

Newton Fund Newsletter



Women in Science

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Foreword

Welcome to the Women's edition of the UK-SA Newton Fund Newsletter!

Over half of Newton Fund South Africa's grant recipients are women. This is a noteworthy achievement considering that female academics are underrepresented in senior academic positions. This disparity makes the fact that the majority of our large scale research projects, 18 of 25 in fact, are led by women even more awe inspiring and worthy of celebrating.

In this issue, we will be profiling some of the many great women of the UK-SA Newton Fund, with a particular look at our larger research calls, innovation and capacity development.

Tori Bungane, Newton Fund Officer, victoria.bungane@fco.gov.uk



I am delighted that we are dedicating the second edition of the Newton Fund newsletter to Women in Science. And it is timely as Minister Naledi Pandor moves on to Higher Education, leaving behind her an extraordinary legacy in promoting and strengthening science and research in South Africa and handing the baton to Minister Kubayi-Ngubane, another woman to lead this important arm of government.

It is sad that in 2018 we are still talking about the need for equality across all aspects of business and society – it is sad because it is not yet a reality. In STEM this lack of equality is often more keenly felt. We all need to address this, working to inspire women and girls to consider STEM, and encourage greater numbers into research. Some of the tools at our disposal include having a policy that demands equality and representation in programmes that we fund, and promoting and celebrating role models for young women to follow and to aspire to emulate. I am extraordinarily proud that the UK-SA Newton Fund is mostly meeting the challenge (we are below 50% under the innovation pillar) and pleased that we have the chance in this edition to showcase some of the extraordinary women leading research under this Fund in South Africa.

Regional Head: Science and Innovation, John Wade-Smith



Precision Medicine: Innovative medical interventions!

The UK-SA Newton Fund has funded two projects for innovative medical interventions. Dr Maritha Kotze (Stellenbosch) and her team have developed a tool that combines the holistic background of a patient and instant DNA testing to accurately determine predisposition to cancer, in this instance, breast cancer specifically. The tool will improve diagnosis from a weeks to just an hour, on site!

About the project...

Precision medicine offers the opportunity for a multifaceted approach, looking at the effects of familial inheritance, co-morbidities, lifestyle choices and drug response at the individual level. In this project a novel point of care (PoC) diagnostic testing system (figure 1) and screening tool will be developed to improve the clinical management of patients with breast cancer and other non-communicable diseases (NCDs). [LGC](#) in the UK will collaborate with two South African entities, [Stellenbosch University](#) and a spinout company of the South Africa Medical Research Council, [Gknowmix](#), to develop the system.



Figure 1: Standard ParaDNA system showing the sampling process and diagnostic test result displayed within 1 hour. The expected genotype output demonstrated with the ParaDNA Warfarin genotype guided dosing test kit is commercially available and implemented in the UK.

Although genetic testing for predisposition to various diseases is already available, the actual probability of a disease occurring cannot be predicted by genetics alone. Gknowmix has therefore developed a comprehensive web-based database and screening tool that incorporates other crucial aspects such as clinical, pathological and lifestyle factors. Adaptable reports are provided as part of this application to help explain why a particular medical condition exists, or to identify areas where genetic risk factors may become clinically relevant if left untreated.

Breast cancer is a heterogeneous disease with genetically distinct subtypes that differ in their response to treatment. It is the leading cause of cancer death amongst women globally. Incidence rates continue to increase in developing countries where the majority of cases are diagnosed at an advanced stage. Survival rates vary greatly between high- and low-income countries, with low survival rates explained mainly by late detection in resource-restricted countries. Many factors influence the risk of breast cancer, including genetic factors, body weight, diet, physical activity, co-existing disease

and medication. The new assay will include assessment of risk factors involved in familial inheritance as well as nutrient and drug metabolism, in order to identify patient subgroups with different treatment requirements.



Figure 2: Rapid ParaDNA and pre-screen algorithm approach for improved clinical management of patients with breast cancer and associated co-morbidities

The technology is made possible by utilising the LGC ParaDNA technology, enabling point of application (PoA) genetic testing within 1 hour by non-expert users. Current laboratory methods take at least 1 week from sample collection to reporting. For the first time, PoC DNA testing will be used to detect known pathogenic *BRCA1/2* mutations and genetic variants in key pathways shared by various NCDs. Combining the unique PoA, ParaDNA technology with the proprietary, interpretative pathology supported genetic testing algorithms of Gknowmix, will result in this quantum innovation by moving PoA to PoC. A successful outcome will enable this system (figure 2) to be scaled in South Africa and globally with significant benefit to breast cancer patients and ultimately also those at risk for developing other NCDs.

The ultimate aim is to grow a network of genetic care centres through this collaboration, focussing on clinical risk assessment, disease prevention and identification of therapeutic targets applicable to the most prevalent NCDs such as cancer, depression, cardiovascular disease and diabetes. Genetic/genomic counselling will form an integral part of this initiative, to bridge the knowledge gaps that still exist between single-gene panel testing and next generation sequencing as the next step in 1) genetically uncharacterised early-onset, familial cases, and 2) in patients who experience unexplained treatment failure or severe side effects. Implementation of the unique pathology-supported genetic testing concept developed in South Africa enables the incorporation of genomics into a universally accepted body of knowledge routinely applied in clinical pathology.

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Rural Education in South Africa: How rurality influences the experience of education in South Africa.

South Africa is the most urbanised and industrialised country in Africa and yet, one of the most unequal in the world. Despite wide ranging policies to address equity and access to higher education, there continues to be a significant lack of academic achievement of students from historically under-represented backgrounds, including students from rural backgrounds. Rural students face distinct challenges in transitioning to and participating in higher education where the continuing legacy of apartheid and the colonial past is perhaps most strongly felt. Yet students of rural backgrounds are also brought up in a rich cultural world where they learn many skills and forms of knowledge that are frequently unacknowledged and represent opportunities within university contexts.

These opportunities and challenges are the focus of a current Newton project, funded through the ESRC (UK) and NRF (SA) agencies as part of the Higher Education Research programme. It involves partners from Universities of Johannesburg, Fort Hare and Rhodes University (SA) and Universities of Bristol and Brighton (UK). This 30 month collaborative project jointly led by Professor Brenda



Leibowitz (UJ) and Dr Sue Timmis (Bristol) is investigating how rural students negotiate the transition to university and how their prior cultural and educational experiences influence their higher education

trajectories. We are focusing on the practices that shape approaches to learning of university students from rural areas including what social or cultural resources they bring with them from their backgrounds. We are also investigating how university systems and practices, especially in relation to digital technologies, influence student transitions and how their experiences of teaching, learning and living whilst at university help or hinder their progress and sense of belonging and well-being.

We have been working with groups of undergraduate students at three universities for over six months and this is ongoing. Students have been participating as co-researchers alongside the team. This is important as it can help to avoid a deficit positioning of students and act as a decolonising measure, meaning it helps to address the power imbalances often found in many approaches to research and ensures the students are not just participants but researchers of their own lives and through this, agents of change. In April 2018, we will begin the next phase where we will explore the perspectives of university leaders and lecturers drawing on the work done with student co-researchers. Our ultimate aim is to suggest strategies and policies for rethinking curricula and to propose inclusive alternatives that build on all (including rural) student experiences

By Dr. Sue Timmis <http://sarihe.org.za>

Women-led Research: TB, Non-Communicable Diseases, and Higher Education

The UK-SA Newton Fund has funded five large scale research calls resulting in 25 research projects; 18 of these research projects are led by female researchers. Here is a brief look at some of the research calls and the women leading them:

ESRC-NRF collaborative research on Higher Education in South Africa:

These collaborative projects between UK and South African researchers seek to answer fundamental questions about higher education.

5 projects have been funded jointly by the UK and South Africa totalling £3.1m (R51m):

Dr. Ruth Massey, University of the Free State. Project Title: “The appropriateness, usefulness and impact of the current urban planning curriculum in South African Higher Education”

Dr. Stephanie Allais, University of the Witwatersrand. Project Title: “Higher Education, Inequality and the Public Good in four African countries: South Africa, Kenya, Nigeria and Ghana”

MRC-SA MRC Non communicable Disease Research:

5 of the 7 NCD projects are led by female researcher. These projects have £3.5 (R57m) of joint UK-SA funding

Dr. Debbie Bradshaw, Medical Research Council. Project Title: “Evolving risk factors for cancers in African populations: Lifestyle, infection, genetic susceptibility and cancer in South Africa: development of research capacity and an evidence base for cancer control”

Dr. Lisa Micklefield, University of the Witwatersrand. Project Title: “Physical activity and components of body composition and growth in cohorts of black South African participants at different stages in the life course/ Determinants of type 2 diabetes mellitus (T2D) risk in middle-aged black South African (SA) men and women: dissecting the role of sex hormones, inflammation and glucocorticoids”

Dr. Aletta Schutte. Project Title: “The African Prospective study on the Early Detection and Identification of Cardiovascular disease and Hypertension (African-PREDICT)”

MRC- SAMRC TB Research:

These projects are aimed at supporting TB control implementation science.

6 projects have been funded receiving £3m (R49m) over three years.

Dr Salome Sharalombous. Project Title: “Optimizing the efficiency of household contact tracing for TB control in South Africa”

Dr Wendy Stevens. Project Title: “Technology supported systems for rapid impact on TB control”

Dr Kogielium Naidoo. Project Title: “Addressing the challenges in scaling up TB and HIV treatment integration in public health settings in South Africa”

Research on the ground: African Breast and Cervical Cancer Awareness (ABCCS) Tool

Background:

Newton grant holder Prof Jennifer Moodley (University of Cape Town) is developing a tool that will improve the timely diagnosis of symptomatic breast and cervical cancer in Sub-Saharan Africa. This will be the first Africa-specific questionnaire to be adopted by public health administrators, ensuring the early detection and treatment of female cancers.

The tool will serve two primary purposes: first to raise symptom awareness for patients; secondly to equip primary healthcare providers with the ability to identify early presentation of symptoms. This will have a major impact on the public health and socioeconomic burden of these diseases. Cervical cancer rates, for example, are higher amongst black South African women than any other demographic in the world and are often unnecessarily fatal due to late detection.

Let's take a brief look at the research project's highlights on the ground:

2017:

- Tool validation by cancer experts completed and accepted
- Project team received ethics clearance in South Africa and Uganda
- 2 PhDs and 2 MPhil students from South Africa and Uganda joined the research team
- Draft of first project publication complete

2018:

- English Version of tool has been developed and completed. IsiXhosa and Anchoi versions underway
- MPhil students travelled to the UK for training
- Investigation team met on site in Khayelitsha



Jackie Lalam (Makerere, Uganda) and Trish Muzenda (UCT) attended an MPhil course in Primary Care Research, organised by UK research partner Dr. Fiona Walter.

“The Designing, delivering and analysing surveys in primary care module... was particularly interesting in that it put into perspective the vast techniques and expertise used ... in the development of the ABCSSA tool.” **Trish Muzenda**

“Besides studying, I took time to explore... the Fitzwilliam Museum, Old Roman Churches, the famous Corpus Clock and Panting on the River Cam. While on the study visit in London, I visited the London Bridge” **Jackie Lalam**



Khayelitsha site visit: Back row, left to right: Jennifer Moodley, Fiona Walter, Rosemary Jacobs (Khayelitsha liaison). Front row, left to right: Johnson Fetu (sub-council manager), Jennifer Githaiga, Amos Mwaka.

Meet a Newtonian: Profiling our Newton Fund Alumni- Women's edition!



Leigh Cobban, RCUK PhD Partnerships on Climate Change



Dr. Monique Williams, NRF Travel Grant, improving the pipeline of SA's Science Academics



Dr. Helena Wessels, BA Newton Advanced Fellow, changing how math is taught in schools



Dr. Fanelwa Ajayi, NRF Travel Grant, Ama'Qawe Ngemfundo, promoting STEM in townships.



Dr. Dale Rae, NRF Travel Grant, sleep and its effects on health

Current Open Calls:

Newton Advanced Fellowship

MRC- The MRC, the Economic and Social Research Council (ESRC) and the South African Medical Research Council (SAMRC) are pleased to invite research proposals to the UK-South Africa mental health initiative. **Closes 2 May 2018**

Newton Advanced Fellowship

Royal Society- Newton Advanced Fellowships provide early to mid-career international researchers who already have a track record with an opportunity to develop their research strengths and capabilities, and those of their group or network, through training, collaboration and visits with a partner in the UK. **Closes 14 March 2018**

Mobility Grant

Academy of Medical Science/ Royal Society- Newton Mobility Grants provide support for international researchers based in South Africa to establish and develop collaboration with UK researchers around a specific jointly defined research project. These one-year awards are particularly suited to initiate new collaborative partnerships, between scholars who have not previously worked together, or new initiatives between scholars who have collaborated in the past. **Closes 14 March 2018**

Events March-June 2018

- 8 March: Review panel of UK-SA Newton Fund TB Research Projects, Cape Town
- 15-16 March UK-SA Newton Fund Taskforce, London

About the UK-SA Newton Fund

The **UK-South Africa Newton Fund** is a major part of the UK's global Newton Fund. Since its launch in 2014, there has been over £30m invested by both countries. UK and South Africa have agreed to extend the duration of the partnership for a further 4 years to 2021.

- **During the its first three years, the UK-SA Newton Fund successes have included:**
 - 25 research programmes (from TB, non-communicable diseases to social science for development, including urban transformations)
 - Supported 3 Bilateral Research Chairs
 - 42 Fellowships and over 100 mobility grants
 - international PhD partnership programme involving 288 students
 - Taken 45 participants through the Royal Academy of Engineering's Leaders in Innovation Fellowship programme.
 - STEM skills and training through the Development in Africa through Radio Astronomy (DARA) programme
 - A Women in Science communications training programme
 - Established the Weather and Climate Science for Service Partnership South Africa – a partnership between the Met Office and South African Weather Service