aid-related expert advice tends to keep young democracies in a status of dependence rather than making them self-reliant. Thereby, it contributes to the on-going debate about the impact of aid taking place both at the level of politics and in academia. The conclusions it presents are relevant for all those that negotiate, decide on, deliver, receive, finance, and evaluate development assistance. Thus, the book is an insightful manual for scholars, decision makers and practitioners alike.

## Publications

### Peer-reviewed articles

Larivière, V. & Costas, R. How many is too many? On the relationship between research productivity and impact. *PLOS ONE*, 11(9):e0162709

Tijssen, R.J.W. & Wong, P.K. Unravelling complexities of university-industry research interactions: the analytical power of case studies. *Research Evaluation*, 25(2):119–120

Tijssen, R.J.W., Yegros-Yegros, A. & Winnink, J.J. University–industry R&D linkage metrics: validity and applicability in world university rankings. *Scientometrics*, 109(2):677–696

Yegros-Yegros, A., Azagra-Caro, J.M., Lopez-Ferrer, M. & Tijssen, R.J.W. Do university–industry co-publication outputs correspond with university funding from firms? *Research Evaluation*, 25(2):136–150

### Contributions to peer-reviewed conference proceedings

**In Ràfols, I., Molas-Gallart, J., Castro-Martínez, E. & Woolley, R. *Proceedings of the 21st international conference on science and technology indicators*. València: Editorial Universitat Politècnica de València**

Azagra-Caro J.M., Tijssen, R.J.W., Yegros-Yegros, A. Measuring macro-level effects of the global economic recession on university-industry research cooperation. 213–212

Boshoff, N. & Esterhuysen, H. “Productive interactions” for societal impact: developing a research information system for agriculture (RIS-Agric) at Stellenbosch University, South Africa. 325–331



## Focus area 4: Science, technology and innovation studies

This focus area seeks to consolidate existing work conducted by the core partners of the CoE to expand the opportunities for critical studies on the role of science and technology (S&T) and innovation in society, the economy and in governance. This work is necessarily interdisciplinary, and includes consideration of social and cultural values, economic ideologies and government policies that influence the development and direction of S&T and innovation policies, and their implementation locally, regionally and globally. The objective is to develop analytical coverage of the entire spectrum of S&T and innovation activities, ranging from historiography to policy, practice and foresight, as well as impact and outcome studies.

This RFA provides critical analysis of the transformational and transactional processes determining the creation, dissemination, diffusion and utilisation of the results of R&D as part of S&T in advancing innovation. It concentrates on the roles of knowledge (including scientific, traditional and indigenous systems), governance and policy making and its implementation towards the realisation of local, regional and global social, economic and political objectives.

To achieve the objectives of this RFA, the research undertaken within it deals with fundamental problems in South Africa and in the developing world: diversity; inclusive and grassroots innovation; sustainable and equitable development; and then broadening its scope to include the development goals since 2015 and the contribution of South Africa to new indicators of development. While the primary focus is on South Africa, this RFA extends the work of SciSTIP to include other African, Asian and Latin American countries of the global South.

Research in South Africa is designed to build on the approach, adopted by the South African government, of a national system of innovation (NSI) and its use in reorganising its R&D competences. The NSI framework is widely used elsewhere and supports comparative analysis of innovation activities and innovation policy, as well as their implementation and evaluation, in South Africa and other countries.

Innovation is critically linked to economic growth but, as has been variously evinced, can have negative as well as positive consequences for society and politics. The interdisciplinary nature of this RFA addresses these issues and seeks to provide policy advice on managing the risk of negative outcomes. Some of this work was undertaken at the same time as the Organisation for Economic

Cooperation and Development (OECD) and the European Commission were revising the Oslo Manual, which governs (for measurement purposes) the definition of innovation and the collection and interpretation of data on the activity of innovation, as well as innovation activities, including R&D. The projects within this RFA are in a position to contribute to this work, adding to the international profile of SciSTIP.

While the projects are directly relevant to policy analysis in South Africa, the teams responsible have the experience and competence to deliver research of a high quality that in 2016 led to research papers and communications to the policy community and to the broader public.

### Operationalising inclusive innovation: a research programme

**Principal investigator: Dr S. Grobbelaar (CREST;  
ssgrobbelaar@sun.ac.za)**

Innovation for inclusive development (I4ID) refers to the improvement of living conditions and creation of employment opportunities for the poor through the development of new products, services, processes and business models aimed at resource-poor communities. The socio-economically marginalised should not only be seen as potential customers but also as co-creators, business partners and hence as “knowledge producers”. Conceptualisations of “inclusion” in the innovation process may include various knowledge-production processes, such as problem definition, processes of innovation, and the adoption or absorption of innovation outputs.

It is the goal of this research programme to investigate how I4ID may provide solutions to the lack of access to clean water, healthcare, financial services, electrical power, modern communications, and education. A broad range of case studies have been completed, with many of them specifically focusing on the role of universities in supporting I4ID, with highlights as described below.



The programme primarily involves students and staff from both CREST and the Department of Industrial Engineering at Stellenbosch University (SU). One of its initial projects, entitled “University-driven innovation for inclusive development”, also forms part of an ongoing project conducted as part of the Centre for Frugal Innovation in Africa, which itself involves an alliance between Leiden University, Delft University and Erasmus University. The SciSTIP-funded part of this larger-scale project entailed an exploration of the role of African universities in contributing to development processes. More specifically, the researchers examined the general nature of university-driven or university-supported activities with regard to inclusive technological innovations. The project involved 15 case studies from four universities in the Western Cape Province namely UCT, SU, Cape Peninsula University of Technology and UWC.

Through this research it has become clear that it is only through partnership, deep contextual knowledge and appropriate infrastructure that these case-study projects are likely to become sustainable. Most of the projects reviewed are ad-hoc in nature, and tend to depend heavily on a specific project champion within its respective university. The question remains: How do we ensure these kinds of projects are institutionalised and become more mainstream in the university system?

This question has prompted further work on developing and improving the evaluation of I4ID projects in order to advance methods for analysing and understanding outcomes and impacts achieved. As an example, Ms L. Botha was awarded a master’s degree for her thesis that presents a framework and tool to guide the evaluation of university-driven, technology-based, innovation-for-inclusive-development projects.

Also in 2016, a project was initiated on I4ID platforms and intermediaries. Here the focus is on hard and soft infrastructure, and the creation of spaces and places that are conducive for learning and collaborative problem-solving and experimentation. Earlier collaboration with staff at UFH (in particular Prof G. de Wet, the Dean of Research) resulted in two articles exploring the platform-development process. A number of master’s students were enrolled in 2016, whose thesis topics focus on agricultural and healthcare innovation platforms in the African context.

The researchers have therefore secured a strong foundation for developing this research programme into a mega-project that will allow an in-depth understanding of the role of innovation in inclusive growth development for all on the African continent. Their collaboration with private-sector partners has expanded, which is expected to provide even further momentum to their work. To this end, in 2016 the Health System Engineering and Innovation Hub at SU began supporting three staff members and 14 postgraduate (master’s and PhD) students with significant

grants and scholarships, with the objective of developing systems capacity for improving access to public healthcare on the African continent.

This programme produced an impressive volume of scholarly output in 2016:

#### Peer-reviewed articles

Grobbelaar, S. & De Wet, G. Exploring pathways towards an integrated development role: the University of Fort Hare. *South African Journal of Higher Education*, 30(1):162–187

Grobbelaar, S., Gwynne-Evans, N. & Brent, A.C. From enterprise development to inclusive innovation: a systemic instruments framework for regional innovation support. *African Journal of Science, Technology, Innovation and Development*, 8(2):233–246

Grobbelaar, S., Schiller, U. & De Wet, G. A university-supported inclusive innovation platform for sustainable scholarly community engagement at the University of Fort Hare. *Innovation and Development*, <http://dx.doi.org/10.1080/2157930X.2016.1252376>

Grobbelaar, S., Tijssen, R., Dijksterhuis, M. University-driven inclusive innovations in the Western Cape of South Africa: towards a research framework of innovation regimes. *African Journal of Science, Technology, Innovation and Development*, <http://dx.doi.org/10.1080/20421338.2016.1225549>.

Botha, L., Grobbelaar, S. & Bam, W. Towards a framework to guide the evaluation of inclusive innovation systems. *South African Journal of Industrial Engineering*, 27(3):64–78

#### Contributions to peer-reviewed conference proceedings

##### In Proceedings of the Portland International Center for Management of Engineering and Technology '16 Conference: Technology Management for Social Innovation

Van der Merwe, E. & Grobbelaar, S. A framework for evaluating inclusive innovation performance: the case of the eHealth innovation system in the Stellenbosch region, South Africa

Chutukuta, S. & Grobbelaar, S. Challenges to scaling inclusive innovations: four case studies from the Healthcare Sector in the Western Cape Province of South Africa

Grobbelaar, S. & Van der Merwe, E. Supporting inclusive innovation: Developing improved analytical methods and STI policy instruments to operationalise inclusive innovation

##### In Proceedings of the Fourth Annual System Dynamics Conference in South Africa

Bernardes, T.C.A., Maldonado, M.U. & Grobbelaar, S.S. Solar energy technology diffusion: a comparative study between South Africa and Brazil

Leusin, M.E., Grobbelaar, S.S & Maldonado, M.U. Wind energy technology diffusion: a comparative study between South Africa and Brazil





PROF. M. SCERRI

## The emergence of systems of innovation in south(ern) Africa: long histories and contemporary debates

**Editor: Prof M. Scerri**

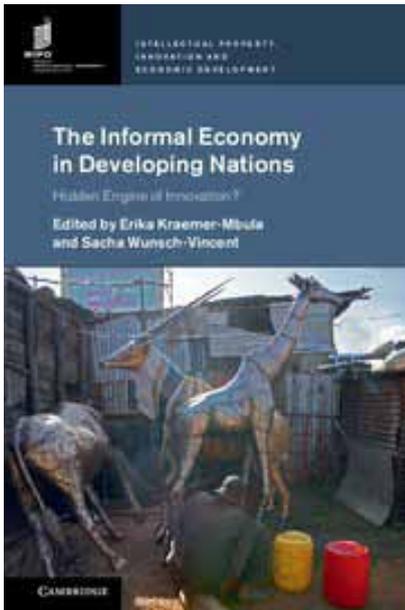
**Publisher: Mapungubwe Institute for Strategic Reflection**

The question addressed in this book is the existence, nature and the evolution of systems of innovation in

that part of the world which, considerably late in its long history, eventually formed into the Republic of South Africa. The time span covered in this book runs from the Early Stone Age to the present. The book is organised in two sections, the first concerning chronological history while the second addresses several critical aspects of the post-apartheid NSI.

The chapters by SciSTIP-affiliated authors are as follows:

Scerri, M.	The long history of innovation systems in South Africa
<b>Section 1: Histories</b>	
Pogue, T. & Scerri, M.	The colonial system of innovation
Scerri, M.	From Union to Apartheid
Maharajh, R.	The co-evolution of the South African national system of innovation (1948–2014)
<p><i>In this chapter the authors analyse the economic history of South Africa from the ascent to political power of the National Party in 1948 until inauguration of the fifth post-apartheid regime in 2014. Its coverage of the 66-year historical period focuses on the ideological framing of the doctrine of apartheid and its translation in a national system of exclusion and racial capitalism. This economic history is presented utilising an eight-stage periodisation. Each of these periods are described according to five vectors, namely (1) political economy; (2) ideology; (3) public management; (4) economic policy; and (5) science, technology and innovation (STI) strategies.</i></p>	
<b>Section 2: Thematic areas</b>	
Mphahlele, L. & Scerri, M.	The human factor in the evolution of the South African system of innovation
<p><i>In this chapter the authors explore various theoretical and ideological perspectives on the development of human capabilities and their engagement with the various levels of the NSI. The process of human capabilities development is seen as comprising the broad array of basic-needs provision, as well as formal education. Recommendations are drafted on the basis of this exploration, aimed at a broad human-capabilities-development policy which is appropriate for a viable NSI in South Africa. The main areas covered in this chapter are set within a human-capabilities approach and include a review of the education and skills landscape and infrastructure in South Africa, inherited from the apartheid government, and policies for human development and their stage of implementation.</i></p>	
Kraemer-Mbula, E. & Sehlapelo, D.	Measuring the South African national system of innovation
<p><i>In this chapter the authors discuss the current indicators of the NSI and propose measures to enhance STI indicators and other measures of innovation and competitiveness indicators, ensuring the inclusion of socio-economic innovations. It covers the history of R&amp;D and Innovation Surveys in South Africa, from the 1960s to 2012, provides a comparison of South African surveys with those carried out in the OECD and Latin America, carries out an assessment of the utilisation of innovation indicators in STI-policy formulation in South Africa and of the suitability of the current survey methodology for the South African NSI. In this last section the authors examine the suitability of current methodologies to measure innovation, in the context of the structural challenges and socio-economic reality of South Africa, as well as in connection to a broader understanding of innovation as a learning process.</i></p>	
Kraemer-Mbula, E.	Informal innovations and the South African innovation system
Scerri, M.	The regional setting of the South African system of innovation
Scerri, M & Maharajh, R.	The policy environment and policy options for the South African system of innovation
<p><i>In this concluding chapter the authors locate the evolution of the democratic South African NSI within the STI and economic planning framework of the broader political economy. They provide a critical reading of the assessments of the South African NSI by the OECD and the recommendations of the inter-ministerial committee on the reform of STI policy in South Africa. The authors conclude with an assessment of the National Development Plan in terms of its implications for the long-term viability of the South African NSI.</i></p>	



DRS E. KRAEMER-MBULA &amp; S. WUNSCH-VINCENT



## The informal economy in developing nations: hidden engine of innovation?

**Editors: Drs E. Kraemer-Mbula & S. Wunsch-Vincent**

**Publisher: Cambridge University Press**

The informal economy in Africa is of undeniable importance. It provides a source of income, employment and livelihood to a large portion of the population in many developing countries. Yet little is known about this hidden engine of innovation, as informality is a phenomenon with many facets that scholars and practitioners are still trying to unpack. Informality is tightly linked to exclusion, poverty and marginalisation. At the same time, many innovators in developing countries work informally, finding creative solutions to everyday problems.

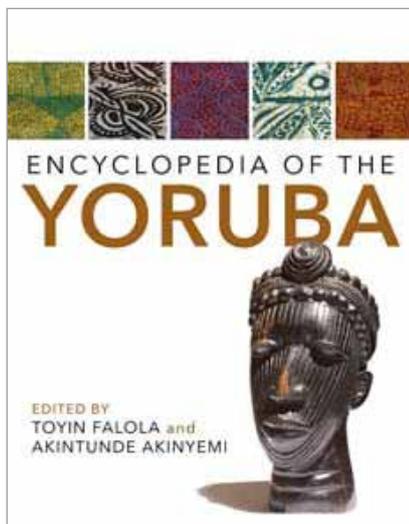
A central concern of this pioneering book is better to understand whether innovative solutions can be found in the informal economy, and whether such innovations can be promoted and supported in such a way that they lead to a more equitable scenario. In particular, the authors address the following crucial questions:

- What is the role of the informal sector in economic development?
- How does innovation occur in the informal economy? How does it spread, who are the key actors and what impact does it have?
- How do inventors and entrepreneurs in the informal economy reap benefits from their innovations? And what stops informal sector innovation from scaling up?
- How can informal sector innovation in developing countries be measured?
- What policies might support informal sector innovation and improve its impact?

The book starts with forewords by Dr P. Mjwara (Director-General: Department of Science and Technology [DG:DST]), and Prof B-A. Lundvall, and contains contributions from 22 experts. The chapters by SciSTIP-funded researchers are as follows:

Kraemer-Mbula, E. & Wunsch-Vincent, S.	Introduction
Kraemer-Mbula, E.	Informal manufacturing of home and personal care products in South Africa
Kraemer-Mbula, E. & Konte, A.	Innovation policy and the informal economy: toward a new policy framework
Charmes, J., Gault, F. & Wunsch-Vincent, S.	Formulating an agenda for the measurement of innovation in the informal economy

This book will stimulate further work on this crucial but under-researched subject. As well as rich empirical evidence from several ground-breaking studies in three African countries (South Africa, Kenya and Ghana), it includes conceptual and methodological tools and policy recommendations to help researchers and policy-makers understand innovation in the informal economy.



### Project: Regional diversity and inclusive systems of innovation

**Principal investigator: Dr S. Osha (IERI; oshaoo@tut.ac.za)**

The notion of indigenous knowledge systems is a key component of the SciSTIP-funded project on regional diversity and inclusive systems of innovation, and the focus of Dr S. Osha's collaboration in an encyclopaedia project commissioned by Indiana University Press and published in 2016. The project examined the Yoruba, a major ethnic group found in Nigeria, Benin, Togo and Sierra Leone in West Africa, and in various parts of the Americas, notably Colombia, Brazil, Cuba, Puerto Rico, Haiti, Trinidad and Tobago, as well as other countries. The project examined their history, language, culture, modes and levels of technological development, indigenous knowledge systems and precolonial social and political organisations. The significance of this project is that it provides a useful blueprint for undertaking a similar project in southern Africa by employing roughly the same methodological parameters.

Dr Osha's collaboration in the project produced a chapter in the encyclopaedia.

Osha, S. Fela Anikulapo-Kuti, in Falola, T. & Akinyemi, A. (eds.). *Encyclopedia of the Yoruba*. Bloomington, IN: Indiana University Press.

### Other publications

#### Peer-reviewed articles

Kahn, M.J. Mitigating South Africa's HIV epidemic: the interplay of social entrepreneurship and the innovation system. *Minerva*, 54(2):129–150

Lorenz, E., Lundvall, B.-A., Kraemer-Mbula, E. & Rasmussen, P. Work organisation, forms of employee learning and national systems of education and training. *European Journal of Education*, 51(2):154–175

Ndabeni, L., Rogerson, C.M. & Booyens, I. Innovation and local economic development policy in the global South: new South African perspectives. *Local Economy*, 31(1/2):299–311

Osha, S. Aspects of Ken Saro-Wiwa's Legacy. *Socialism and Democracy*, 30(3):106–118

Osha, S. Memories of the Ogoni Tragedy. *The Journal of International Relations, Peace Studies, and Development*, 2(1)

Osha, S. Rage against that good night. *Africa Review of Books / Revue Africaine des Livres*, 12(2):4–5.

#### Chapters in books

**In Adesida, O., Karuri-Sebina, G. & Resende-Santos, J. (eds.). *Innovation Africa: emerging hubs of entrepreneurship*. London: Emerald**

Comins, N. & Kraemer-Mbula, E. Innovation hubs in southern Africa. 37–98

**In Chaturvedi, S. (ed.). *Health, nature and quality of life: towards BRICS wellness index*. New Delhi: Research and Information System for Developing Countries**

Govender, R., Maharajh, R., Thulare, A. & Veriava, Y. Wellness and well-being research in South Africa. 27–40

**In Nyamnjoh, F.B. (ed.). *#Rhodes must fall: nibbling at resilient colonialism in South Africa*. Cameroon: Langaa Research and Publishing Common Initiative Group**

Osha, S. The image of Cecil John Rhodes.

Contribution to peer-reviewed conference proceedings

In United Nations @ 70 Proceedings Report. Tshwane: Institute for Global Dialogue and Friedrich Ebert Stiftung.

Maharajh, R. Reflections on the reform of the institutions of economic governance: time for transformation? 11–12



## Focus area 5: Communication in and of science

This focus area addresses two separate but related questions: how do scientists communicate with each other within the science system, and how do scientists communicate and engage with their publics? The first question addresses issues such as the nature of scientific and scholarly publishing, debates around open access and intellectual property (IP), as well as the sociology of scientific recognition and reputation (Merton, Latour and others). The second question is variously referred to as “science communication”, “science engagement”, the “advancement of science”, and so on. Related to the second question are also the long-standing debates around “scientific literacy” and “the public understanding of science and technology”. The importance of the advancement and promotion of science amongst its publics in South Africa has recently been re-affirmed through the approval of a new Science Engagement Framework by the Minister of Science and Technology in January 2015.

### Project: A study of scientific journal and book publishing in South Africa, 2005–2014

**Principal investigator: Prof J. Mouton (CREST; jm6@sun.ac.za)**

The last systematic studies of scientific journals and scholarly publishing in South Africa were done in 2006 and 2009 respectively. Both studies were done by CREST under commission from the Academy of Science of South Africa (ASSAf). However, both of these studies are now outdated. One reason for this has to do with the revision of the DHET Research Subsidy Framework in 2003 (which

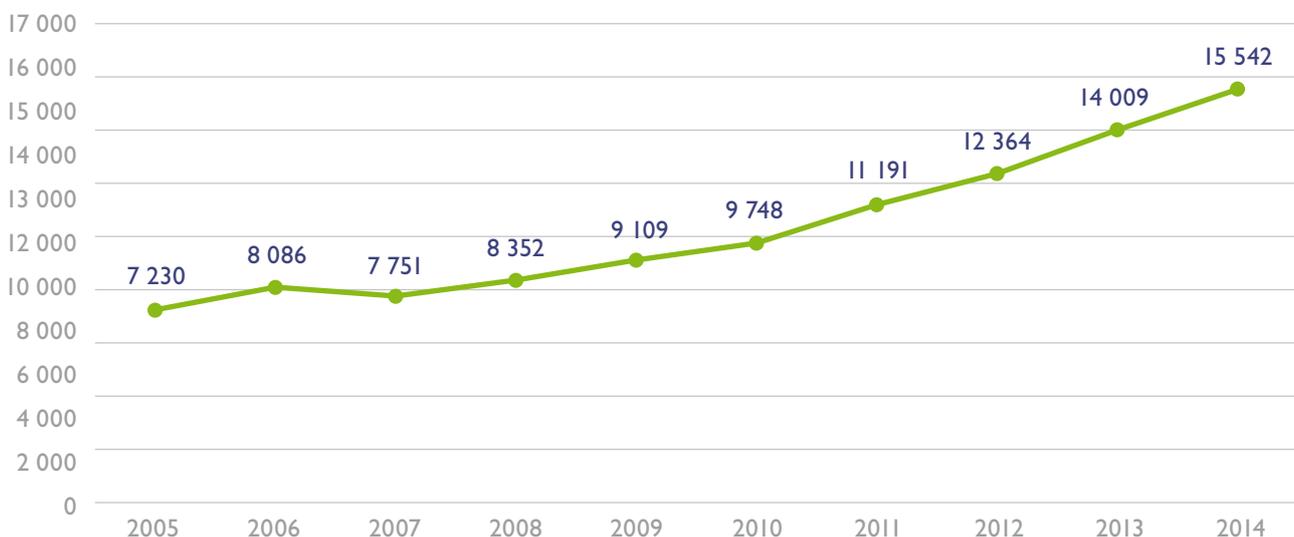
came into effect in 2005) as well as the more recently suggested additional revisions to the Framework. This framework is currently being implemented (with effect from 2017). As with the revision in 2003, we believe that these revisions will have far-reaching effects on scholarly publishing in South Africa. CREST was commissioned in 2015 to conduct a comprehensive review of the state of scholarly publishing in South Africa, for ASSAf. The final report was completed in December 2016 and submitted to ASSAf. In this section we present a brief extract of some of the high-level findings.

#### High-level trends in output of SA universities

Academics at South African universities are rewarded for publishing journal articles, books, book chapters and conference proceedings that are either accredited or recognised by the DHET. As far as journal articles are concerned, a subsidy is earned for publication in any journal included in the WoS database (Core Collection), the Proquest International Bibliography of Social Science (IBSS) and local South African journals accredited by the DHET.

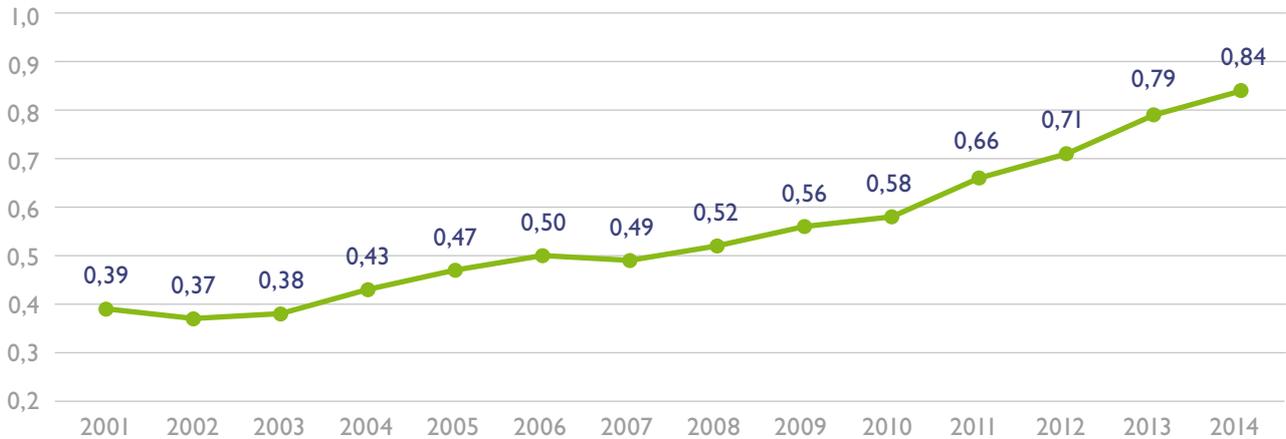
In Figure 7 we show that research output (all publication categories) over the past decade has increased twofold (from 7 230 in 2005 to 15 542 in 2014). This increase translates into an average annual growth rate for the past ten years of 8.8%.

At the same time that we witnessed this substantial growth in output, the human-resource base at South African universities has not grown commensurately. The average



**FIGURE 7:** TOTAL RESEARCH PUBLICATIONS PRODUCED BY SA UNIVERSITIES (1994 TO 2014)

DATA SOURCE: SAK, CREST



**FIGURE 8: PER CAPITA PUBLICATION UNITS AT SOUTH AFRICAN UNIVERSITIES**  
 DATA SOURCE: DHET

annual growth in headcount of academic staff for the same period has only increased by 2.9% per annum. This would suggest that the average academic or researcher at South African universities has increased their publication output. However, one should keep in mind that most universities have become very “strategic” in mobilising additional human resources to contribute to the overall research production. This would include the appointment of larger numbers of visiting and extraordinary professors, as well as post-doctoral fellows and graduate students, who now all contribute regularly to the output of a university. Nevertheless, it is still striking how the per capita research output has increased for the sector as a whole (see Figure 8).

**Distribution of journal articles by journal list**

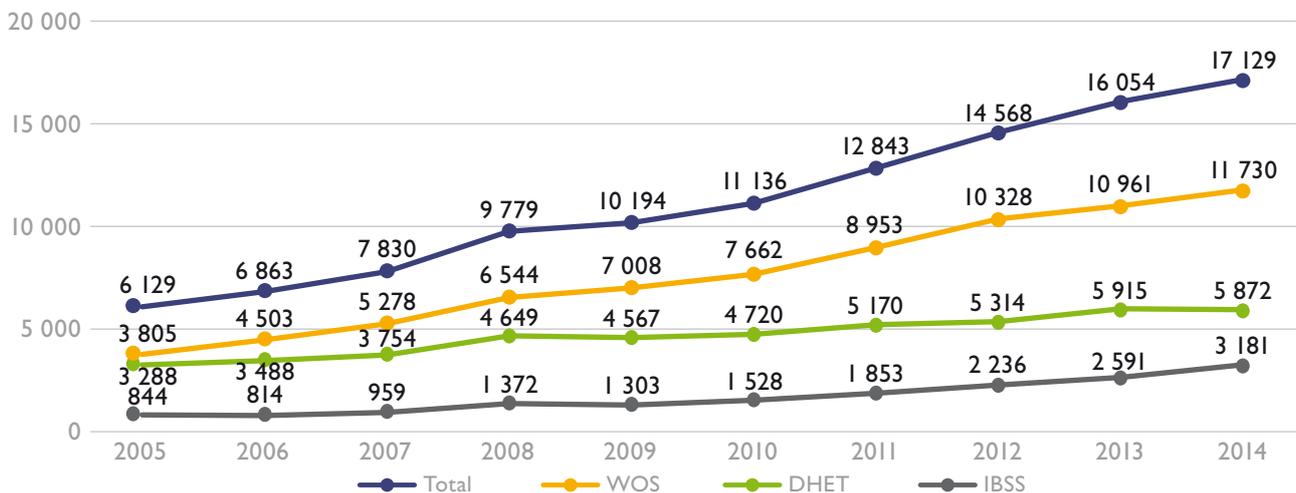
The 2003 DHET Funding Framework is built on three pillars of “accreditation” (or quality control):

1. The DHET recognises all journals listed in the WoS (Core Collection) for subsidy purposes. This means that any university academic who publishes in any of the more than 20 000 journals indexed in the WoS (formerly the

Institute for Scientific Information, or ISI) automatically qualifies for a subsidy. From the perspective of the DHET, this means that it “trusts” the judgment of the WoS in its inclusion of journals. There is a low “turnover” of journal titles in the WoS. Some journals are “de-accredited”, whilst new journals are added every year.

2. The DHET also recognises all journals listed in the ProQuest IBSS. The IBSS was added in 2003 palpably to ensure better coverage of the social sciences and humanities. The WoS has been consistently criticised for its meagre coverage of journals dealing with the humanities and social sciences. As is the case with the WoS, the DHET therefore also must trust ProQuest in its decision to include or exclude journal titles.
3. The DHET accredits South African journals for inclusion or exclusion for subsidy purposes. This is an ongoing process, as new journals can submit for “accreditation” to the DHET on an annual basis. If they are successful, they are added to the “DHET List”.

The distribution of papers by journal list by year is presented in Figure 9 below.



**FIGURE 9: DISTRIBUTION OF SOUTH AFRICAN JOURNAL ARTICLES BY JOURNAL LIST (FULL PAPER COUNT)**  
 DATA SOURCE: SAK, CREST



Journal title	Average annual no. of papers over the past 5 years	No. of articles, 2010–2014	No. of articles 2005–2014
PLOS ONE	192	960	996
AJPHRD: African Journal for Physical, Health Education, Recreation and Dance	191	957	1227
SAMJ: South African Medical Journal	135	674	1109
HTS Teologiese Studies/Theological Studies	126	631	998
Journal of Social Sciences	95	476	485
Acta Crystallographica Section E: Structure Reports Online	92	462	728
South African Journal of Higher Education/Suid-Afrikaanse Tydskrif vir Hoër Onderwys	89	445	798
African Journal of Business Management	83	413	438
Journal of Psychology in Africa	81	403	584
South African Journal of Science	80	401	875

### Distribution of journal articles by journal title

The South African HE sector produced 113 555 unique articles in the lists of accredited journals over the period 2005 to 2014. These articles appeared in 8 052 individual journals. However, this figure is somewhat misleading, as 50% of all the articles appeared in only 296 journals. An interesting finding from our study is the emergence of so-called “mega-journals”, i.e. those that publish very high volumes of papers annually. The table below lists the 10 high-volume journals (more than 80 papers on average per year) in which South African academics had published over the past decade.

Although the majority of these are high-quality journals, it is also unfortunately the case that two (*Journal of Social Sciences* and the *African Journal of Business Management*) are classified by us as probably predatory journals. Another two [*African Journal for Physical, Health Education, Recreation and Dance* (AJPHRD) and *Acta Crystallographica*] are journals that probably engage in questionable (unethical) publication practices. The journal that tops the list, PLOS ONE, is now one of the so-called “mega-journals” in the world. Although it is not generally seen as engaging in questionable publication practices, some scholars have criticised its editorial policies. The other journals in this list can be considered the “mega South African journals”: the *South African Medical Journal*, *HTS Teologiese Studies/Theological Studies*, *South African Journal of Higher Education*, the *Journal of Psychology in Africa* and the *South African Journal of Science*.

### Publications

#### Peer-reviewed article

Ndlovu, H., Joubert, M. & Boshoff, N. Public science communication in Africa: views and practices of academics at the National University of Science and Technology in Zimbabwe. *JCOM: Journal of Science Communication*, 15(6):A05

#### Chapter in book

Haustein, S., Bowman, T.D. & Costas, R. Interpreting “altmetrics”: viewing acts on social media through the lens of citation and social theories, in Sugimoto, C.R. (ed.). *Theories of informetrics and scholarly communication: a Festschrift in honor of Blaise Cronin*. Berlin: De Gruyter Mouton. 372–405

#### Contributions to peer-reviewed conference proceedings

In Ràfols, I., Molas-Gallart, J., Castro-Martínez, E. & Woolley, R. *Proceedings of the 21st international conference on science and technology indicators*. València: Editorial Universitat Politècnica de València

Costas, R., Perianes-Rodríguez, A. & Ruiz-Castillo, J. Currencies of science: discussing disciplinary “exchange rates” for citations and Mendeley readership. 1173–1182

Zahedi, Z.; Costas, R.; Larivière, V.; Haustein, S. What makes papers visible on social media? An analysis of various document characteristics. 1196–1198

## Other scholarly publications

On occasion SciSTIP-affiliated researchers produce scholarly outputs that are not directly related to projects funded by SciSTIP, and are therefore not reported above. However, because they do relate to the core mandate of the CoE, they are listed here, with the institutional affiliation of the SciSTIP researcher indicated in brackets:

### Peer-reviewed articles

Tijssen, R.J.W. & Winnink, J.J. Twenty-first century macro-trends in the institutional fabric of science: bibliometric monitoring and analysis. *Scientometrics*, 109:2181–2194 (CWTS)

Winnink, J.J., Tijssen, R.J.W. & Van Raan, A.F.J. Theory-changing breakthroughs in science: the impact of research teamwork on scientific discoveries. *Journal of the Association for Information Science and Technology*, 67(5):1210-1223 (CWTS)

### Chapter in book

Botha, J. Centres and institutes as academic organizational units, in Frick, L., Trafford, V. & Fourie-Malherbe, M. *Being scholarly: Festschrift in honour of the work of Eli M. Bitzer*. Stellenbosch: AFRICAN SUNMeDIA. 25-36 (CREST)

## PART TWO: Education and training

The contribution of SciSTIP to human-capacity building in 2016 involved a wide variety of means: a master's and doctoral degree programme in STS; providing supervisory and/or financial support to 41 students, various training and capacity-building activities, ranging from hosting training workshops to presenting, by invitation, individual workshops sessions and lectures, and advancement of students' research capacity through their involvement in research projects funded by SciSTIP.

## MPhil and PhD in Science and Technology Studies

### Student funding support, 2016

The table above provides information on all students, in terms of their funding support from SciSTIP and enrolled in 2016 at CREST for the STS degree programmes, other sources.

#### STUDENT FUNDING SUPPORT, 2016

Categories of funding		Number of students		Gender	
		MPhil	PhD	Female	Male
Fully funded	Full-time		4	3	1
	Part-time		1		1
Other scholarships	CREST, DRUSSA, SciCOM & YSA	15	9	14	10
Self-funded		5	7	6	6
<b>TOTAL</b>		<b>20</b>	<b>21</b>	<b>23</b>	<b>18</b>

### Graduates

CREST is proud that 10 MPhil and two PhD students graduated in 2016. We provide more information below.

#### MPhil



**Name** Grace Oluyemisi Akinola

**Supervisor** Dr S. Grobbelaar

#### Thesis title & summary

##### *Uptake of management research in the financial sector: the case of the Nigerian banking industry*

This study mapped the research requirements by the Nigerian banking sector; mapped and categorised existing research that had already been done by universities on this sector; and determined the most effective channels through which research requirements of the sector could be communicated to Nigerian universities, and those through which research findings of Nigerian universities could be communicated to the banking sector of the country. The study also examined the types of problems that make use of research in management of Nigerian universities in order to solve problems in the banking sector of the country; and how research collaboration between universities and the financial sector of the country could be improved. The latter was studied with the view to provide information on how stronger research partnerships may be forged between the university sector and banking-services companies in Nigeria. Primary and secondary data were sourced for this study, and the data collected were coded using an EpiData package, and analysed using descriptive statistics with a Stata package.



**Name** John Kofie Anoku

**Supervisor** Prof J. Mouton

#### Thesis title & summary

##### *Towards science utilisation: a survey analysis of the utilisation of research at the University of Ghana*

The main aim of the study was to conduct a survey among faculty members at the University of Ghana in order to investigate the issues around the utilisation of research that has been produced by faculty members. The study sought to explore the extent to which the research is utilised and by whom.



**Name** Daniel Atwine

**Supervisor** Prof J. Mouton

**Thesis title & summary**

***Research career aspirations: magnitude, predictors and perceptions of science-oriented undergraduate students at Mbarara University, Uganda***

The economic transformation process in Africa requires an increase in S&T capacity and a skilled workforce to undertake applied research, accelerate technology absorption, raise productivity and generate new competitive sectors or enterprises. Uganda falls short in terms of the quantity of such human resources needed for sustainable development. Generating university graduates with appropriate research skills and research aspirations is not only a direct indicator of effective knowledge transfer processes, but a vital output of the immense government investment through science students' sponsorships. Having research career aspirations (RCAs) is a proxy indicator of an individual's future involvement in STEM specialisation and R&D. The exploration of the aspect of RCAs among students at the point of completing university contributed to the understanding of the obvious discrepancy between the human-capital-development investment of the government and the low number of researchers actively involved in national R&D. In this study, the student established the proportion of science-based students with various forms of RCAs (i.e. beginning-of-university RCAs, end-of-university RCAs, gained RCAs and lost RCAs). He established the factors responsible for each of these types of RCAs, and the common information sources with regard to research careers among undergraduate science students completing their final year at university. He further explored the students' awareness, attitudes and perceptions towards research careers, and assessed the gaps in their research skills on completion of university education.



**Name** Annabella Basaza

**Supervisor** Dr N. Boshoff

**Thesis title & summary**

***Research collaboration in Uganda: a bibliometric profile***

In the 21st century, research systems are a vital area of interest in STI studies globally. This is attributed to the accelerated implementation of STI policy. The scientific research output and co-authorship patterns of Ugandan-affiliated researchers were investigated with an in-depth bibliometric analysis of the publications of researchers affiliated to Uganda that appeared in journals indexed by the WoS. All articles published between 1980 and 2013 were extracted and exported to a Microsoft Access database. A total of 7 134 unique articles were identified as belonging to Ugandan-affiliated researchers, and was used for the bibliometric analysis.



**Name** Beatrice Sakyibea Biney-Nyamekye

**Supervisor** Ms M. Joubert

**Thesis title & summary**

***Using social media to disseminate research findings among researchers and the public: views and practices from the University of Ghana***

In the midst of limited resources for research, an increasing number of funding agencies are demanding that research findings should be made accessible and that researchers should engage the public. The incorporation of social media into the research workflow may enhance the communication of research findings to the scholarly community and to the public, thus enhancing the possibility of research findings being taken up, and their relevance to society being enhanced. Despite the rising importance of social media and the possible benefits of helping universities to disseminate their findings in an open and timely manner, anecdotal evidence indicated that usage is limited among researchers at the University of Ghana. This study explored how academics at the university use and perceive social media as a channel (communication tool) to engage with the public and the scientific community, discovered factors that influence intention and use of social media, and examined the ethical issues relating to use of social media in public engagement and scholarly communication.



**Name** Jaco Franken

**Supervisor** Prof J. Botha

**Thesis title & summary**

***Doctoral education in the economic and management sciences in South Africa***

A great deal of attention has been directed at increasing the number of PhDs that are produced by the South African higher education system, with a specific focus on the science, engineering and technology disciplines. The national discussion of doctoral education is also framed within a broader international context, where a debate has been ongoing about the value of the PhD, both to recipients of the degree and also its potential contribution to society in general. In addition, authors have cautioned that we should not sacrifice quality for quantity in the drive to increase doctoral production. These discussions have stimulated several detailed research reports that characterise PhD production in South Africa, and have greatly contributed to understanding national systemic strengths and weaknesses with regards to doctoral education. The economic and management sciences (EMS), however, have not traditionally been recognised as research-intensive disciplines, and are mostly overlooked or underemphasised in the current consideration of research (and doctoral output) in the country. Considering that South Africa shares a developing socio-economic climate similar to that of the rest the continent, the potential value that PhD-level research projects and candidates in the EMS disciplines bring to the process cannot be overstated. It is therefore imperative to develop a clearer picture of the current standing of doctoral education within the EMS disciplines in order to provide a stronger foundation effectively to drive current and future management initiatives and policies. To move towards filling this gap, this study provided a descriptive profile of indicators to characterise PhD production in the EMS disciplines over the past two decades. In addition, qualitative interviews were used to provide deeper insight into the current viewpoints on the EMS doctorate.



**Name** Tracy Klarenbeek

**Supervisor** Dr N. Boshoff

**Thesis title & summary**

***Bibliometric profile of interdisciplinary health research at South African universities***

This study involved a bibliometric analysis of interdisciplinary health research in South Africa, based on an analysis of more than 38 000 publications in WoS, published between 1984 and 2013. Two indicators of interdisciplinarity were considered: the institutional affiliation of authors (health and non-health affiliations) and the subject-category classification of the journals in which the publications appeared (health and non-health subject categories). A third indicator, based on the degree of overlap between the other two indicators, was also considered.



**Name** Ernest Modibe Letsoalo

**Supervisor** Prof J. Botha

**Thesis title & summary**

***The scholarship of engagement in agricultural knowledge production and utilisation: a case study of the School of Agricultural and Environmental Sciences, University of Limpopo***

This study identified and described how the practice of an engaged scholarship by the School of Agricultural and Environmental Sciences (SAES) can contribute to agricultural knowledge production and utilisation. The purpose of the study was to identify and describe the characteristics of engaged scholarship as it is manifested in selected Zero Hunger research projects of the SAES. The objectives of the study were: (1) to describe the characteristics of an engaged scholarship, in particular the characteristics that differentiate it from other forms of scholarship, (2) to determine whether a selection of research projects of the SAES of UL meets the characteristics of engaged scholarship, (3) to explore the role that funders play in the determination of the type and nature of the SAES Zero Hunger research projects, and (4) to assess the contribution made by the SAES Zero Hunger research projects to agricultural knowledge production.



**Name** Similo Ngwenya

**Supervisor** Dr N. Boshoff

**Thesis title & summary**

***Valorisation of research by the Faculty of Applied Sciences at the National University of Science and Technology, Zimbabwe***

The study explored the nature and mechanisms of research valorisation at the Faculty of Applied Sciences at the National University of Science and Technology in Zimbabwe, with the aim of contributing towards the development of a valorisation map which can be applied in an African university context. A valorisation map provides a combination of quantitative and qualitative indicators used to illustrate and measure the pathway and mechanisms to ensure societally relevant research. To achieve the goal of the study, a preliminary valorisation map for the Faculty of Applied Sciences was constructed by using an example from the 4D valorisation model by Van Drooge *et al.* (2013). A bibliometric analysis, semi-structured interviews and analysis of documents were performed. The empirical data collected were then used to “populate” the map and its indicators, and to reflect on what a valorisation map for a faculty of science should look like in the African context. Possible indicators and data sources that could be of value in the assessment of valorisation of an African university context were identified. A combination of quantitative and qualitative indicators was used to develop a valorisation map. The study established that, although quantitative data can be converted to indicators rather “easily” (e.g. number of co-authored research articles or number of doctoral dissertations), qualitative information (e.g. interview data) is essential to contextualise the quantitative data and highlight their limitations. Furthermore, the study established that qualitative information generates the so-called indications (as opposed to indicators) of valorisation.



**Name** Eme T. Owoaje

**Supervisor** Dr N. Boshoff

**Thesis title & summary**

***Perceptions of researchers at the University of Ibadan about users’ utilisation of research results***

This thesis examined the University of Ibadan researchers’ perception of utilisation of their research findings by end users, using a web-based questionnaire survey. Two hundred and six researchers responded to the survey, and the findings indicated that the researchers engage in research utilisation activities, and most of them are committed to disseminating the findings of their research. The traditional academic modes of communicating research findings, such as articles in journals and conference presentations, are still predominant. Variations exist in the perceived levels of research utilisation across the faculty categories. The researchers in the humanities, social sciences and education are more likely to perceive higher levels of research utilisation by the end-users. Funding for research and institutional support are major determinants for effective research utilisation.

**PhD**



**Name** Harris Andoh

**Supervisor** Prof J. Mouton

**Dissertation title & summary**

***Uptake of doctoral research in the environmental and natural resource science at universities in Ghana***

The study evaluated the uptake of doctoral research conducted in Ghana between the years 2000 to 2015. The overarching aim of the study was to determine the uptake of PhD research conducted in Ghana from 2000 to 2015, and to address the environmental and natural resources challenges in Ghana, specifically as they relate to national-policy formulation and implementation. The study was a descriptive one which integrates different methods, including content analysis of completed theses, a CV-analysis of the authors, bibliometric studies of any publications that ensued from the doctoral theses, and finally in-depth interviews with key informants, such as university academics, students, and policy makers in this field.



**Name** Saahier Parker

**Supervisor** Prof J. Mouton

**Dissertation title & summary**

***Development of indicators for the measurement of South African public understanding of science***

South Africa has yet to develop a comprehensive assessment of the public's understanding of science. This is interestingly set against a backdrop of civic challenges driving the strategic goal at multiple levels of socio-economic transformation within South Africa. This dissertation involves the first systematic, demographically representative and linguistically diverse survey of the South African public's understanding of science. The research further provided insight into the current South African public's understanding of science, as well as an understanding of how varying demographic and socio-economic factors influence public understanding of science. The ultimate aim was to produce a set of reliable, appropriate and accurate indicators of the measurement of public understanding of science in the South African context.



PROF. J. MOUTON (CENTRE) WITH THE TWO PHD GRADUATES HE SUPERVISED: DRS H. ANDOH AND S. PARKER

## Currently enrolled students

A total of 41 (20 master's and 21 doctoral) students were registered in STS programmes at CREST during 2016. These students are conducting research for their theses or dissertations on the following topics.

### MPhil




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**Name** Moses Atanda Akanmu

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**Supervisor** Dr N. Boshoff

#### Thesis title & summary

***Comparative analysis of research productivity (1990–2013) at Obafemi Awolowo University, Ile-Ife, Nigeria: Web of Science versus Scopus***

There is no known study of the research productivity of Obafemi Awolowo University (OAU), Ile-Ife, Nigeria. The objective of this study is therefore to measure the research output of the university within a specific period (1990–2013), using two databases (WoS and Scopus), and also to determine the degree of overlap in database coverage. Relevant data were obtained by conducting searches in the address field of the online version of Scopus and in the raw data of the WoS database at CREST. The search criteria included the term “Nigeria” and different spelling variants of OAU. A more detailed comparison was conducted for the Faculty of Pharmacy at OAU. In addition to using Scopus and WoS data, the faculty staff also submitted their CVs, which were used to capture the details of articles published in journals not indexed by the two databases. The bibliometric analysis generated information on the research outputs of OAU in terms of numbers of journal publications, profiles of research productivity at the level of faculty and department, profiles of research collaboration (inter-faculty, national, regional and international), among others. It also highlighted differences in the bibliometric profiles of research at the Faculty of Pharmacy when publications listed in the CVs of academic staff are used together with WoS and Scopus data. Finally, although Scopus reported more OAU articles than WoS did, the difference in coverage did not always correspond to different interpretations of certain research patterns (e.g. rankings or collaboration profiles).

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**Name** Richard Bruce Lamptey

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**Supervisor** Dr N. Boshoff

#### Thesis title & summary

***University librarians in Ghana: patterns of and reasons for publication in academic journals***

This thesis investigates the rate of research publication output among academic librarians in Ghana from 2005 to 2015, using informatics techniques.

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**Name** Nico Gey van Pittius

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**Supervisor** Prof R. Tijssen & Prof J. Mouton

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**Thesis title**

***Determining discipline-specific parameters for the h-index of academics in medicine and health sciences in South Africa***

Various measures have been used over the years to try to measure individual scientific performance, for example by looking at the numbers of papers or citations. In 2005, a new measure for academic impact, namely the h-index, was developed, which generated great interest due to its simplicity and general robustness. However, as with any measure, it has its limitations, and the h-index has been criticised especially for its inability to take into account the publication and citation differences observed between different scientific disciplines (i.e. h-indices in the natural sciences are generally much higher than those in the social sciences and humanities, due to different referencing and co-authorship practices and publication outlets). The h-index is thought to be generally quite applicable as a tool to measure individual performance of researchers in the medical and health sciences. However, critics, especially from the more clinical disciplines with large clinical service loads, argue that even within the larger health sciences environment differences between discipline-specific publication and citation practices are large enough so that it needs to be taken into account when comparing h-indices of (bio)medical and health-sciences researchers ranging across diverse fields (such as, for example, gastroenterology, physiology and nursing). This study will aim to address whether discipline-specific differences exist between the different broader disciplines in medical and health sciences in South Africa and whether discipline-specific parameters can be determined for the h-index of top medical scientists in the country. The ultimate objective is to assess the analytical and evaluative potential of h-index-based measures as possible reference values, to compare the research performances of SU-based medical researchers relative to the South African context.

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**Name** Johann Hendricks

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**Supervisor** Prof J. Mouton

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**Thesis title & summary**

***Developing a typology of funding acknowledgements to SA publications in the Web of Science***

The aim of the study is to develop a new classification of types of funding acknowledgements, as captured in the WoS since 2009. The dataset for the study includes all South African-authored publications with populated funding acknowledgements (n = 6000+). This study is the first that provides a fine-grained classification (more than 30 categories) of the funding acknowledgements that authors list.

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**Name** Courage Logah

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**Supervisor** Prof R. Tijssen

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**Thesis title & summary**

***Improving knowledge/technology transfer in public universities in Ghana: a case study of university–industry collaborations at Kwame Nkrumah University of Science and Technology (KNUST)***

The study seeks to measure the knowledge and technology transfer (KTT) outputs from KNUST, and its effectiveness in addressing an identified information gap to help the university better understand the function and potential of KTT in the university. The argument is that, when public universities are more able to pursue and demonstrate such impacts, they are likely to attract more funding for research from a research-dependent industry, the wider business sector and development partners, whilst at the same time legitimating further investment in R&D from the government. In addition, universities enrich their teaching and capacity-building curricula with relevant frontier research, and provide empirical evidence for more responsive policies for societal development.

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**Name** Frank Mazibuko

**Supervisor** Dr N. Boshoff

**Thesis title & summary**

***The NRF International Bilateral Funding Programme: benefits to participating students***

Excellence in research and capacity development is a key imperative in achieving the aspiration to establish South Africa as a preferred destination for S&T investment in, and for, the continent, and to establish a globally competitive science system. The NRF is the South African research funding agency that is expected to contribute in several ways towards achieving this goal. Two of many NRF strategic, collaborative initiatives within Africa are those between Kenya and South Africa, and between Namibia and South Africa. They are aimed at improving synergies between these two countries and South Africa, for the purpose of supporting research and innovation, as well as developing the requisite human capacity on the continent, which is aligned with the evolving Africa Strategy that the Division International Cooperation and Resources at the DST is developing. A committed focus on inclusivity of geographical spread of participating South African institutions, diversity and equity among both the researchers and participating students, and a drive towards research excellence through joint panels, are areas of strategic output for South Africa. The governments of Kenya and South Africa, and of South Africa and Namibia, signed an agreement for cooperation in S&T in August 2004. The three countries have decided jointly to support researchers at public universities and public research institutes on an equal and mutually beneficial basis, in an effort to enhance scientific and technological cooperation between the respective countries. This study aims to investigate the benefit these collaborative initiatives has had for the participating students. The study also considers the long-term effects/impact as the result of participating in these initiatives.



**Name** Noxolo Moyake

**Supervisor** Ms M. Joubert

**Thesis title & summary**

***Benchmark mapping of science engagements in South Africa's national system for innovation***

This benchmark study notes that there are pockets of science engagement activities taking place in various entities of the NSI of South Africa, although it is not clear where these are happening, or in what format they are taking place, what their target audiences are, or where these audiences are situated geographically. The study also notes the plans by the DST to implement its Science Engagement Framework between 2015 and 2030, in which a number of actionable items have been identified, and a budget allocated for their execution. It is therefore important that we have a baseline to work from as we move towards 2030, so that we can understand what the current situation is, in order to have something to measure performance against in 2030. The study will cover science councils and their subsidiaries, science centres (including museums and planetariums) government departments, science policy organisations and six research universities in South Africa. The study will also, although to a limited extent, consider how these organisations fund engagements, and whether the funding is internally or externally sourced, so that we can understand what the financial challenges and opportunities are.



**Name** Thirumeni Naidoo-Swettenham

**Supervisor** Prof J. Mouton

**Thesis title & summary**

***Understanding the enabling factors, instruments and role of the intermediary in supporting innovation: case studies from southern Africa***

Developing countries or emerging economies in southern Africa have embraced the need to transform into knowledge economies, and have put in place measures to develop and advance their innovation systems. This is further emphasised and motivated by national, regional and continental strategies to support these intentions. But how is this demonstrated in practice? Despite the political will, policy environment and resourcing provided by public-sector and overseas development assistance in this sector, why are there still challenges with regard to developing, supporting and strengthening innovation ecosystems in developing countries? The focus of this study is to examine the role that innovation intermediaries play in the national innovation ecosystem, and how these organisations enable, influence and implement processes or activities to support innovation ecosystems. While it is acknowledged that networking, as well as intra-institutional and inter-institutional collaboration, are mechanisms needed to advance innovation effectively, there has been a lack of practical examples where this has been demonstrated, or insufficient attempts have been made to document how this works in a practical context. By adopting a case study methodology, the study examines the effectiveness of instruments in supporting networking, capacity building and regional collaboration, and the key role of innovation intermediaries and their interactions with each other in advancing an enabling environment conducive to innovation-ecosystem development. Moreover, the study also examines how leadership, both at decision-making levels and at implementation level, is often overlooked in making innovation work; and also highlights challenges that still exist in innovation-ecosystem development.



**Name** Pfungwa Nyamukachi

**Supervisor** Prof J. Mouton

**Thesis title & summary**

***The influence of three major funding organisations in Africa: An analysis of the NIH, the Wellcome Trust and the Bill and Melinda Gates Foundation***

This study will focus on the role and influence of three major international funding agencies on scientific production in Africa. Data from the recent YSA survey will be linked to grant data from these funding agencies to develop a fine-grained picture of how such funding influences the production of science in different countries and different scientific fields.



**Name** Puleng Tshitlho

**Supervisor** Dr N. Boshoff

**Thesis title & summary**

***Demographic factors associated with the contribution of researchers to collaborative research output: A study of South African researchers***

Puleng’s study is concerned with two questions: what contributions do researchers make to co-authored articles, and how do these contributions vary according to certain demographic variables? The relevant demographic variables are gender, population group and age. The data source is the list of articles specified in the NRF database of researchers. Apart from having to specify their demographics, NRF funded researchers must also state, for any article in the database, the unique contribution made to that article. The different contributions have been classified in a number of themes and these themes are now being related to the selected demographics, as well as to the number of authors per article, among others.

## PhD



<b>Name</b>	Vincent A. Ankamah-Lomotey
<b>Supervisors</b>	Prof J. Mouton & Dr S. Grobbelaar

**Dissertation title & summary*****Research uptake management: A strategic framework for institutionalising research uptake at KNUST***

Academic and research institutions have a mandate to conduct research that will advance knowledge in S&T to affect socio-economic development positively, both locally and nationally. A key challenge, however, is how to translate research into policy and practice. The need to address the lack of mechanisms, policies and capacity, both individually and institutionally, for the management of research uptake, necessitated this study. The study aims to address the problem of research uptake and utilisation by designing a policy framework for institutionalising research uptake at KNUST, a university in Ghana. The framework seeks to provide guidelines with general applicability.



<b>Name</b>	Name	Supervisors
<b>Supervisors</b>	Tracy Bailey	Prof J. Mouton & N. Cloete

**Dissertation title & summary*****The provision and influence of evidence-based policy advice in the science sector in South Africa: a case study of the National Advisory Council on Innovation***

This study takes as its point of departure the growing emphasis internationally, since the early 1990s, on the provision of scientific or evidence-based policy advice to governments. The study investigates this phenomenon in the South African science policy context through the lens of a semi-autonomous government advisory body, the National Advisory Council on Innovation (NACI), which is mandated to provide evidence-based policy advice to the Minister of Science and Technology. The study explores the origins, mandate and operation of NACI, and traces shifts and developments in its institutional design and advice formulation over time. The study will also explore in greater depth two or three instances of policy advice provision by NACI, with a view to identifying the factors impacting on the formulation of the advice, as well as use (or non-use) of this advice by the Minister.



<b>Name</b>	Name	Supervisors
<b>Supervisors</b>	Isabel Basson	Dr H. Prozesky & Prof J. Mouton

**Dissertation title & summary*****Investigating the open access citation advantage: citation analysis of South African academic research articles.***

Open access to research is considered to be a public good, beneficial to the South African science system, and is thought to increase visibility to research. However, it would be misleading to espouse these benefits if they have not been investigated empirically. This dissertation investigates one of these benefits, i.e. that publishing in open access journals increases the visibility of those research articles amongst academic audiences. This is investigated through a citation analysis focused on South African co-authored articles. Citation trends, especially of articles published in open access journals, are influenced by a variety of complex factors which are poorly understood and differ significantly between research areas. To understand open access scholarly publishing in South Africa, it is insufficient to merely investigate the effort that the science system in the country invests in open access. Knowing the publication and usage patterns of open access articles across research areas is required as well. This study will contribute to a better understanding of the publication and citation trends in those research areas in which South African authors publish in open access journals in general, and for South African authored articles specifically. The aims of this dissertation are therefore to identify the research areas in South Africa that are participating in open access publication through open access journals, and to determine whether publishing in these open access journals provide a citation benefit for South African research. These aims are pursued by examining the citation profiles of the articles within these subject areas, across WoS, for the journals (open access and not) in which South African authors publish, and for the articles by South African authors themselves, over the period 2005–2011.



**Name** Nico Elema

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**Supervisors** Profs J. Mouton & E. Cloete

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**Dissertation title & summary**

***Scientrometric analysis of water resource research in the southern African region***

This dissertation involves a case study of knowledge production and policy-impact assessment resulting from the Water Research Fund for southern Africa. With increasing demand from various stakeholders, research programmes should place a strong emphasis on the results and impact achieved through research undertaken. Within the African and specifically the Southern African Development Community (SADC) region, various programmes are currently underway to address the scientific research needs within the water sector. The question now arises: What has been the impact, if any, of such high-level research in the SADC water sector? The aim of the study is develop a theoretical framework against which research impact could be evaluated. Research impact would include scientific, policy, economic, ecological and social impacts, as they further relate to the research process. Moreover, high-level research undertaken during the implementation phases of the Water Research Fund for southern Africa programme between 1999 and 2006 will be assessed, based on the theoretical framework.

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**Name** Harrie Esterhuyse

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**Supervisors** Dr N. Boshoff & Prof J. Mouton

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**Dissertation title & summary**

***Understanding the societal impact of research through productive interactions and realistic theory-based evaluation: selected cases of agricultural research in South Africa***

Researchers are increasingly expected to be responsive to, and undertake research that engages with, the current needs of society. Measures of the societal impact of research have come to be seen as important considerations in research evaluation, yet understanding what societal impact of research is or how to measure it remains a challenge. This study makes use of a promising new approach (the SIAMPI approach) to understanding societal impact, and investigates the “productive interactions” that occur between researchers, their research and society. The aim of this approach is to identify the interactions that originate from research that have an effect on society (productive interactions). These productive interactions potentially project societal impact. Productive interactions, however, do not provide a quantifiable result. Productive interactions are any identifiable effects on society: positive or negative, small or large. This makes them more useful in research aimed at understanding impact, than for evaluation where value judgements of impact are required. The student proposes to bring together the research approach of SIAMPI as a method with the evaluation approach of realist theory-based evaluation. The novel combination of research and evaluation will allow for the identification of productive interactions, in addition to establishing their value through outcome criteria established through realistic theory-based evaluation. The study focusses on agricultural research projects in South Africa.

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**Name** Fiona Farquharson

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**Supervisor** Dr H. Prozesky

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**Dissertation title & summary**

***“Dropping out” or “moving on”? Factors contributing to the voluntary exiting of women scientists from public higher-education institutions in South Africa***

The aim of this qualitative study is to investigate why productive women scientists at public HEIs in South Africa are choosing voluntarily to exit their academic careers, for reasons other than retirement. This phenomenon, known as “the leaky pipeline”, has been well researched elsewhere in the world, as have the related themes of faculty turnover, departure and retention. However, very little is known in South Africa about why women in particular are exiting their academic careers. In the main, existing studies have focused on research productivity, barriers to progression, and factors contributing towards career success. This dissertation aims to make a contribution by drawing on developmental career theory, and adopting a “systems” contextual approach to develop a theoretical model of the “push” and “pull” factors influencing the departure of women from their academic careers, and to provide empirically based recommendations to enhance their retention in the academic workforce. These two research aims are pursued by exploring the career narratives of 22 women who exited their academic careers from public HEIs in South Africa between January 2000 and December 2013. The data were collected by conducting in-depth, in-person interviews during the period 2013–2015. A variety of analytical constructs, drawn from the sub-field of career psychology, will be employed. Curriculum vitae analysis is used as a secondary source of descriptive data about the participants, for contextualisation purposes.

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**Name** Tania Holmes-Watts

**Supervisor** Prof J. Botha

**Dissertation title & summary**

***A comparative multi-level investigation into research productivity of South African academics in different university contexts: an interpretivist approach***

Internationally, the importance of knowledge production, particularly its benefit to national development, is emphasised, and the important role that HEIs play in this process is evident. However, the differences in research productivity (as depicted in the research-output figures of the DHET) among HEIs in South Africa are evident, especially the contrast between previously advantaged and disadvantaged institutions. Also, the literature has shown that explanations for the painfully slow transformation at HEIs have not moved beyond the historical, structural inequities of the apartheid past of South Africa. The literature is supported theoretically by the construct of isomorphic tendencies and the accumulative advantage theory that stipulates that “the rich get richer and the poor get poorer”. While these inequities cannot be ignored, the current body of literature lacks a holistic, comprehensive understanding of research-output trajectories at South African universities with different historical backgrounds and contexts, as in the case of SU, UWC and UFH. Such insight is highly significant when strategising to build the next generation of researchers from a local base. This study aims to determine how the research-output trajectories at three South African universities with different historical backgrounds and contexts can be understood through an identification of the necessary and sufficient conditions required for research progression at any institution of higher learning.



**Name** Marina Joubert

**Supervisor** Prof P. Weingart

**Dissertation title & summary**

***From ivory tower to public arena: an investigation into the factors motivating South African researchers to engage public audiences***

This student’s PhD research explores the question: what factors influence whether, why and how researchers engage with public audiences? The student is interested in documenting the communication experiences of scientists and, in the process, to understand what motivates scientists to step out of their offices and laboratories to interact with society, directly or via a range of media channels. The student is exploring the incentives and rewards that sustain the public communication of scientists about their work, but also the barriers that constrain their involvement in this regard. In her research, the student uses notions and concepts from behavioural psychology (that help us to understand what drives human behaviour), and also draw from communication science and sociology of science. She is particularly fascinated by highly visible scientists for whom public engagement is a core element of their research careers. She is therefore interviewing such publicly visible scientists, identified by a panel of science journalists and media researchers, for this research.



**Name** Samuel Wanjohi Kiiru

**Supervisor** Prof J. Mouton

**Dissertation title & summary**

***Knowledge production, transfer and utilisation in agriculture: a case study of three public universities in Kenya***

The study is anchored within the broad field of research utilisation or uptake. As such, the study is premised on the expectation that, for countries such as Kenya to become knowledge economies, there is a need for universities to produce knowledge that informs practice and policy. In other words, the study considers the link between higher education (especially universities) and development, particularly agricultural-based activities at the national, regional or local levels, in an attempt to shed light on the relevance of universities in agricultural economies: a category that is well suited to most African countries. By so doing, the study aims to answer the question: what is the role of university research and innovations in agricultural development in Kenya? Of particular concern to the student therefore, are issues around research and innovation in public universities, and whether and how these benefit agricultural communities in development or in navigating their way out of poverty. Thus, the study investigates the links between universities as producers of scientific knowledge, and communities as users of research knowledge in agriculture. To this end, the study considers the factors that drive the utilisation of agricultural research knowledge (in three public universities in Kenya) to inform practice or policy making, and whether the utilisation of such knowledge has had an effect on community livelihoods at the point of utilisation.



**Name** Phyllis Kalele

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**Supervisors** Prof J. Mouton & Dr H. Prozesky

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**Dissertation title & summary**

***Factors influencing the research productivity of young women scientists in Africa and its impact on their career advancement***

This study is part of a multinational project that is a joint initiative between CREST at SU, and the Polytechnique Montréal. It is co-funded by the International Development Research Centre (IDRC) in Canada and the Robert Bosch Stiftung in Germany. The multinational project investigates the factors influencing research performance and career development of young scientists in Botswana, Ethiopia, Ghana, Kenya, Malawi, Nigeria, South Africa, Tanzania, Uganda, Zambia and Zimbabwe. This multinational project follows in the footsteps of the Global Young Academy's study, The Global State of Young Scientists, led by Prof C. Beaudry, which culminated in a report published in 2014 (Beaudry & Friesenhahn, 2014). In the light of the results of that study, which identified some of the concerns of young researchers globally, there was recognition of a need for gaining more in-depth knowledge on young researchers in certain regions, in order to impact their career progress in those regions positively. The purpose of this study is to investigate the factors that both constrain and enhance the research performance and career advancement of women early-career scientists in eleven African countries. Comparable studies on young scientists' careers and working environments are sparse in general, especially in Africa. The results of the study will ultimately provide information that will ensure engagement and initiatives undertaken by higher-education stakeholders to support young women scientists are approached from a well-informed point of view.

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**Name** Agnes Lutomiah

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**Supervisor** Prof J. Mouton

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**Dissertation title & summary**

***Assessment of research performance and scientific capabilities within the Kenyan science system***

Reviews of national science systems are increasingly important for research-performing and -funding institutions. Scientometric assessment results enable research-funding and -performing organisations to make informed decisions on funding allocations, research-priority setting and alignment of goals in a national innovation system. The recent reforms in the governance and management of science, new public management, call for accountability of taxpayers' funds invested in research, as well as the outputs. Accountability is associated with performativity metrics. This scientometric study aims to understand and assess the state of science in Kenya by analysing the current and recent historical research-performance and scientific capabilities of Kenyan scientific institutions. Specifically, the study aims to answer the question: what are the strengths and weaknesses of the research performance of the Kenyan research institutions? Using scientometric methodologies, this study will assess the significant trends and patterns in the research performance of the entire Kenyan science system. Therefore, this analysis will be focused on the research performance of the major scientific institutions and scientists of the research system: HEIs, the government research institutes, and non-governmental research institutes, including international research organisations. The major elements on which the scientometric analysis focuses include: R&D, publication output, citations by institutions and for the country, co-authorships, thematic fields, and trends in research funding. The trends and patterns identified in the research system will enable the Kenyan science institutions to identify their strengths and weaknesses, and inform new strategies on how to address the latter.

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**Name** Corlia Meyer

**Supervisor** Prof P. Weingart

**Dissertation title & summary**

***Public perception and understanding of environmental challenges: determining the influencing factors***

This dissertation seeks to determine the perceptions and understanding of environmental issues by the population of a region in a developing country: the Western Cape, South Africa. It relies on the conceptual model originating from the environmental-behaviour literature, which relies primarily on socio-demographic factors to predict how the South African public perceives the natural environment. The study intends to explore the effect of socio-demographic variables and sources of environmental news on the development and formation of environmental perceptions. The assumption is that environmental communication in the media, socio-demographic variables, and the environment itself, contribute to people's perception about the environment. These perceptions are a point of access for environmental-behaviour change through the changing of attitudes. Policies should be formed with perceptions and communication sources in mind, with the aim to create pro-environmental behaviour in citizens.



**Name** Monica Morrison

**Supervisor** Dr N. Boshoff

**Dissertation title & summary**

***Communicating biodiversity: The uptake of wildlife survey data in northern Botswana***

The decline of wildlife populations in southern Africa threatens livelihoods and the biodiversity of the region. This study seeks to understand why research on wildlife in northern Botswana has not led to action that would slow down the decline. The student is studying how the people who manage wildlife in northern Botswana create, share and use wildlife research data. She is considering methods and tools scientists use to share the results of their work with other scientists. If these scholarly communication tools can be transformed, they might render the research results easier for non-scientists to understand and use in their policies and work.



**Name** Felicitas N. Moyo

**Supervisor** Prof J. Mouton

**Dissertation title & summary**

***The state of social science research for policy utilisation in Zambia***

This is a study of the utilisation of research that has been produced by academic staff at the three public universities in Zambia (the University of Zambia, Copperbelt University and Mulungushi University) to investigate whether any studies have been utilised by policy makers. The objectives of the study are to generate an overview of the perceived level of research uptake and utilisation at these universities, and to obtain information about their dissemination strategies and extent of collaboration with stakeholders. In order to achieve these objectives, the study will first provide a historical literature review of the three universities, the history of social science in Zambia, and the challenges that the universities may have encountered that could possibly have inhibited the utilisation of social science. Solutions to these challenges, if any, will also be discussed. Furthermore, the study will involve a survey to elicit information about the dissemination strategies these researchers use. After the survey, interviews will be conducted to highlight case studies of research projects, the findings of which have been utilised by policy makers. A bibliometric analysis emanating from a database of Zambian journal publications and from WoS and Scopus that the student has created, will be used to conduct a comparative study on the research carried out by social scientists and natural scientists. This is intended to provide comparison between the two fields of science in terms of research utilisation, dissemination strategies and collaborations.



**Name** Dorothy Ngila

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**Supervisors** Dr N. Boshoff & Prof J. Mouton

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**Dissertation title & summary**

***African academies of science as health science advisers: the case of Nigeria, South Africa and Uganda***

The study seeks to investigate the role and nature of science academies as scientific advisory bodies. It includes consideration of the uptake of the results of such advisory activities, specifically pertaining to the field of health in the policy-making process. The study will focus on three academies in Africa – the Nigerian Academy of Science, ASSAf and the Uganda National Academy of Sciences. The objectives of the study are to describe and understand the different types, roles and structures of academies of science (by discussing examples of different models of science academies), to investigate and compare the institutional advisory models used by the academies of science in Uganda, Nigeria and South Africa in the provision of health-science advice to their governments, to investigate the uptake of science advice by the science academies of Uganda, Nigeria and South Africa in health-policy making in these countries, and to provide recommendations on the future role of African science academies as science advisers. The study will follow a qualitative approach, with the embedded case study adopted as research design.

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**Name** Mhitshane Reetsang

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**Supervisor** Dr N. Boshoff

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**Dissertation title & summary**

***The influence of research on national policy: the case of the University of Botswana***

The influence of research on national policy is an issue of debate globally. From the late 1970s and early 1980s (a golden age of research on impact evaluation) studies have been conducted on the move from research to policy. Several scholars conducted large-scale surveys to test how research and evaluation findings were used by intended users, as a call to action for researchers and policy makers to address the “gap” between research and its uptake in policy development. Differences in style and culture between researchers and decision-makers give a strong impression that there is a tension between them, which results in serious misunderstanding and lost opportunities. This could be the result of differences in values and ideologies that prevail between researchers and research users. Research has revealed that policy is determined as much by the decision-making context, including economic, political and cultural forces, as by research evidence. While policymakers’ perceptions of research form an important part of this story, it is argued that researchers should also try to understand policymakers’ needs and the environment that they work in, to be able to assist them effectively in addressing issues related to research and its use. Policymaking follows a logic that is different from that of the scientific enterprise and, given the complexity of the research process, researchers should pay attention the “real-life” context in which policymakers situate their decision-making. Such mutual understanding will enable the facilitators of, and the barriers to, research to emerge and be addressed accordingly, to manage the uptake of research.

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**Name** Jacques Stofberg

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**Supervisor** Prof J. Mouton

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**Dissertation title & summary**

***Commercialising intellectual property emanating from universities in the Western Cape Province of South Africa***

The purpose of the study is to gain a better understanding of the concept of IP in general, and the importance of effective commercialisation for universities in South Africa through cases studies of the four universities located in the Western Cape Province. The motivation to undertake the study, and the primary focus of the research results, are that the findings should be used to improve technology-transfer practices at South African universities, as valuable IP assets can then be commercialised for the public good by these universities. The commercialisation of IP rights requires greater understanding of the issues involved in legal protection, and the ability of IP rights to add considerable value to its users. It is hoped that this study will lead to better co-operation and increased disclosure amongst university academic staff, and between academic staff and other research institutions within geographical regions. If academic staff members co-operate and disclose their findings, they can both contribute to, and benefit from, the enormous growth potential of the knowledge society.

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**Name** Milandr  van Lill

**Supervisor** Prof J. Mouton

**Dissertation title & summary**

***A study of the doctoral pipeline: case studies of doctoral education in selected disciplines at South African universities***

An important factor in the study of doctoral success is discipline or field of study. A large body of scholarship on disciplinary differences, and the consequential differences in departmental, faculty and cultural habitus, highlights the importance of acknowledging disciplinary differences in studying tertiary education. The scholarship on doctoral education in South Africa, however, is limited to general factors that affect the successful completion of a doctorate, with very little reference to disciplinary differences. This thesis will aim to fill this gap through an in-depth analysis of the differences between disciplines in South African universities pertaining to doctoral education, and specifically how these differences affect progression and retention rates of students. It is also anticipated that the findings of this study will inform national policies on doctoral studies in South Africa.



**Name** Fran ois van Schalkwyk

**Supervisor** Prof P. Weingart

**Dissertation title & summary**

***Openness and divergent trajectories: the use of open research data by non-scientists***

Access by the public to science and the machinations of science has become increasingly open. However, for open science to be both judiciously deployed and purposeful, a deeper understanding of the social and epistemological impacts of open science is needed. This research will reveal some of these impacts by investigating the use of open research data by non-scientists, with a focus on areas of contestation, such as the purported links between vaccinations and autism.

Six of our PhD students are full-time students in residence at CREST. This is a record number for CREST since it started offering its STS PhD programme in 1997. Three of these PhD students were offered research assistantships in 2016 (which are linked to their full-time doctoral scholarships), thereby advancing their research capacity through their involvement in research projects funded by SciSTIP.

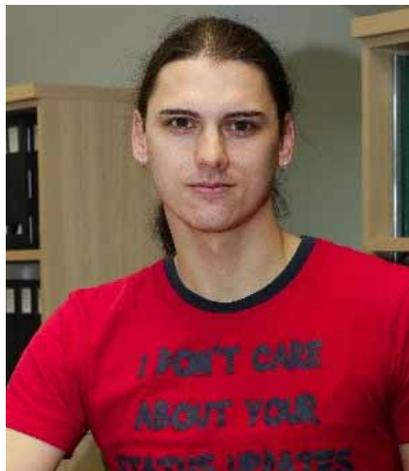
On completion of their degrees, these and the other PhD candidates will make a valuable and much needed contribution to the African knowledge-base in science communication, research impact and evaluation, and science knowledge systems. These are all critical factors in growing the South African and African contributions to global knowledge networks.



RESIDENT PHD (STS) STUDENTS

## Postdoctoral fellows

Three postdoctoral fellows were funded by SciSTIP in 2016.



### Dr Jaco Blanckenberg

Dr Blanckenberg obtained a doctorate in Physics from Stellenbosch University (SU) in 2015. His master's and doctoral studies included strong elements of computer simulation and computational physics, both of which require working with, and analysing, large quantities of data. These skills are vital for the effective analysis of scientometric data.

His training in Physics has also taught him to approach problems in new and creative ways. As part of the SciSTIP team, he uses these skills to address what are currently considered to be some of the most challenging problems in bibliometrics, such as the mass cleaning of author affiliations to African countries, and the disambiguation of authors in the WoS database. Cleaning data on author affiliations is a crucial step, especially for the YSA project, to enable accurate reporting of impacts and outputs of research emanating from African institutions. Furthermore, accurate disambiguation of authors will not only allow determination to a greater level of accuracy, of the impact of highly productive researchers, but will also allow tracking of the movement of researchers from one institution to another throughout their careers.

Dr Blanckenberg is also engaged with the topic of citation profiles of individual articles, in particular how articles accrue citations over time. Citations are often used as a proxy for impact in the evaluation of institutions, departments and individuals, therefore their correct treatment, specifically the appropriate use of citation windows, is important. While research on citations is generally conducted at a journal or even discipline level, Dr Blanckenberg is investigating a novel approach to the large-scale analysis of citation data on individual publications.

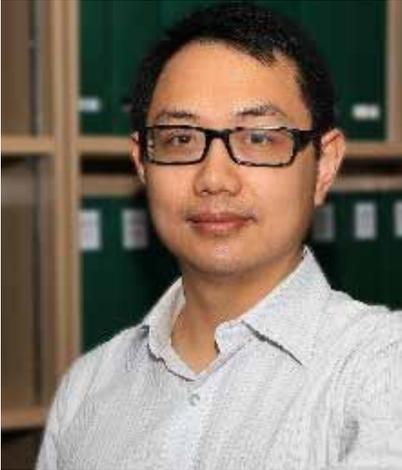


### Dr Charl Swart

Dr Charl Swart obtained his PhD in Political Science from Stellenbosch University in 2013. His masters focussed on public opinion on land reform and the rule of law, whilst his PhD focussed on what meaning is ascribed to the rule of law by different stakeholders in South Africa. During these research projects he developed an interest into the rule of law, constitutionalism and the government's obligation to ensure that citizens' socio-economic rights are upheld. He has subsequently published findings from his PhD and masters in a co-authored peer-reviewed book entitled "South Africa and the case for renegotiating the peace" and a peer-reviewed book chapter, respectively.

After completing his PhD, he held a postdoctoral fellowship at the School of Public Health, at UWC during 2014 and 2015. During this fellowship, he further explored his interest in government obligation and constitutionalism by investigating the future management of the HIV/AIDS situation in South Africa.

He joined CREST as a postdoctoral fellow in January 2016 specifically to focus on the YSA project, in both a managerial and research capacity. This project, which has a strong focus on providing policy recommendations that will enable the successful development of young researchers, will allow him to explore his substantive research interests in the field of higher education. During 2016 he was responsible for managing the survey phase of the project, and his future duties include managing the qualitative interview phase, as well as generating research reports, academic articles and policy briefs related to the YSA project.



### Dr Xiaoming Liu

Dr “Andy” Liu received a PhD in Computer Science from UWC in 2015. During his masters and doctoral studies, he developed a unified modelling framework and a set of automatic modelling tools, which show how to generate meaningful adaptive network models from empirical data of complex real-world systems. These techniques can assist multidisciplinary researchers in developing more complex and more accurate system models in scientific systems by using appropriate empirical data and computation models from different research fields.

As part of the SciSTIP team for the larger part of 2016, Andy applied his skills to develop an automated data-integration tool for the YSA project. This tool uses semantic analytics and clustering techniques to extract demographic information from WoS data, Scopus data, web-sourced data, and other existing data collected by CREST, and to then identify African scholars’ correct affiliation and contact information. He also developed a web- and graphic-information-system (GIS)-based application for bibliometric mapping and visualisation by using advanced GIS visualisation techniques. This application with advanced GIS analytics would provide strong quantitative support for the key role of the impact and outcomes in shaping the dynamics of Africa-wide, innovative research activities.



### Dr Lars Guenther

Lars Guenther received his doctorate at the Institute of Communication Research at Friedrich Schiller University in Jena, Germany, his country of origin. His dissertation was entitled “The coverage of (un)certainty: science journalists’ perceptions and reporting on scientific evidence” and it was graded with *summa cum laude* in 2015. So far, he has authored or co-authored four monographs, 18 peer-reviewed journal articles in international journals, and 12 book chapters. Lars has made more than 40 presentations at international conferences. In Germany, he was a research assistant and the vice project leader of three research projects, funded by the German Research Foundation, and focused on science and the general public. He was also a lecturer for Media Theories (2012, 2014), Media Effects (2014), and Media Analysis (2014) at his university.

Lars has journalistic work experience, which he gained in Germany over a number of years, doing freelance work for daily newspapers, a radio station, a public-broadcasting television station, and a news agency. This shaped his overall research interest in journalism. More specifically, 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.

Lars joined CREST in 2015. He is a postdoctoral fellow at the South African Research Chair in Science Communication (SciCOM), where he currently re-positions his research into the public’s perceptions of science and technology, and mapping the science, health, and technology coverage in South African newspapers. He also has an interest in the way in which different publics understand and interpret science and scientific findings.

## 11th International Globelics PhD Academy on Innovation and Development

In addition to supporting postdoctoral fellows and postgraduate students at CREST, SciSTIP contributed to human-capacity building by funding, together with the Globelics Secretariat, the 11th International Globelics PhD Academy, hosted from the 20th June to the 1st of July 2016 by the Institute for Economic Research on Innovation (IERI) at Tshwane University of Technology (TUT). The 2016 edition was the first international Globelics PhD Academy hosted in Africa. The local organising committee was comprised of three SciSTIP affiliates (Dr E. Kraemer-Mbula as chair, Profs R. Maharajh and M. Scerri), as well as and Mr Lucas Madia.

The Globelics PhD Academy is an annual event that brings together leading scholars and frontier researchers in innovation studies with international PhD students to inspire and qualify their work. The Academy also serves as networking opportunity for emergent researchers to join high-quality and leading-edge research communities in science, technology and innovation studies. It has an excellent reputation and high international visibility, particularly within the community of innovation and development scholars.

The call for applications resulted in a pool of 67 applicants from all over the world. A committee of 10 highly experienced international scholars selected twenty candidates: 10 males and 10 females from 11 countries, representing Latin America, Asia, Europe and Africa.

The Academy was opened on the 20th June 2016 by TUT Deputy Vice-Chancellor (DVC) Dr E.A. Nesamvuni, the Dean of the Faculty for Economics and Finance, Prof R. Rugimbana, SciSTIP nodal head and IERI Director, Prof R. Maharajh, Globelics Academy coordinator, Dr E. Kraemer-Mbula, and Globelics representative, Prof J. Sutz.

The 2016 edition had a total of 17 lecturers, including international renowned lecturers such as Prof J. Sutz (University of the Republic, Uruguay), SciSTIP affiliate, Prof F. Gault, and Prof E. Lorenz (Centre National de la Recherche Scientifique (National Centre for Scientific Research), University of Nice Sophia-Antipolis, as well as a video lecture by Prof B-A. Lundvall (University of Aalborg, Denmark), produced specifically for the Academy. It also counted valuable lecture contributions from the following SciSTIP affiliates:

Kahn, M.	Making sense of bibliometrics for policy formulation
Maharajh, R.	Sustainability and post-capitalism
Mouton, J.	Evaluative bibliometrics: the challenge of assessing research performance
Scerri, M.	Modes of innovation
	The viability and integration of national systems of innovation in Africa

In addition, Prof M. Kahn and Dr. L. Ndabeni served as panelists during two round tables (on linking evidence and innovation policy, and on urban/rural dynamics, respectively). Paper commentaries were presented by SciSTIP affiliates Drs S. Osha and L. Ndabeni. Dr E. Kraemer-Mbula coordinated the Academy.

Lectures focused on methodological issues and theories of innovation, as well as contemporary themes and challenges in innovation and development. Comments and discussion during the lectures were encouraged. During the most lectures students were highly interactive and intensive discussions were elicited. Lectures were complemented with active engagements, including visits to The Origins Centre in Johannesburg, and to The Innovation Hub in Pretoria. Students were given a feedback questionnaire at the end of the Academy, and the feedback received was very positive overall.



THE STUDENTS WHO ATTENDED THE 11TH INTERNATIONAL GLOBELICS PHD ACADEMY ON INNOVATION AND DEVELOPMENT

## Short courses

### Online course in science communication

The online science communication course at CREST (presented under the auspices of SciCOM) was offered for the fourth time during 2016. Running over a period of 12 weeks from September to November 2016, the course consisted of six weekly modules, followed by six weeks of practical work. Most of the 60 participants were affiliated with South African research organisations, but participants also enrolled from Botswana (3), Ghana (2), India (2), Kenya (2), Lesotho (1), Namibia (1), Nigeria (2); Tanzania (1); Trinidad & Tobago (1), Uganda (1), Zambia (1), Italy (1) and the USA (1). In addition to the content presented by the course coordinator Ms. M. Joubert, Dr L. Guenther presented a module on research in the field of science communication, while Prof G. Claassen from the Department of Journalism at SU presented a module on science and the mass media. Of the 60 candidates, 13 achieved 90% or more, while the average mark was 74.8%. The course feedback was very positive: 53% of candidates rated the course as very useful, while 34% rated it as exceptionally useful; and 72% said that they would definitely be able to apply the new skills in their current work environments.



### Doctoral supervision

With a surge in the number of PhD candidates currently enrolled at African universities, the demand for training in doctoral supervision has also increased. During the course of 2016, Prof Jan Botha presented a series of courses on the topic at SU, UCT and in two other African countries. The participants, a total of 137, represented South Africa and various other African countries, including Ghana, Nigeria, DRC, Congo, Cameroon, Ethiopia, Eritrea, Uganda, Kenya, Tanzania, Malawi, Zimbabwe, Zambia, Mozambique, and Swaziland. The details of the short courses are as follows:

Name of course	Audience / location	Date	No. of participants
Certificate Course in Doctoral Supervision	African Doctoral Academy Summer School, Stellenbosch	11–16 January	25
		4–8 July	24
Course in Doctoral Supervision	Academic Staff of the University of Malawi	22–26 February	43
		29 February–3 March	
	Academic Staff of Makerere University	12–16 September 2016	35
Introductory Course in Doctoral Supervision	African Mental Health Research Initiative, School of Public Health, UCT	14–15 November	20

## FameLab® workshop and heat hosted



CONTESTANTS IN THE REGIONAL FAMELAB® WORKSHOP AND HEAT

Fifteen young scientists from SU participated in a regional FameLab® workshop and heat on 18 February 2016. The event was hosted at SciSTIP, which co-funded this event with the DST-NRF Centre of Excellence for Invasion Biology. Five of the young researchers were selected to proceed to the national finals in Johannesburg. FameLab is a global competition that seeks to build science communication and media skills among young researchers (21 to 35 years of age), by challenging them to present their work to a general audience in just three minutes, rendering it as engaging and accessible as possible, but maintaining solid content and accuracy. This initiative will go a long way in contributing to the new Science Engagement Framework which was approved by the Minister of Science and Technology in January 2015.

## Training workshop ahead of the key research survey of Qatar

Stakeholders from the public, private, academic, and research sectors in Qatar gained insights that will guide their contribution to an in-depth overview of the nation’s research landscape, through a training workshop hosted by Qatar Foundation Research and Development in collaboration with the Ministry of Development Planning and Statistics (MDPS).

The two-day exercise (26–27 September) at Qatar National Convention Centre, attended by 111 participants from 69 entities involved in research, prepared the ground for 2015 Research and Development Survey of MDPS, which aims to measure the R&D inputs from Qatar, such as human capacity, infrastructure and facilities, and investments, to track progress, draw global comparisons, and support future planning.

Sessions focusing on elements including R&D expenditure, personnel and funding, as well as the global research

ranking of Qatar and the survey goals and methodologies, were led by policy analyst, research and innovation evaluator, and SciSTIP affiliate Prof M. Kahn, who will supervise the implementation of the survey.



PROF MICHAEL KAHN (SOURCE: QATAR FOUNDATION)

## Further contributions to education and training

SciSTIP affiliate	Event	Title	Date	Location
Maharajh, R.	Lecture presented at IndiaLICS Doctoral Academy	Socially-engaged scholarship in the 21st century: some challenges for science, technology, and innovation studies	14 March	Kerala, India
Prozesky, H.	Presentation at HERS-SA mini-Academy	Highlights and pitfalls in career timelines	7 September	Cape Town

In 2016 CREST introduced a fairly innovative model of joining PhD scholarships with part-time Research Assistantships that are, in part, funded through SciSTIP. At the time of writing, 6 full-time doctoral students and research assistantships were in residence, a fact which contributes significantly to the human-resource capacity available for SciSTIP projects.

Some other students, although not registered at CREST, also benefitted directly or indirectly from their involvement in SciSTIP-funded projects. Dr S. Grobbelaar used SciSTIP funding to employ two postgraduate students, Mr E. van der Merwe and Ms L. Botha, as research assistants in her project on operationalising inclusive innovation. Three further postgraduate students are also involved in the project, thereby advancing their own research capacity.

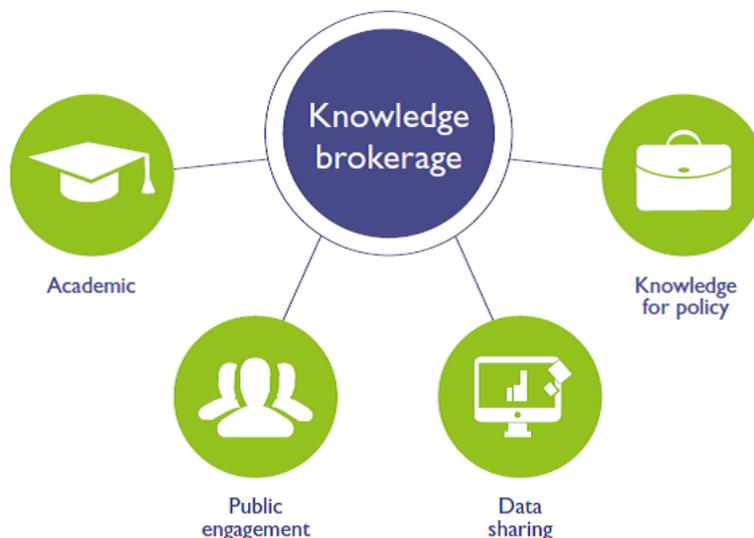
In a similar vein, two MTech students at IERI were involved in fieldwork (data collection) for an Open African Innovation Research Partnership (Open AIR) project on

Gauteng Makerspaces, led by Dr E. Kraemer-Mbula. The central aim of the project is to investigate how IP regimes can be harnessed in Africa to facilitate innovation through collaboration, and to make processes more participatory, knowledge more accessible, and benefits more widely shared. Interconnected, empirical case studies are exploring a range of research questions in countries across the continent.

In 2016, Prof M. Swilling (Distinguished Professor and Programme Coordinator: Sustainable Development in the School of Public Leadership, SU and Academic Director of the Sustainability Institute) used the volume, “Reconceptualising Development in the Global Information Age” as the primary text for his new course on alternative economics. The volume resulted from a two-day seminar, hosted by SciSTIP in 2014 as an initiative of Prof N. Cloete of CHET. It was edited by Profs M. Castells and P. Himanen, and published in October 2014.

## PART THREE: Knowledge brokerage

The knowledge held by SciSTIP is routinely made accessible by the promotion of knowledge-sharing and knowledge-transfer activities that allow communication to take place with the public, policy-makers and academic peers in formats other than published, scholarly research output.



## Academic knowledge brokerage

### International Conference on Scientometrics, STI Policy and Science Communication

SciSTIP and SciCOM held a joint, international conference at SU from 31 October to 3 November 2016.

The conference was preceded by a PhD Colloquium at which a number of STS PhD candidates presented their research and preliminary results.

Andoh, H.	The uptake of doctoral thesis research in Ghana
Morrison, M.	Communicating biodiversity: the usefulness of action research in studying northern Botswana's conservation community-of-practice
Moyo, F.	The early history of social sciences research in Zambia
Bailey, T.	The conceptualisation, organisation and operationalisation of expert policy advice in the science and higher education sectors in South Africa: Case studies of the National Advisory Council on Innovation and the Council on Higher Education
Parker, S.	Development of indicators for the South African public's understanding of science

The conference was officially opened by Dr P. Mjwara (DG: DST). His address was based on a speech prepared by the original keynote speaker, Minister N. Pandor, who was unable to attend the opening. Referring to SciSTIP, he said “this centre of excellence builds on our existing capabilities in scientometrics and innovation policy and affords us additional capacity and takes our ability to understand and fine-tune our innovation policy and environment to a new level”.



PROF W. DE VILLIERS WELCOMES THE GUESTS

(Source: A. Jordaan, SU)

Prof W. de Villiers, SU Rector and VC, welcomed the guests and said it is a privilege for the university to host the conference.

On the first day, delegates were welcomed and proceedings opened by Prof E. Cloete, Vice-Rector: Research, Innovation and Postgraduate Studies, SU, followed by the keynote introduction of Dr T. auf der Heyde (DDG: DST).



DR P. MJWARA DELIVERS THE KEYNOTE ADDRESS

(Source: A. Jordaan, SU)

The conference focused on three thematic areas. These, and the details of the presentations by SciSTIP-funded researchers within each area, are as follows:

### Science and innovation studies

#### Current themes and priorities in science policy debates

Mouton, J.	The changing face of South African science
Cloete, N.	Africa needs research universities: knowledge production in eight African flagship universities

#### University-supported innovation for inclusive development: South African studies

Tijssen, R.	Introductory overview
Grobbelaar, S.	I4ID and innovation platforms in Africa: a research agenda
Dijksterhuis, M.	Case studies in the Western Cape (Part 1)
Botha, L.	Case studies in the Western Cape (Part 2)

#### Science and innovation for development

Maharajh, R.	Science, technology, and innovation: prospects for being well in the 21st century
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### Bibliometrics and research evaluation

Costas, R.	Funding acknowledgements and altmetric landscapes in Africa
	The global scientific brain: indicators of research mobility using bibliometric data
Boshoff, N.	Research impact assessment: leaning towards learning

### Challenges in communicating science

Mouton, J. & Valentine, A.	Predatory publishing and other questionable publication practices in South Africa
Kahn, M.	Big Science, co-publication and collaboration: getting to the core
Wouters, P. & Tijssen, R.	University rankings

The conference also hosted the launch of three exciting new books (for more detail, see p. 58).



PROF. R. COWAN

## Workshops, seminars and other scholarly meetings

### Workshop on Academic Science in South Africa

A workshop on Academic Science in South Africa, jointly hosted by CREST, the Stellenbosch Institute for Advanced Study (STIAS), and the *Institut Universitaire de France* was held on the 7th and 8th of April 2016. The workshop brought together a small, select group of European and South African experts working to understand the dynamics of academic science in Africa generally, and South Africa specifically. The workshop was the brainchild of Prof R. Cowan (Professor of Economics, Maastricht University and University of Strasbourg) and Prof J. Mouton (Director of SciSTIP).

The overarching goal was to further understanding of how research takes place in universities in South Africa, and what avenues exist to improve its performance both scientifically and societally. Within that goal, a wide range of themes were discussed. The SciSTIP-funded researchers' contributions are as follows:

Kahn, M.	Evolution of science policy in South Africa: <i>plus ça change...</i>
Grobbelaar, S., Gwynne-Evans, N. & Brent, A.C.	From enterprise development to inclusive innovation: transforming regional innovation support
Tijssen, R.	South African university-industry research collaboration: an international comparison
Mouton, J.	The good, the bad and perverse of research metrics
Boshoff, N.	The different meanings of the societal impact of research

In true academic fashion the workshop stimulated heated, but thought-provoking debate, laying the groundwork for further international cooperation on the topics discussed.

### HERANA 3 Seminar

The third annual meeting of HERANA, held in Franschhoek, South Africa, during November 2016, was attended by representatives of seven of the eight participating universities from different Sub-Saharan African countries: Botswana, Cape Town, Dar es Salaam, Eduardo Mondlane in Mozambique, Ghana, Nairobi in Kenya, Mauritius, and Makerere in Uganda.

Each university gave detailed presentations on key research indicators at their institution. Framing the presentations were contributions from international experts including Dr F. Hayward, and Profs P. Maassen, L. Goedegebuure, R. Tijssen and Å. Gornitzka. The ensuing discussions reflected on the governance of research at African universities and the central role of governments in supporting evolving research ecosystems in Africa.

The details of presentations by SciSTIP-funded researchers at this seminar are as follows:

Cloete, N.	Overview of the HERANA project
Maassen, P., Gornitzka, Å & Goedegebuure, L.	International perspectives
Cloete, N.	Changes and trends over the 15-year period: issues for HERANA universities
Mouton, J. & Tijssen, R.	Research performance

Led by CHET, the goal of the third and current phase of the HERANA project is to institutionalise data collection with a view to strengthening knowledge production in a group of emerging research-intensive flagship universities.



DELEGATES AT THE HERANA 3 SEMINAR

*Makerere University has been part of the HERANA project since 2008. Several developments have emerged from this network. These have ranged from the perspective of exploring the academic core, community engagement to knowledge production and university as an engine for development. HERANA has further articulated how Makerere University, the flagship university in Uganda, defines itself in terms of mission and vision; and how these compare with other flagships on the African continent. As Makerere University, our strategy is to move towards a research-led university. The HERANA programme explores parameters that point to how research-led universities can and/or should function.*

**Prof J. Ddumba-Ssentamu, VC, Makerere University**

### Differentiation Dialogue: Indicators for Development

Another scholarly event organised by CHET in 2016 was the “Differentiation Dialogue” on indicators for development held in Cape Town, 21–23 August. The event focused on two thematic areas, and the details of the presentations by SciSTIP-funded researchers related to each of the areas are as follows:

Mandates, performance and discourses	
Bunting, I.	The academic core: performance and change indicators
Cloete, N. & Sheppard, C.	Differentiated fees
A development-driven transformation indicator framework	
Cloete, N.	Functions of higher education as a new Transformation Framework
Mouton, J.	Possible R&D indicators



PROF. A. BAWA SPEAKING AT THE OPENING DINNER OF THE SEMINAR



DR R. COSTAS AND SOME OF THE WORKSHOP PARTICIPANTS



### Altmetrics16 Workshop

Dr R. Costas, SciSTIP affiliate and researcher at the Centre for Science and Technology Studies (CWTS), Leiden University, was one of the five organisers of the 2016 Altmetrics Workshop, held on 27 September 2016 at the University of Medicine and Pharmacy Carol Davila in Bucharest, Romania. Titled “Moving beyond counts: integrating context”, the workshop focused on altmetrics beyond mere counts and correlations, i.e. on approaches with more contextual perspectives.

Co-organised with the 3rd Altmetrics Conference (3:AM), this workshop provided the following SciSTIP-funded researchers, who are affiliated to CWTS and who specialise in altmetrics, with a platform for active discussions and exchange among other researchers and practitioners to reflect upon current and future challenges of altmetrics.

Costas, R., Haustein, S., Zahedi, Z. & Larivière, V.	Exploring paths for the normalization of altmetrics: applying the characteristics scores and scales
Van Honk, J. & Costas, R.	Integrating context in Twitter metrics: preliminary investigation on the possibilities of hashtags as an altmetric resource
Zahedi, Z., Haustein, S., Larivière, V. & Costas, R.	On the relationships between bibliometric and altmetric indicators: the effect of discipline and density level
Fraumann, G., Costas, R., Mugnaini, R., Packer, A.L. & Zahedi, Z.	Twitter presence and altmetrics counts of SciELO Brazil journals

### Roundtables and working seminars organised by CREST

While in residence at SciSTIP, two bibliometric scholars, Dr R. Costas and Prof I. Rafols, presented working seminars in October. The seminars covered topics that are central to many of the projects currently funded by SciSTIP. On 25 October, Prof Rafols discussed an analytic framework for STI Indicators, aimed at “opening up” S&T policy, and using interdisciplinary measures as an example. The presentation by Dr Costas, on 27 October, concerned altmetrics and the use of Mendeley for bibliometric purposes, and was followed by another, shorter presentation by Prof Rafols on his current work to map societal impact via collaboration patterns, using translational research initiatives as an example. In addition to the Workshop on Academic Science in South Africa referred to above, a round table at CREST was held with Prof R. Cowan in February.

### Dr N. Boshoff presents on research impact assessment

The Southern African Research and Innovation Management Association (SARIMA), through the support of the Special Programme for Research and Training in Tropical Diseases at the World Health Organisation, sponsored a workshop on research impact assessment, presented by Dr N. Boshoff. The workshop discussed the assessments of both the scientific and societal impact of research. For scientific impact, the discussion focused on citations whereas, for societal impact, frameworks and methods for assessing the non-academic impact of research were explored. These included the payback framework, the search for “productive interactions”, valorisation maps, and social media metrics.

This highly successful workshop lasted two days and was attended by a variety of delegates, including university research directors, senior academics and research officials.



### HERS-SA Workshop: Academic career progression

Higher Education Resources Systems-South Africa (HERS-SA) is a non-profit organisation (NPO) dedicated to the advancement and leadership development of women in the higher-education sector. SciSTIP research manager Dr H. Prozesky was invited to co-convene (with HERS-SA Chair, Prof K. Esler) a workshop on academic career progression at the 2016 HERS-SA mini-academy, a three-day programme offered exclusively to HERS alumnae who have participated in a residential HERS programme based either in South Africa and/or in the USA.

### Contributions at scholarly meetings

In addition to the presentations they contributed to scholarly events hosted by SciSTIP, its co-host and/or institutional partners, SciSTIP-funded researchers communicated their work to academic peers at the following scholarly meetings:

#### Conference presentations

##### International conferences

##### 21st International Conference on Science and Technology Indicators September; València, Spain

At this conference, the Director of SciSTIP, Prof J. Mouton, was invited to present a keynote address, titled “The deep structure of STI indicators: contextual knowledge and scientometrics”. In addition, SciSTIP was well represented at this conference, with five members’ papers accepted for presentation:

Boshoff, N. & Esterhuysen, H.	“Productive interactions” for societal impact: developing a research information system for agriculture (RIS-Agric) at Stellenbosch University, South Africa
Costas, R., Perianes-Rodríguez, A. & Ruiz-Castillo, J.	Currencies of science: discussing disciplinary “exchange rates” for citations and Mendeley readership
Paul-Hus, A., Díaz-Faes, A., Desrochers, N., Costas, R., Sainte-Marie, M., Benoit, M. & Larivière, V.	Beyond funding: what can acknowledgements reveal about credit distribution in science?
Robinson-Garcia, R., Cañibano, C., Woolley, R. & Costas, R.	Scientific mobility of early career researchers in Spain and the Netherlands through their publications
Van Honk, J., Costas, R. & Calero-Medina, C.	Funding acknowledgements in the Web of science: inconsistencies in data collection and standardization of funding organizations
Zahedi, Z., Costas, R., Larivière, V. & Haustein, S.	What makes papers visible on social media? An analysis of various document characteristics



DR H. PROZESKY (CENTRE) WITH HERS-SA CHAIR, PROF K. ESLER (LEFT) AND DIRECTOR, DR S. SURTEE (RIGHT)

##### International Conference “The Transformation of Research in the South: Policies and Outcomes” January; Paris, France

This conference was organised by the International Development Research Center, Canada; Institut de Recherche pour le Développement, France; Centre Population et Développement, University of Paris Descartes, Paris; Institut Recherche-Innovation-Société, France; and the OECD Development Center.

It aimed to improve the understanding of the institutional, political and economic conditions driving changes in how governments support research and promote science that are reshaping research systems in the South. The consequences of these changes in terms of building scientific capacity and the broader application of results from scientific research, as well as lessons for public policy, were also under the spotlight. The specific conference themes were as follows: developing research policy frameworks; strengthening academic research; assessing research performance and impact; and transnational cooperation in research.

At this conference, Prof J. Mouton presented two papers, titled “Priority issues for evaluation research in science granting councils: sub-Saharan Africa”, and “Science-granting councils in Sub-Saharan Africa: a typology of diverse science funding configurations”, while SciSTIP member Prof M. Kahn presented on the topic of the evolution of science policy research in South Africa. Proceedings of the conference will be published in 2017.



*Portland International Center for Management of Engineering and Technology '16 Conference*  
September; Honolulu, USA

SciSTIP researcher Dr S. Grobbelaar and members of her team presented their work on operationalising inclusive innovation at an international conference in Portland:

Van der Merwe, E. & Grobbelaar, S.	A framework for evaluating inclusive innovation performance of an innovation system
Chatukuta, S. & Grobbelaar, S.	Challenges to scaling inclusive innovations: four case studies from the healthcare sector in the Western Cape Province of South Africa
Grobbelaar, S. & Van der Merwe, E.	Supporting inclusive innovation: Developing improved analytical methods and STI policy instruments to operationalise inclusive innovation

*R&D Management Conference*  
July; Cambridge, United Kingdom

Dr Grobbelaar also presented her work on this topic at an R&D Management Conference:

Botha, L. & Grobbelaar, S.	A framework to guide the evaluation of inclusive innovation systems aimed at the empowerment of the BoP
Grobbelaar, S. & De Wet, G.	Research uptake and inclusive innovative intermediary platforms for sustainable scholarly community engagement at the University of Fort Hare, South Africa

*14th Globelics International Conference*  
October; Bandung, Indonesia

The central theme of the 2016 Globelics conference was innovation, creativity and development: strategies for inclusiveness and sustainability. As such, it covered various issues in the field of science, technology, innovation and development, such as the role of innovation and competence building in relation to health, university-industry relations, creative industries, indigenous knowledge and agriculture; as well as the way in which innovation and creativity relate with trade and foreign direct investments, gender and social media. The conference also explored the role of finance and intellectual property rights in relation to the performance of national and regional system. Special attention was devoted to the manner in which innovation and

competence building can support the realisation of the recently approved UN Sustainable Development Goals.

The conference brought together scholars from different disciplines to enhance the quality of studies on innovation, creativity and development for inclusive and sustainable global transformation. Scholars affiliated to SciSTIP co-host IERI presented the following papers related to the CoE's research focus area, "Science and technology and innovation studies":

Kraemer-Mbula, E. & Wunsch-Vincent, S.	Innovation in informal enterprises in developing countries: policy and measurement implications
Maharajh, R. & Motala, E.	Re-forming human capabilities utilising science, technology, and innovation policy: the case of South Africa

*The 3rd Altmetrics (3:AM) Conference*  
September; Bucharest, Romania

Dr R. Costas, in collaboration with his colleagues, presented two papers on altmetrics:

Costas, R.; van Honk, J.; Zahedi, Z.; Calero-Medina, C.	Discussing practical applications for altmetrics: social media profiles for African, European and North American publications
Haustein, S., Tsou, A., Minik, V., Brinson, D., Hayes, E., Costas, R. & Sugimoto, C.R.	Identifying Twitter user communities in the context of altmetrics

*Third IndiaLICS International Conference on Innovation and Sustainable Development*  
March; Kerala, India

At the national conference of the Indian Chapter of Globelics, Prof R. Maharajh from IERI presented two papers:

- Emerging southern African perspectives on innovation for inclusive and sustainable development
- The specter of post-capitalism and rethinking science, technology, and innovation for development

*Other presentations at international conferences*

Other notable SciSTIP presentations at international conferences include those of:

- Prof M. Kahn, plenary speaker on Euro-BRICS scientific cooperation at a public conference, titled "Instrumentality of the Euro-BRICS bridging in addressing the challenges of the multipolar world", held in April, in Paris, France;
- Dr S. Osha, invited speaker on Afrocentricity: discourse and marginality, at the Conference on Marginalisation in African Philosophy: Women and the Environment, held in September, in Calabar, Nigeria.
- Prof R. Maharajh, presenter of the keynote address, "Developments in South African STI policy: emerging



future challenges” at the SPRU-AFRICA Conference on Science, Technology and Innovation Policies for Transformative Change held in May in Tshwane.

In addition, Prof R. Maharajh presented papers at two international conferences in China and Russia:

Defending and expanding the global knowledge commons: cyber-infrastructures and the political economy of the techno-economic platforms of the 21st century	3rd World Internet Conference, International High-level Think Tank Forum on Internet	November, Wuzhen, China
Science, technology, and innovation policy in South Africa	XVII April International Academic Conference on Economic and Social Development	April, Moscow, Russia

Finally, Dr S. Grobbelaar, in collaboration with Dr G.A. Oosthuizen and Ms N. Moloko, presented on strategies to develop local suppliers, at an Innovative Project Workshop Session of the 14th Global Conference on Sustainable Manufacturing, in October in Stellenbosch.

**National and regional conferences**

*4th Annual System Dynamics Conference in South Africa September; Stellenbosch*

At this local conference, Dr Grobbelaar presented two papers, in collaboration with her colleagues, at the 4th Annual System Dynamics Conference.

Bernardes, T.C.A., Maldonado, M.U. & Grobbelaar, S.S.	Solar energy technology diffusion: a comparative study between South Africa and Brazil
Leusin, M.E., Grobbelaar, S.S. & Maldonado, M.U.	Wind energy technology diffusion: a comparative study between South Africa and Brazil

*Other presentations at regional conferences*

Botha, J., Breet, E., Swartz, L. & Horn, L.	Monetary incentives to enhance the research outputs of South African universities	23rd Annual Conference of the Southern African Association for Institutional Research (SAAIR)	October, Potchefstroom
Mouton, J.	The doctorate in SA: trends, challenges and constraints	South African PhD Regional Conference	February, Bloemfontein

**Presentations at fora and meetings**

**International and regional**

- Prof M. Kahn delivered a keynote presentation on research and innovation, at the United Nation Economic Commission for Africa Roundtable on beneficiation and mineral value chains.
- Prof M. Scerri presented on the viability of systems of innovation in the SADC region, at the Southern African Development Community (SADC) Science, Technology and Innovation Policy and Indicators meeting in April in Gaborone, Botswana.
- Prof R. Tijssen and Mr J. Winnink presented a paper, “R&D Excellence: new performance indicators for international comparisons” at the OECD Blue Sky Forum in September in Ghent, Belgium.
- Prof R. Maharajh presented a position paper, titled “Regulating the new commons and related global public goods: a vision from the perspective of the BRICS” at the 8th BRICS Academic Forum in October in Goa, India.
- Prof R. Tijssen and Dr E. Kraemer-Mbula presented their discussion paper on perceptions and measurement of research excellence in November in Maputo, Mozambique, at the Annual Forum of the Science Granting Councils Initiative in Sub-Saharan Africa: Investing in Research Excellence in Africa.



PARTICIPANTS AT THE SOUTH AFRICAN BRICS THINK TANK ACADEMIC FORUM

**National***5th Brazilian Meeting of Bibliometrics and Scientometrics  
July; São Paulo, Brazil*

Dr R. Costas presented the keynote address, “Infrastructure for the consolidation of research groups specialising in quantitative methods for the study and evaluation of scientific activity”, as well as a workshop titled “Introduction to “altmetrics”: sources, limitations, and possibilities” at the 5th Brazilian Meeting on Bibliometrics and Scientometrics.

*South African BRICS Think Tank Academic Forum  
March; Johannesburg*

Prof R. Maharajh was invited to present two papers – one on economic alternatives (unemployment and inequality); and another on science, technology and innovation – at the first Academic Forum of the South African BRICS Think Tank, hosted by the National Institute for the Humanities and Social Sciences.

*Other presentations at national fora*

Cloete, N., Sheppard, C. & Van Schalkwyk, F.	#Fees must fall: past, present and future	UWC Deans of Science Forum	July, Cape Town
Mouton, J.	An analysis of SA journals	ASSAf National Editors' Forum	September, Pretoria

**Presentations at seminars****International***International Seminar on the Future of the Brazilian Development  
May; Rio de Janeiro, Brazil*

Prof R. Maharajh was invited as a delegate to this seminar, where he presented on the global crisis and the BRICS. German Academic Exchange Service (DAAD) Seminar September; Nairobi, Kenya

Prof J. Mouton delivered a keynote address, titled “The multi-faceted dimensions of providing quality doctoral education in Africa”, as well as a presentation on ethics and research integrity in doctoral education, at this seminar on quality doctoral education.

*University of Oslo, Department of Education Open Seminar  
February; Oslo, Norway*

Prof Cloete, as one of the lead authors of a chapter, “How Can Education Promote Social Progress?”, to be published in a 2017 report of the International Panel on Social Progress (IPSP), presented in this seminar the main debates, agreements and disagreements of the Working Group on Education of IPSP, bringing insights from the Group’s second meeting, held a week before in Vienna.

**National**

Cloete, N.	Fees and sustainable development: moving the higher education fees debate from ideology to evidence	Students for Law and Social Justice Seminar	June, Johannesburg
Maharajh, R.	The emergence of post-capitalism and its challenges	Centre for Integrated Post- School Education and Training Seminar	Port Elizabeth

**Presentations at workshops**

In January, Dr E. Kraemer-Mbula presented her contribution as lead author of one of the chapters (“Varieties of global governance, institutional and distributional effects of globalization”) of the report “Rethinking Society for the 21st Century”, to be published by IPSP. The workshop of scholars in Germany was aimed at exploring opportunities for STS to make a significant contribution to the report.

SciSTIP researchers also presented their work at the following regional and national workshops.

Scerri, M.	STI measurement, policies and convergence within the SADC region	Regional Workshop on Capacity in Data Development in STI for Sustainable Development in Africa	November, Johannesburg
Ndabeni, L., Rogerson, C.M. & Booyens, I.	Local economic development planning and implications for strengthening district systems of innovation: factoring science, technology and innovation in the crafting of local economic development strategies	DST/Cooperative Governance and Traditional Affairs Workshop	March, Pretoria
Scerri, M.	The global economy in 2025	World Expo 2025 South Africa: Theme Development Workshop	September, Johannesburg
Prozesky, H.	Reviewing “scientific design”: the case of qualitative research	1st Annual Western Cape Research Ethics C Workshop	August, Cape Town

### Presentations at other scholarly meetings

In addition to the scholarly meetings referred to above, SciSTIP affiliates communicated their research at a variety of other events or institutions.

SciSTIP member	Title of presentation	Event / Inviting institution	Month & place
<b>International</b>			
Cloete, N.	Africa needs research universities	United States International University	November, Nairobi, Kenya
Cloete, N., Maassen, P. & Moja, T.	Doctoral education in South Africa and seven African states	Global Higher Education Salon, International Institute of Education	May, New York, USA
<b>National</b>			
Cloete, N.	Sustainable funding: money is not the main problem	8th Inyathelo Leadership Retreat: Strategies in fast-changing societies: How do universities adapt (or die)?	April, Cape Town
Mouton, J.	A discussion on the Humanities and Social Sciences in South Africa	ASSAf Strategic Planning	February, Pretoria
Cloete, N.	Self-destructive policies	South African Registrars Imbizo	March, Durban
Maharajh, R.	Re-reading our past, re-framing our present, re-envisioning our futures: the spectre of post-capitalism and our contemporary revolutionary challenges	Inaugural Colloquium: South Africa Today: To What Extent has the Country Achieved the Goals of the Liberation Struggle?	April, Pietermaritzburg
	The city as a knowledge and innovation hub stream	Tshwane Research and Innovation Symposium 2016	May, Tshwane
Mouton, J.	Measuring the quality of research	Stellenbosch Psychology Department Colloquium	August, Stellenbosch
Mouton, J. (with Cloete, N. & Sheppard, C.).	An analysis of doctoral education in South Africa and resultant scenarios and shifts	UCT Research Indaba	May, Cape Town
Cloete, N.	Universities globally and in Africa	Faculty of Medicine and Health Sciences, SU	May, Stellenbosch
	University fees in South Africa: a story from evidence	South African Labour and Development Research Unit, UCT	August, Cape Town
	The fallacy of free higher education: moving the fees debate from ideology to evidence	Faculty of Commerce, UCT	October, Cape Town

## Book launches

### Doctoral education in South Africa

Prof J. Mouton launched the book (jointly authored with Dr N. Cloete and Dr C. Sheppard) in Bloemfontein on Wednesday, 24 February 2016 at the Prosperitas Auditorium at the Central University of Technology (CUT). The launch, which was opened by the VC of CUT, Prof T.Z. Mthembu, was attended by academics from CUT and the University of the Free State. “Doctoral Education in South Africa” is published by open-access publisher African Minds.



PROF. J. MOUTON (RIGHT) WITH ATTENDEES OF THE LAUNCH

### The emergence of systems of innovation in south(ern) Africa: long histories and contemporary debates

This edited collection was launched on 1 November as part of the International Conference on Scientometrics, STI Policy and Science Communication. For more information on the book, see p. 19 above.



PROF. J. MOUTON (BACK, RIGHT) WITH THE EDITORS/AUTHORS OF THE THREE BOOKS LAUNCHED ON 1 NOVEMBER

### The delusion of knowledge transfer: the impact of foreign experts on policy-making in South Africa and Tanzania

The International Conference on Scientometrics, STI Policy and Science Communication was also the occasion for the launch of this book. For more information on the book, see pp. 15–16 above.



DR R. ARVANITIS AND PROF R. TIJSSSEN ENJOY A LIGHTER MOMENT AT THE BOOK LAUNCH

### Institutional research in South African higher education – intersecting contexts and practices

This edited collection was launched on two separate occasions: in October at the 23rd Annual Conference of SAAIR, and on 1 November as part of the International Conference on Scientometrics, STI Policy and Science Communication. For more information on the book, see pp. 8–9 above.

### Pathways through Higher Education Research: A festschrift in honour of Peter Maassen

The HERANA 3 Seminar, organised by CHET (see p. 51 above), served as the platform for the launch of this edited collection.



PROF. R. MAHARAJH CHAIRS THE BOOK LAUNCH PANEL

### The informal economy in developing nations: hidden engine of innovation?

This book was launched on the 8th December 2016 during Science Forum South Africa, at the Council for Scientific and Industrial Research (CSIR) International Convention Centre, Pretoria (for more detail on the book itself, see p. 20 above).

The book launch was structured as a panel discussion during which the main findings were presented. The panel was chaired by Prof R. Maharajh, and the panellists included Dr E. Kraemer-Mbula, Dr P. Mjwara (DG: DST), Dr G.O. Essegbey (Director, Science and Technology Policy Research Institute, CSIR, Ghana) and Ms A. Morgan (SADC Secretariat, Botswana).

## Knowledge for policy

Various SciSTIP researchers have been involved in policy-related studies and work.

### Towards the Next-Generation Science and Technology White Paper for South Africa

Three SciSTIP members contributed in various ways to inform the DST and NACI on South African STI policy. Prof R. Maharajh, in his capacity as member of the STI Institutional Landscape Panel, which was appointed at the end of 2014 by the Minister of Science and Technology, Ms N. Pandor, to review the STI institutional landscape of South Africa, presented (in Tshwane, in February, March and October, respectively), the following commissioned papers:

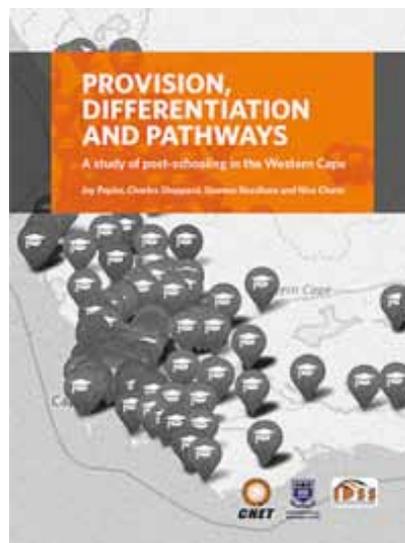
- A methodological approach;
- Mapping the STI institutions of South Africa's national system of innovation landscape (with Dr T. Dlamini)
- Brief international review of governance of science, technology, and innovation landscape governance: selected country comparisons.

Prof Maharajh was also co-author with Dr D.R. Walwyn (Project Leader), Mr A. Bertoldi, Prof D. Kaplan, Dr S.T. Manzini, and Prof E. Motala, of a report, "Review of the White Paper on Science and Technology", commissioned by NACI. He further undertook a situational analysis of innovation for transformative change and inclusive development that contributed to a discussion document for NACI, titled "Towards the Next-Generation Science and Technology White Paper for South Africa". Prof M. Kahn conducted a performance analysis of the South African NSI that contributed to the same discussion document, while Prof J. Mouton conducted a critical review of the draft White Paper on Science and Technology, as requested by the Minister of Science and Technology, Ms N. Pandor.

### Report: Provision, differentiation and pathways: a study of post-schooling in the Western Cape

**Authors: Profs J. Papier & C. Sheppard;  
Mr. S. Needham & Prof N. Cloete (88 pp.)  
Publisher: CHET**

The emergence of standpoints which argue that vocational education has a responsibility to provide both the basis for further learning in higher education as well as workplace preparation, have gained ground in South Africa. But this kind of integrated approach has proven difficult in the South African situation, with the vocational qualifications falling short on the side of practical training, and theoretical components being emphasised to the detriment of the qualification value in the workplace.



"Provision, differentiation and pathways: a study of post-schooling in the Western Cape" seeks to sharpen our understanding of what currently exists, and to contribute to a more coherent data repository upon which deliberations around the future configuration of public post-school provision could be based. Nationally there is concern with the limited access to information on options for further and higher education and training, particularly for peri-urban and rural youth. Apart from improving knowledge of what opportunities exist in post-schooling across the Western Cape Province through a comprehensive mapping of learning opportunities for youth, other issues that affect the post-school system and often serve to frustrate the attempts of those seeking opportunities are highlighted. Unresolved matters associated with post-school policies, such as articulation, differentiation, and recognition of prior learning, were considered critical areas for investigation, since they potentially impact on access and pathways to learning.

This book aims to provide a window into issues that are critical to creating a diverse, comprehensive and differentiated post-school system responsive to the demands for access, skills development for economic growth, and in service of communities. The Ford Foundation funded this project, conducted by the Further Education and Training Institute of UWC (now part of the Institute for Post-School Studies) in conjunction with CHET, during 2014 and 2015.

## Background report to 2016 STIAS-Wallenberg Roundtable on Innovation for Prosperity: Realising Innovation Opportunities in Sub-Saharan Africa

Authors: Drs S. Grobbelaar & S. Schwaag Serger (48 pp.)

This report served as a background for the discussions during a round table meeting, hosted STIAS, in collaboration with the Wallenberg Foundation, in early 2016, with a focus on bringing together experts and cutting-edge thinkers from around the world to debate the most appropriate pathways towards realising sustainable and inclusive growth opportunities for sub-Saharan Africa. The report assisted participants to identify and discuss measures to remedy potential barriers to growth in Africa and to inform thinking on appropriate growth paths and patterns for various contexts within Africa. The report thus presents policy suggestions and aims to provide context for prioritising measures towards achieving these growth paths.



### Other reports and papers

Prof J. Botha submitted to the DHET on 10 December 2016 a commissioned “Draft Policy Framework for the Internationalisation of Higher Education in South Africa” (69 pp.). The policy was signed by the Minister in January 2017 and published in the Government Gazette in April 2017.

Prof Mouton, in collaboration with Prof R. Tijssen, produced the first SciSTIP STI Indicator Report, titled “The changing face of South African science” (24 pp.).

### HERANA 3: Institutional forums with university leadership

As part of its HERANA project, CHET held four institutional fora with the leadership of each one of four emerging, research-intensive flagship universities in Africa. The purpose of these fora was to discuss progress regarding the institutionalisation of data collection at these



PROF. J. MOUTON (DIRECTOR, SCISTIP), DR P. MJWARA (DG:DST), AND PROF. W. DE VILLIERS (SU RECTOR AND VC) WITH THE FIRST SCISTIP STI INDICATOR REPORT

universities. This includes the analysis of the data collected to contribute to evidence-based strategic planning and strengthening knowledge production at these universities. At these fora, various presentations were made by Prof. N. Cloete and his colleagues at CHET.

#### University of Ghana

28 June; Accra, Ghana

Bunting, I.	Radar graph of university of Ghana (UG) (strengths and weaknesses)
Bunting, I.	University of Ghana: indicators of change and institutional performance
Cloete, N., Bunting, I. & Van Schalkwyk, F.	Towards research-led universities in Africa: University of Ghana

#### Makerere University

4 July; Kampala, Uganda

Bunting, I.	African flagship: comparative analysis for research production – focus on Makerere University
Cloete, N., Bunting, I. & Van Schalkwyk, F.	Towards research-led universities in Africa: Makerere University

#### University of Mauritius

12 July; Moka, Mauritius

Bunting, I.	University of Mauritius: indicators of change and institutional performance
Cloete, N.	HERANA 3 Forum: towards research-intensive universities in Africa

#### University of Botswana

13 October; Gaborone, Botswana

Bunting, I.	University of Botswana: indicators and institutional performance
Cloete, N.	HERANA 3 Forum: towards research-intensive universities in Africa

### Presentations to stakeholders

- Cloete, N. Mediating between policy and political activism. Audience: Catholic Bishops in South Africa. November, Pretoria.
- Cloete, N., Sheppard, C. & Van Schalkwyk, F. A differentiated fee system: Moving the higher education fees debate from ideology to evidence. Student leaders from all four Western Cape universities. Ndabeni, L. Successful local and regional development requires effective community engagement. Invited presentation at the First National Bank Academy for Municipal Excellence. November, Johannesburg.
- Ndabeni, L. Integrating science, technology and innovation in local economic development planning. Invited presentation at the First National Bank Academy for Municipal Excellence, October, eThekweni.

### Other knowledge for policy

The volume “Reconceptualising development in the global information age”, which resulted from a two-day seminar hosted by SciSTIP in 2014 as an initiative of Prof N. Cloete of CHET, formed the basis for a United Nations report on the future of cities, completed in 2016 by

Prof M. Swilling (Distinguished Professor and Programme Coordinator: Sustainable Development in the School of Public Leadership, SU and Academic Director of the Sustainability Institute).

Prof M. Kahn undertook consultancy for the Government of Finland: Southern African Innovation Support programme, and Profs N. Cloete and Cheryl de la Rey met with the Norwegian Parliamentary Group on Education in January. A delegation from the Finnish Embassy visited CREST in October, and during a meeting indicated that key concepts in the research of SciSTIP resonated with them, such as “frugal” innovation. The panel also expressed key interest in the YSA project, as well as in the measurement of the impact of funding in general.

In July, a stakeholder engagement meeting was held between NACI and SciSTIP, to share information on the current priorities of NACI as an organisation, and to explore possible areas of collaboration. The meeting took place at SciSTIP, and was attended by the NACI Chief Executive Officer, Dr M. Cele, as well as Mr P. Letaba (Senior Specialist: STI Measurement), and Ms R. Maila (Deputy Director: Policy Analysis Investigation) of the DST.

## Sharing knowledge with the public

### Articles in the popular media

Prof N. Cloete published a number of articles in *University World News*, a free, weekly emailed newspaper aimed at higher education readers worldwide. These include “A “third force” in higher education student activism” (4 March, Issue No: 403), “Student fees, the petite bourgeoisie and the Treasury” (3 October, Issue No: 430), and a third article – co-authored with Profs P. Langa and G. Wangenge-Ouma, G., and Dr J. Jungblut – titled “South Africa and the illusion of free higher education” (26 February, Issue No: 402). Also in *University World News*, Prof R. Tijssen dealt with the question, “Are world university rankings up to date?” in an article published 5 February (Issue No: 399).



Prof Cloete’s other contributions in the popular media included the piece “Free university education: unequal and poor” in the *Financial Mail* of 14 October, “The universities: why free for all doesn’t make sense” in *politicsweb* of 2 October, and “The wrong questions are being asked in the free higher education debate” – an article first published in *The Conversation* of 27 September, then reprinted in *Fin24* of 28 September, and the *Sunday Times* of 29 September.



Prof R. Maharajh, Director of SciSTIP co-host IERI, published an article in the January 28 edition *The Conversation*, titled “Quality, free university education is necessary and possible”, and co-authored with Profs S. Vally and E. Motala, Ms. L-A. Naidoo and Dr Hlatshwayo. IERI was further strongly represented in the popular media by six contributions published by SciSTIP-funded researcher Dr S. Osha. Three of these were published in *Pambazuka News*, an open access, Pan-African e-mail and online electronic newsletter, and an advocacy tool for social justice, designed specifically for those working in Africa. The articles are titled “Mudimbe’s volte-face” (July 21); “The Niger Delta: rites of insurgency” (September 8); and “Consequences of being Cecil Rhodes”, October 6). The remainder of the articles are “Cecil Rhodes as Amakwerekwere” (*The Journalist*); “In remembrance of the slave: Part I of II” (*The Missing Slate*, February 11); and “Toyin Falola’s enchanted Yoruba universe”, an essay published in *African Writer* (July 11).

### SciSTIP in the media

In addition to its affiliated researchers sharing their knowledge in the media, SciSTIP and/or its researchers received coverage in the following news items:

Bateman, B. CHET: Loan schemes shouldn’t be a burden to graduates. *Eyewitness News*, 11 August.

Keppler, V. Vice chancellors acted like spaza shop owners – Nico Cloete. *The Citizen*, 11 August.

South African Broadcasting Corporation (SABC). Universities preserve inequality: Fees Commission. *SABC News*, 11 August.

MacGregor, K. Multiple positive signs for African higher education. *University World News*, 4 September.

Azvolinsky, A. Does productivity diminish research quality? *The Scientist*, 28 September.

Braun, D.B. *Kwantiteit of kwaliteit? Meer publikasies = hoër aandeel topartikelen* [Quantity or quality? More publications = higher proportion of top articles]. Interview with Rodrigo Costas. *Mareonline Magazine* 40(5), 6 Oktober:7.

Basson, A. Free higher education could undermine excellence at SA universities. *news@StellenboschUni*, 1 November.

Jungblut, J. On the move towards research-led universities: meeting of the HERANA project discusses institutional change in African flagship universities. Blogpost written for the *Higher Education Development Association*. 5 December.

Integrated System of Libraries of the University of São Paulo. Interview with Rodrigo Costas on global citations in Altmetrics.

## Data management and access

### The Knowledge Management Unit at CREST

#### Overview

The Knowledge Management Unit (KMU) at CREST comprises a database manager (Dr J. Spies) and two database specialists (Mr H. Redelinghuys and Mr S. Smith) who are administrators of the hardware and software of the servers which host the databases used for SciSTIP research. This involves developing software for managing and updating the data in these databases, as well as database design and management. They are further tasked with web design and web-based interface development. Their direct contribution to SciSTIP research takes the form of developing new indicators, responding to data requests from SciSTIP researchers, and producing reports these researchers use in their projects.

#### Highlights and achievements in 2016

An update to version 9.6 of PostgreSQL on all the servers brought with it exciting new possibilities, *inter alia* more efficiency, interesting new possibilities in the querying language, and indexing. The KMU also built a new version of the WoS database (2016-1), which was the source for data queries for the majority of the WoS-related SciSTIP projects during 2016.

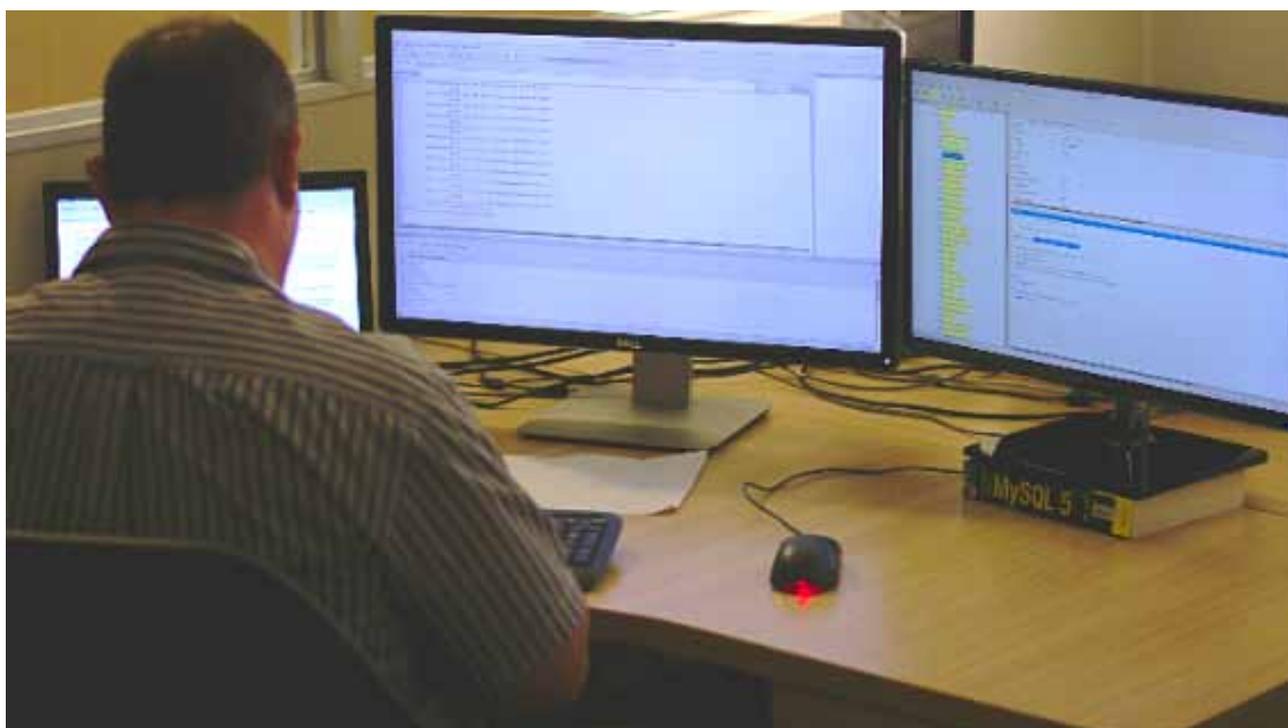
Further achievements in 2016 that are crucial to many of the projects of SciSTIP include the work of KMU to create of datasets with rolling windows for citations, the

construction of new categories of author cooperation, and their work with dynamic groupings of publications based on many different criteria. During 2016, ongoing R&D was also undertaken in relation to author identification, creation of a new set of subject categories to address the specific needs of the (South) African projects of SciSTIP researchers, and disambiguation of names of research institutes. In general, the bibliometric-data-management skills of KMU are continuously upgraded so as to ensure the production of sophisticated bibliometric indicators at CREST.

#### Development of local databases

The work of KMU on SA Knowledgebase (SAK) progressed well: at the time of writing, it consisted of 264427 article authorships, 14378 book or book chapters and 41048 conference-proceeding contributions published by academic scholars at 25 South African universities between 2005 and 2015. Work on compiling detailed demographic data for South African authors needed to identify unique authors more accurately and to link them to authorships in SAK, neared completion in 2016.

The KMU further assisted in compiling a database of South African PhD dissertations completed between 2010 and 2016 (17768 items). This database will in future be integrated with SAK, and has already allowed for interesting analysis, such as identifying SAK publications resulting from, or related to, PhD studies.



DATABASE SPECIALIST, MR REDELINGUYS, WORKING WITH MULTIPLE SCREENS



**Data portal**

Towards the end of 2016, work started on the CREST data portal: a web-based interface for a collection of frequently accessed databases at CREST. Many of these were originally in MS Access-format, which rendered user access difficult. These were migrated to a SQL server, and the web-based interface now allows for simultaneous access by multiple users, while also affording access control and therefore security. The data portal currently contains the following databases:

- SA Journal Database • African Journals Database •
- SA Research Centres in the Social Sciences • Science and Technology Initiatives in Africa •
- SA University Research Statistics • SA Research and Innovation Directory •
- CREST Document Library • Database of SA Dissertations •
- African Evaluation Database.

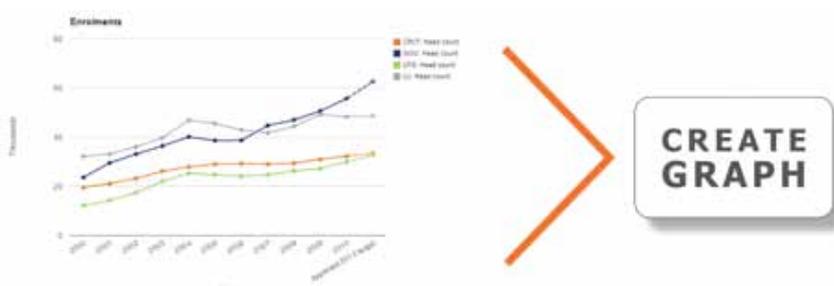
**South African higher education open data**

In 2016, CHET published its South African higher education data for 2009 to 2014 on its website. The data consist of

student, staff, publication and financial indicators of the performance of South African universities, revised and expanded in 2016 to include more granular student and staff data, as well as new financial performance indicators. These revisions were informed by the numerous requests for more detailed data by both the corporate and research sectors in South Africa. All the CHET data are checked, queried and corrected prior to publication on the CHET website as open data under a liberal Creative Commons license.

The following 25 indicators have been released:

Students	
01	Enrolments (headcount and FTEs)
02	Average annual growth in headcount enrolments and graduates (2009–2013)
03	Number of enrolments by qualification type: undergraduate certificates, undergraduate diplomas, undergraduate degrees, postgraduate certificates and diplomas, honours, masters, PhDs, occasional students



Students	
04	Number of enrolments by major field of study: undergraduates, postgraduates below masters, Masters, PhDs, each per classification-of-educational-subject-matter (CESM) categories and six broad categories
05	Number of enrolments by population group
06	Number of enrolments by gender
07	Success rates
08	Number of graduates by qualification type: undergraduate certificates, undergraduate diplomas, undergraduate degrees, postgraduate certificates and diplomas, honours, masters, PhDs, occasional students
09	Number of graduates by major field of study: undergraduates, postgraduates below masters, masters, PhDs, each per CESM categories and six broad categories
10	Weighted graduates

Staff	
11	Number of staff: academic staff, admin and technical staff, service staff
12	Academic staff by rank: lecturer and below, senior lecturer, associate professors and professors, director
13	Academic staff by qualification: below masters, masters, PhDs
14	Academic staff by population group
15	Academic staff by gender
16	Total academic staff: full-time equivalent (FTE)
17	Ratio of student FTEs to staff FTEs

Publications	
18	Number of publications: journal articles, books/chapters in books, conference proceedings
19	Weighted total research output per academic staff member

Financial	
20	Income and expenditure
21	Surplus/deficit on all activities (as a %)
22	Sources of income (%)
23	Research income as a % of block grant
24	Teaching income as a % of block grant
25	Personnel costs as a % of total expenditure

CHET publishes selected infographics alongside the indicator data to supplement the data and highlight emerging trends in higher education in South Africa.

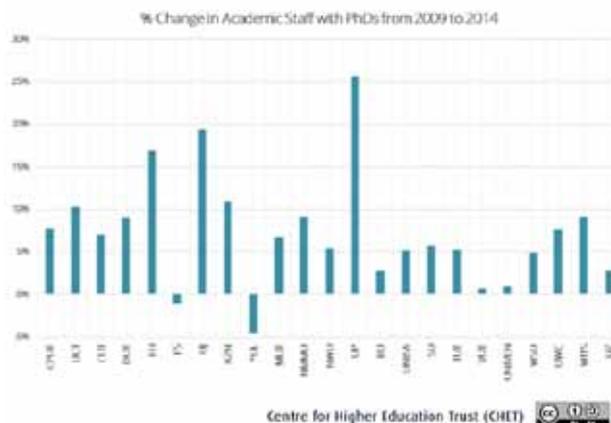


FIGURE 9: % CHANGE IN SOURCE OF INCOME 2009 VERSUS 2014

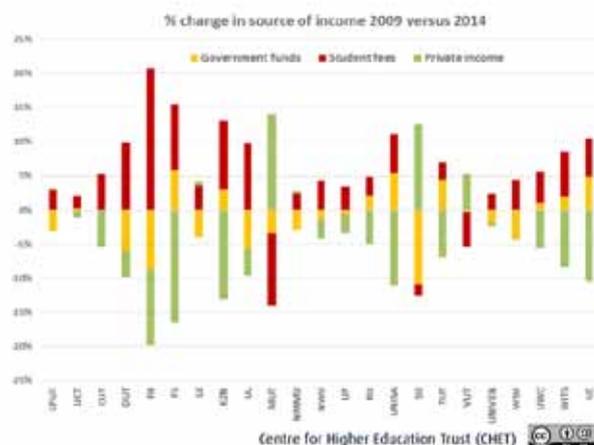


FIGURE 10: % CHANGE IN ACADEMIC STAFF WITH PHDS FROM 2009 TO 2014

CHET receives frequent requests from industry, researchers and university postgraduate students for these data. For example, researchers G. Makou, K. Wilkinson and V. Bhardwaj used these data to compile an online Factsheet on funding and the changing face of the public universities of South Africa.

## PART FOUR: Networking

During 2016 SciSTIP networked and collaborated with both locally and internationally based individuals, groups and institutions that are reputable and knowledgeable in the fields of scientometrics and/or STI policy. The CoE also negotiated and helped to realise national, regional, continental and international partnerships in various ways, which are detailed in this section.

## Academic visitors/scholars

A variety of prominent research partners visited the host, the node, and institutional partners of SciSTIP during 2015 in their capacity as collaborators on research projects and/or to present seminars.

### Hosted by CREST



#### Prof Robin Cowan

This world-renowned academic was a visiting scholar at the institutional host of SciSTIP, CREST, during a number of months in 2016. He is Professor of the Economics of Technical Change at the University of Maastricht, and Professor of Management at the

Faculty of Economics and Management at the University of Strasbourg.

Prof Cowan is, amongst other research interests, undertaking a large-scale project with several of his colleagues in Maastricht and Strasbourg. The project concerns universities and science in middle-income countries, with a particular focus on South Africa and transformation in the post-apartheid era in its university system, and more specifically its formerly white, research-focussed universities, towards a racial composition that is more representative of the society as a whole. His team aims to construct a model that will allow them to examine different aspects of that recent transition, and thereby to guide policy interventions intended to speed up the transition.

Originally, Prof Cowan was invited as a resident at STIAS for three months in 2016, and in the course of arranging his visit, he became aware of the complementarity between his research and that conducted at the SciSTIP host, CREST. Director of SciSTIP, Prof Mouton, arranged a round table in February to investigate further collaboration between the Prof Cowan's team and SciSTIP researchers at CREST. This culminated in the two scholars arranging an international workshop, hosted by SciSTIP (see p. 62 above).

## Academic visits to other institutions

Dr R. Costas visited the *Chaire de recherché du Canada sur les transformations de la communication savant* [Canada Research Chair on the Transformations of Scholarly



#### Dr Jack Spaapen

Dr Spaapen is senior policy advisor at the Royal Netherlands Academy of Arts and Sciences. He represents the Academy in many national and international platforms regarding research evaluation, societal impact evaluation, responsible research and

innovation and scientific advice. On invitation of Dr N. Boshoff, Dr Spaapen presented a lecture in April at CREST, on the public value of research and responsible research and innovation.

### Hosted by CHET

Peter Maassen	Professor, Department of Educational Research, UiO, and Director, Higher Education Development Association
Åse Gornitzka	Professor of Political Science, UiO
Leo Goedegebuure	Professor, University of Melbourne, and Director, LH Martin Institute
David Perry	Professor of Urban Planning and Policy, University of Illinois Chicago

### Hosted by Dr R. Costas, CWTS

From October to December, Dr Costas supervised the visit of Mr C.L. González-Valiente from the National Library of Cuba, on the topic of bibliometric methods for the analysis of converge/divergence of scientific topics. Dr Robinson-Garcia from INGENIO (Valencia-Spain) visited Dr Costas in October to develop indicators on open data derived from DataCite, as well as indicators on the mobility of scholars. This visit coincided with another one by Dr Cassidy Sugimoto and PhD student Dakota Murray from Indiana University Bloomington, also to develop indicators on the mobility of scientific scholars.

Communication], on invitation from the Director, Prof V. Larivière from May to July, and again from November to December.



## Partnerships and collaborative arrangements

### CHET hosts the regional branch of the IPSP

The aim of IPSP is to focus attention globally on the policy and research questions related to the promotion of social justice. A strong message from the academic community on what can be done could constitute an important contribution. The IPSP will harness the competence of hundreds of experts on social issues and will deliver a report addressed to all social actors, movements, organisations, politicians and decision-makers, in order to provide them with the best expertise on questions that bear on social change.

For that purpose the Panel will produce a global report on the perspectives for social progress in the various regions of the world in the coming decades. Each chapter of the report will be led by two Coordinating Lead Authors who will supervise the preparation of a chapter co-signed by about ten Lead Authors from various disciplines and

with different regional experiences. The report, titled “Rethinking Society for the 21st Century”, will be published in 2017.

The role of CHET as a regional branch of the IPSP is as follows:

- to serve as a communication hub – from South Africa to IPSP, and as a contact for colleagues, media and social actors in the region to source more information about IPSP;
- to utilise the CHET network to distribute drafts and solicit feedback as the report takes shape. This will be an important process for the success of the report;
- to organise more formal seminars on topics directly related to the chapters; and
- in collaboration with University World News (with over 50 000 subscribers in 120 countries), to publish short articles about the activities of the IPSP and articles related to the research being done.



## PART FIVE: Service rendering

As a publicly funded CoE, service rendering is one of the core SciSTIP activities. This KPA underlies all of the accomplishments presented in this report.

This section, however, will focus specifically on the informed and reliable advice which members and associates of SciSTIP have provided to various stakeholders, primarily as members of various bodies and as academic editors, reviewers and referees.

## Service on official bodies

### Scientific Committee of 21st International Conference on Science and Technology Indicators

A large majority of SciSTIP researchers served on this committee in 2016, i.e. Dr R. Costas, Prof F. Gault, Dr E. Kraemer-Mbula, and Profs J. Mouton and R. Tijssen. Prof Tijssen also served on the Programme Board of the Conference.

### Advisory Committee of the Centre for Science, Technology and Innovation Indicators

Prof F. Gault and Dr E. Kraemer-Mbula are members of this Centre of the Human Sciences Research Council (HSRC).

### Other roles

Kahn, M.	Agricultural Research Council	Vice Chairperson
	R&D and Evaluation Committee	Chairperson
	Strategy Committee	Chairperson
Kraemer-Mbula, E.	Open AIR Scientific Steering Committee	Member
	Consultative Advisory Group of Partnership for Skills in Applied Sciences, Engineering and Technology	Member
Maharajh, R.	Scientific Board of 4th Annual CAAST-Net Plus Meeting,	Member
	Council of Rhodes University	Ministerial appointee
	AfricaLics Scientific Committee	Chair
	Review Committee for the 14th Globelics International Conference	Member
	Horizon 2020 Evaluation, European Commission	External expert observer
Mouton, J.	ASSAf Internal review panel	Chair
Prozesky, H.	Higher Education Resources Services South Africa (HERS-SA)	Board member
	NRF review panel for the Social Sciences, Law and Humanities applications for the Competitive Programme for Unrated Researchers and the Competitive Programme for Rated Researchers	Member

## Service at scholarly events

### International Research Conference on Scientometrics, STI Policy and Science Communication

A large majority of SciSTIP-affiliated scholars served as chairs of one or more sessions (indicated in brackets) during the conference, i.e. Dr N. Boshoff (Student research colloquium, Communication in and of science), Prof J. Botha (Changes in scientific publishing), Prof N. Cloete (University-supported innovation for inclusive development: South African studies), Prof M. Kahn (Science and innovation for development), Prof R. Maharajh (Science policy debates), Prof J. Mouton (Student research colloquium), Dr H. Prozesky (Themes in Bibliometrics), and Prof R. Tijssen (Themes in Bibliometrics).

### Service at other international scholarly events

Dr R. Costas chaired the session on Altmetrics at the 21st International Conference on Science and Technology Indicators, while Prof R. Maharajh served in various capacities at the following international events:

Event	Session / panel	Role
International Seminar on the Role of BRICS in the Evolution of the New Environmental Governance	The role of BRICS in the climate governance and the future of multilateralism	Panellist
14th Globelics International Conference		Plenary panellist & Discussant
8th BRICS Academic Forum	Panel on regulating the new commons and related global public goods: a vision from BRICS perspective	South African delegate & moderator
	Panel on future of energy: implications and opportunities for BRICS	
EuroScience Open Forum	Towards global principles and ethics of science advice (high-level consultation event)	Invited delegate Panel co-ordinator
	BRICS: the new [kids] on the STI bloc(k)	
Third IndiaLICS International Conference on Innovation and Sustainable Development	From MDGs to SDGs: tasks, challenges and way forward	Plenary session panellist
International Conference on South–South Cooperation	S&T, Agriculture and Natural Resources (Different Modalities)	Co-chair
Industry 4.0: Be smart, join the Next Revolution Today	Impact of NIR on South Africa with focus on job creation, SMEs and skills	Panellist

### Service at local scholarly events

SciSTIP member	Event	Session / panel	Role
J. Botha	23rd Annual Conference of SAAIR	SAAIR/SciSTIP book launch: “Institutional research in South African higher education – intersecting contexts and practices”	Panellist
		Plenary session: a social cartography of student data: moving beyond #StudentsAsDataObjects	Chair
Kraemer-Mbula, E.	Science Forum South Africa	Book launch: “The informal economy in developing nations: hidden engine of innovation?”	Panellist
Maharajh, R.	The Policy Environment and Policy Options for the South African System of Innovation		Panellist
	Human Sciences Research Council Action Dialogue on Poverty, Inequality and Sustainable Development in Africa and Beyond		Respondent
	Human and Social Sciences Research Infrastructure Round Table, DST		Delegate
	Round Table: The potential and limit of vocational and community education in advancing the solidarity economy – with particular reference to the needs of youth		Panellist
	Science Forum South Africa	Book launch: “The informal economy in developing nations: hidden engine of innovation?”	Panel chair

## Editorial service for journals

SciSTIP member	Journal(s)	Role
Cloete, N.	Studies in Higher Education	Member of Editorial Board
Kahn, M.	Research Policy	Member of Advisory Board
Kraemer-Mbula, E.	African Journal of Science, Technology, Innovation and Development	Associate Editor and member of the Editorial Board
	Innovation and Development	Member of Editorial Board
	Journal for Economic Policy Reform	
Mouton, J.	South African Journal of Science	Chair of Editorial Advisory Board
	Minerva	Member of Editorial Board
	Science and Public Policy	Member of Editorial Advisory Board
	Scientometrics	Member of Editorial Board
Tijssen R.J.W	Research Evaluation	Co-editor (with P.K. Wong on a special section)

## Reviewing for journals

Costas, R.	Scientometrics; Journal of the Association for Information Science and Technology; Journal of Informetrics; Research Evaluation; Revista Española de Documentación Científica; El Profesional de la Información; PLOS ONE
Gault, F.	Research Policy; Science and Public Policy
Kahn, M.	Research Policy; Science and Public Policy; African Journal of STI for Development
Mouton, J.	South African Journal of Higher Education
Osha, S.	Ethics & International Affairs
Prozesky, H.	Minerva

## Other reviewing services

Costas, R.	Evaluator of research proposals for the US National Science Foundation and the Swiss National Science Foundation
	21st International Conference on Science and Technology Indicators
	Altmetrics 16 Workshop
Gault, F.	14th Globelics International Conference
Kahn, M.	

# PART SIX: SciSTIP Team

List of staff associated with SciSTIP<sup>3</sup>

<sup>3</sup> 2016 only, and excluding postdoctoral fellows, who are included in the section on education and training

## List of staff associated with SciSTIP

### CREST

#### Academic and research staff



Prof Johann Mouton  
Director



Dr Sara Grobbelaar  
Part-time researcher



Ms Tracy Bailey  
Researcher



Ms Marina Joubert  
Researcher and lecturer



Ms Isabel Basson  
Researcher



Dr Heidi Prozesky  
Research manager and researcher



Prof Jan Botha  
Professor



Ms Milandr  van Lill  
Researcher



Dr Nelius Boshoff  
Senior researcher

#### Research support staff



Ms Marthie van Niekerk  
Centre administrative manager



Ms Lynn Lorenzen  
Information officer



Mr Nigel Jansen  
Technical officer



Mr Lenny Poole  
Technical assistant



Ms Rolene Langford  
Administrative officer



Mr Herman Redelinghuys  
Database specialist



Mr Shaun Smith  
Database specialist



Ms Astrid Valentine  
Database and research assistant



Dr Johann Spies  
Database manager

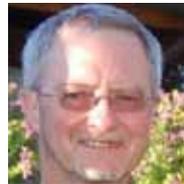


Ms Annemarie Visagie  
Database and research assistant

### Extraordinary professors



Prof Nico Cloete



Prof Joe Muller



Prof Rasigan Maharajh



Prof Peter Maassen



Prof Michael Kahn



Prof Mario Scerri

### Extraordinary associate professor



Dr Erika Kraemer-Mbula

## IERI

### Full-time staff



Prof Rasigan Maharajh  
Chief director



Prof Mario Scerri  
Senior research fellow



Dr Erika Kraemer-Mbula  
Research fellow and senior lecturer



Mr Lucas Madia  
Senior administrator  
Professor Extraordinaire



Dr Lindile L. Ndabeni  
Research fellow and senior lecturer

### Professor Extraordinaire



Dr Sanya Osha  
Research fellow



Prof Fred Gault

## CHET

### Staff and support services



Prof Nico Cloete  
Director



Mr Francois van Schalkwyk  
Publishing, distribution, and website  
and data management



Ms Angela Mias  
Project administrator

## CWTS



Dr Clara Calero-Medina  
Researcher



Prof Robert Tijssen  
Professor of Science &  
Innovation Studies



Dr Rodrigo Costas  
Researcher



Ms Zohreh Zahedi  
PhD candidate

## Appointments elsewhere

Dr E. Kraemer-Mbula was awarded the prestigious Rockefeller Bellagio Fellowship. Under this fellowship she spent four weeks at the Rockefeller Residence in Bellagio,

Italy, where she worked on a project related to innovation in the informal economy in Africa.





