A WORD FROM THE DEAN

Prof Wim de Villiers
Dean of the Faculty of Health Sciences

As dean of the Faculty of Health Sciences since 2013, I feel privileged to be associated with UCT, and leading the top-ranking health sciences faculty on the continent. The reputation of this faculty is rooted in its excellence over the past 102 years – attributable to the caliber and dedication of our students and our alumni. I have personally experienced this, having lived and worked as a clinician-educator, in the United Kingdom and the United States, for more than 20 years.

This year we ranked 48th in the Times Higher Education World University Rankings for clinical, pre-clinical and health. This position is up from the previous two years (53 in 2013 and 50 in 2012) – demonstrating consistency in our output and place us in the company of international research leaders. These rankings are largely derived from the quality of research, teaching and international reputation of these ratings, rating largely on our reputation in education and research (specifically, number of citations and publications).

Our research enterprise has grown tremendously over the past decade, to a projected research income exceeding R1.5 billion in 2013. Last year we also attracted more than double grants from the National Institute of Health from any other university outside the USA. Our publication output more than doubled from five years ago.

The Faculty’s 55 departments host a large number of researchers, spread across clinical, pre-clinical, laboratory, academic-industry, and a particularly well-established in our School of Pharmacy and Pharmaceutical Sciences. Cross-faculty research groups currently enrolled 10 years ago on a single-meal growth with a purposeful increase in research for human health in Africa. It has grown into UCT's largest research entity, attracting the most income for the Faculty.

The faculty commitment to developing human research capacity is illustrated by our more than 2,000 students (38% of UCT's total), of which 300 are PhD candidates in addition to 500 postdoctoral fellows during 2013. We are also increasing our medical student to graduate-student ratio, which stands at 10:1 at UCT Medical School (78.5 at 250, with the aim of increasing this to 75.5:1). Building the infrastructure and expanding the research base is a key priority, and we are strategizing in a fiscally sustainable way. Our approximately 2,000 undergraduate versus the health sciences disciplines is an asset in the country. We aim to expand these PhD opportunities to 220 places in five-year-MRC/MRCo-projects. Our students learn practical skills in community-based settings.

All people from our region to Africa to experience schizophrenia, since schizophrenia remains extremely rare. This indicates an increasing awareness of schizophrenia in African indigenous populations is so rich and diverse, it’s – by analogy – like a Persian carpet. The extreme contrast of African indigenous populations is so rich and diverse, it’s – by analogy – like a Persian carpet. The extreme contrast of African indigenous populations is so rich and diverse, it’s – by analogy – like a Persian carpet.

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Research is competitive – despite also being collaborative, in the global competition for health science research, UCT's Faculty of Health Sciences stands up across the best in the world. The latest results of the Times Higher Education University Rankings placed the faculty at 48th globally. This is in large part due to the caliber of researchers and teaching. It could also be argued, however, that researchers in the field have a perhaps unexpected advantage: the genetic diversity of our region.

Fear and anxiety disorders in Namaqualand

Another area of research that is crucial: “The programme aims to increase human research capacity is illustrated by our more than 2,000 postgraduates (roughly a quarter of UCT’s total), of whom 360 are PhD candidates. In addition, we had 119 postdoctoral fellows during 2013.

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A frequent but neglected disease: sickle-cell anaemia

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MONDAY MONTHLY SUPPLEMENT HEALTH SCIENCES

Research conducted by the Faculty of Health Sciences spans everything from basic health challenges to clinical, rehabilitation and public health. But whether researching vaccines for newborns, the relationship between poverty and mental health, or how exercise can alleviate pain in HIV patients, researchers are united by their desire to help improve the health and the well-being of the people around them. Here are some of the pressing questions to which UCT researchers are currently seeking answers.

IN SEARCH OF BETTER HEALTH

Compiled by Ambre Nicolson

How can we break the cycle of poverty and mental illness?

Growing international evidence shows that mental health interventions are associated with improved economic benefits to individuals and households in low- and middle-income countries. “The economic cost of mental ill health is significant,” says Theodore Baah, professor in the Department of Psychiatry and Mental Health. “This has a knock-on effect to the economy of the country.” He adds, “People in poverty are more likely to suffer from mental illness and are less likely to receive appropriate care.”

How can we help people with asthma breathe more easily?

Two new (and very different) asthma treatments are on the horizon. The first is the use of vaccines in the treatment of asthma in children. A placebo-controlled trial conducted by Paediatric Pulmonologist Professor Heather Zar and her team has shown the use of a low-cost asthma spacer made out of a plastic 500ml cold drinks bottle. When Zar started working at the Red Cross War Memorial Children’s Hospital, children with asthma were often given coarse doses of inhaled corticosteroids – a less effective drug, with many adverse effects. “Success,” Zar says, “sparked in children to breathe in a shop over a number of years, because we saw improvement. Now thanks to the innovative budget solution, the use of corticosteroids is a thing of the past, and the use of these low-cost spacers is catching on.”

How can we prevent heart failure after childbirth?

Professor Karen Sliwa-Hahnle, director of the Hatter Institute for Cardiovascular Research, has found a way of treating heart failure of previously unknown origin, occurring in African women around the time of childbirth. (post-partum cardiomyopathy). By studying a laboratory model of pregnancy, and Professor Elzine Klug-Kleinert, from the Lung Cancer Research Unit, and the Department of Pathology, the researchers have shown that the heart fails due to a lack of blood flow and that it can be prevented by giving oxygen to the mother.

Can we make a better TB vaccine?

Mark Rutherford, a South African virologist, and colleagues from the South African Tuberculosis Vaccine Initiative (SATVI) recently started the first TB vaccine efficacy trial to test whether a new vaccine (the H4 candidate vaccine) can protect against TB. The trial is being conducted with the Department of Health in KwaZulu-Natal, and over 800 HIV-negative, healthy adults in the age group of 18 to 65 years are being followed up by researchers from the University of Cape Town and the University of KwaZulu-Natal.

Can exercise and education help reduce pain in HIV patients?

Research conducted by Professor Jan Carstens, Chad Price and colleagues showed that over 90% of people living with HIV experience pain of moderate severity. A multi-disciplinary pain intervention using a workshop format was found to significantly reduce pain severity and pain interference in the subjects studied.

How can we help women seeking safe abortions?

The World Health Organisation estimates that one in five pregnancies globally results in induced abortion, and 21.6 million of the 43.8 million abortions that occurred in 2008 were due to unsafe procedures. “The first step to consider is the legalisation of abortion,” says Dr. Sita Pillay, a senior lecturer in the Department of Obstetrics and Gynaecology. “If abortion is legalised, the government would have to provide an infrastructure for the delivery of safe abortion services.”

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1924 The two first medics trained in South Africa are elected.

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1943 Andrew Kinnear and Dr Colin Selman establish the Radiology and Pathology Centre. Organization (RESPA).

1956 The Red Cross War Memorial Children’s Hospital is established.

1957 UCT’s first intake for the Diplomate Physiotherapy.

1962 The Department of Psychiatry and Mental Health is established.

1964 South Africa’s first surgical service for organ transplants is performed at Red Cross War Memorial Children’s Hospital.

1967 Chris Barnard and his team perform the first human heart transplant at Groote Schuur Hospital.

1975 Prof. Crisafulli, from the Department of Anatomy, discovers the location of the tumours, the treatment for colliagam hyperplasias.

1977 Prof. Carmen Barnes, a successful social worker, challenges the South Africa’s Medical and Dental Council’s decision to exclude the second South African-trained doctor from the medical register in circumstances leading to anti-apartheid social activists.

1979 The oldest medical school in Southern Africa.

THE TEST OF TIME

A timeline of highlights from the oldest medical school in Southern Africa

1912 The first medical teaching facilities are formally inaugurated at holders Campus on 6 June.

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**HEALTH BY DESIGN**

Heart valves

Several initiatives target the high-critical care needs of children in the country and the growth of Advanced Heart Access Technologies (AHA). The AHA spin-off company develops and manufactures cardio-related medical devices that address the needs of 75 million rheumatic heart disease patients worldwide. In 1993, Chintan Vicatos, an aeronautical engineer, founded AHA. Since then, the company has built over 300000 atrial septal defect and mitral valves without complicated surgery or heart-lung bypass technology. In 2015, AHA received the first CE mark and also developed a plastic heart valve for younger patients, designed to last longer than current valves, which are made from titanium material.

**Hand exoskeleton for stroke patients**

Locally designed medical devices have the potential to revolutionise the form of many in the aftermath of disease and accident. For example, a hand exoskeleton developed by biomedical engineer Yasmin Malik for the Department of Biomedical Engineering, University of Cape Town (UCT) provides a low-cost alternative to existing solutions on the market.

**Alfa for cognitive disorders**

The Department of Psychiatry and Mental Health Prof John Joska’s Cognitive Assessment Tool-Rapid Version (CAT-rapid) is a quick, easy-to-use smartphone application to assist the clinical assessment of primary care patients, including children, with traumatic brain injury. The app includes a link to a YouTube demonstration of the screener.

**Remote testing to identify the ‘super-spreaders’ of drug-resistant TB**

In the aftermath of illness and accident, the division is headed by Professor Graham Fieggen, who in 2009 received a medical doctorate for his work on the innovation known as the Cape Town Stereotactic Radiosurgery System. The system allows surgeons to set the device anywhere in the brain and in real time, allowing surgeons to remove cancerous and non-cancerous growths.

**Innovation, whether reflected in technology, design or systems, is the lifeblood of the health sciences; and at UCT it’s being harnessed to suit conditions in developing countries, where ‘simple’ and ‘affordable’ are watchwords. We take a look at several projects – many the result of cross-faculty collaborations.**

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**Titanium bones**

Mechanical engineer Dr George Vicatos has invented biomimetic and a life-long interest in the medical field to design artificial bones that are more effective in treating bone diseases. The titanium bone can expand or contract and can be used for patients at home and abroad. This technology is currently being tested in South Africa and is expected to be available for purchase within the next few years.

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**E-health mobile technology**

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Dr Ulri Kyllerman’s modified early warning score (MEWS) system for adult patients, incorporating innovative algorithms, has had a significant impact on ‘survival’ and the early detection of life-threatening conditions. This early warning system is a subject to the clinical skill of observation, standardisation and practice. The score is a tool for healthcare practitioners to use in the management of drug-resistant TB patients.

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Africans are hard hit by the worldwide shortage of healthcare workers, with only three percent of the world’s healthcare workers residing in Africa. This is a critical issue as it causes a significant burden for many African countries, leading to health disparities and inadequate healthcare services. To address this, initiatives such as the Africa Training in Africa, On Staying in Africa (ATAOS) program are crucial. This program aims to equip African students with the necessary skills and experiences to support their home countries. Two success stories from this program are highlighted:

**Theresa Shivera-Anton**
- **Internal Medicine Fellow**
- Currently at the University of Cape Town (UCT)
- Completed her postgraduate studies at UCT
- Specializes in general internal medicine
- Has a passion for teaching and believes it is crucial for young medical students to be nurtured.
Many of the bottled tissue and organ specimens in the collection at UCT’s Pathology Learning Centre – the biggest of its kind in Africa – are fast becoming rarities. While medical schools worldwide report declining autopsy rates. But now anyone can ‘adopt a specimen’ and conserve this treasure.

“Not much information around the world has collections like this,” says Fagan. “In Europe, the free text collections of organ and tissue specimens are vast. In the UK, MHRA collection. It is an international collection of clinical and physical specimens.”

Fagan said that people could apply to adopt specimens, either whole organs or specific specimens, from the collection. They are classified into various categories, such as heart, brain, or lung.

As a result, Fagan said, specimen adoption has become very popular, with over 1,000 applications for adoption in the past six months. The collection has also received inquiries from other medical schools in South Africa and internationally, including the United States and Japan.

Fagan added that the specimen adoption scheme is not only beneficial to medical students and researchers, but it also helps to preserve the unique collection.

As Fagan explained, the specimen collections provide an invaluable opportunity for medical students and researchers to study and learn from the specimens. The specimens are not only used for teaching purposes, but they are also used for research and clinical trials.

Furthermore, the specimen adoption scheme helps to conserve the specimens, which are at risk of deterioration if not properly preserved. By adopting a specimen, the students and researchers can help to ensure that the specimens are properly preserved and used for their intended purpose.

In conclusion, Fagan said that the specimen adoption scheme is a win-win situation for everyone involved. It provides a unique opportunity for medical students and researchers to study and learn from the specimens, while also conserving these precious resources for future generations.

The specimen adoption scheme is available to medical students and researchers, who can apply to adopt specimens from the collection. The application process is straightforward, and the students and researchers can choose which specimens they would like to adopt.

Through this scheme, the UCT Pathology Learning Centre is able to conserve its precious specimen collection, and ensure that this unique collection remains available for future generations.

Fagan said that he encourages anyone who is interested to apply for specimen adoption. The application process is simple, and it is a great opportunity to learn from these precious resources.

In summary, the specimen adoption scheme is a great opportunity for medical students and researchers to study and learn from the precious collections at the UCT Pathology Learning Centre. It is a win-win situation for everyone involved, and it helps to conserve these unique resources for future generations. As Fagan said, “This is a great opportunity to learn from these precious resources, and it is a great way to conserve these unique collections.”
There’s no doubt that research in the health sciences is incredibly important, but degrees in this field are known for being difficult – they’re incredibly competitive, not to mention time-intensive. What keeps students motivated when the going gets tough?

My goal is to reduce the disease burden in Africa through science, by contributing to unravelling the mysteries that surround poorly understood diseases and finding therapies using computational means. My first challenge was blending two fields that are traditionally considered divergent [computer science and biology]. Since my honours degree was entirely in computer science, I found it a little challenging grasping some biological concepts that I needed for my studies. I also spend a lot of time away from my family and friends back in Kenya, due to research demands and financial constraints. On the other hand, I have received a lot of support from the Faculty of Health Sciences not only in terms of funding for my studies but also the relationships that I have developed, especially with researchers in the Division of Computational Biology – for which I am very grateful.

I’d like to be able to make a contribution that is relevant in the clinical setting, such as earlier cancer diagnosis through the identification of suitable biomarkers, or the development of a drug that can prolong the life expectancy and quality of life of cancer patients. I am very grateful to have been given the opportunity to keep on studying and do what I love. This has only been made possible by the financial assistance I receive in the form of merit scholarships through the post-graduate funding office.

My field of study is in human genetics – specifically the pharmacogenetics related to breast cancer. There is a predisposition of women in my family to developing breast cancer, and seeing these beautiful, vibrant women reduced to shadows of their former selves motivated me to do something about it. I believe with a personalised medicine approach, we have the best chance of long-term survival.

I want to answer pressing medical questions that affect South Africa (and Africa), and contribute to the knowledge base by solving atomic structures by X-ray crystallography. I am currently trying to clone, express, purify, crystallise and solve the 3D atomic structure of proteins involved in the induced mutagenesis system of Mycobacterium tuberculosis [the bacterium that causes TB].

I am realising more and more now that medicine has granted me such privileged access to the lives and stories of people with whom I would never previously have engaged. I hope to leave my mark on the healthcare system and to honour the stories of the patients whose lives touch mine.

My research area is in maternal health, including health systems strengthening in primary healthcare and sexual rights. I chose this research area as I am interested in the health needs of women and how socioeconomic factors such as education impact the quality and access of reproductive health services. I’m interested in determining the role the health system plays in ensuring that women receive quality reproductive services at the primary healthcare level.

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Pursuing a PhD can be demanding. It can consume you if you allow it to. Of course this journey will cause some things to take a back seat; however, maintaining a balanced lifestyle is important. I absolutely love running and make a point of putting aside some time for exercise. Giving back to the community is also a priority; I am involved in a mentoring programme at an organisation called Ikamva Youth – we aim to equip students from disadvantaged communities with skills and resources to access tertiary education and employment opportunities.

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