UNIVERSITY OF KWAZULU-NATAL ™

INYUVESI YAKWAZULU-NATALI

LAUNCH OF THE
UKZN RESEARCH FLAGSHIPS

Senate Chamber,
Westville Campus, UKZN

5 September 2018

INSPIRING GREATNESS

NOTES

PROGRAMME

09h00	Welcome:	**Dr Albert Van Jaarsveld** Vice-Chancellor & Principal
09h15	UKZN Strategic Plan & Research Flagship Overview:	**Professor Deresh Ramjugernath** Deputy Vice-Chancellor: Research
09h30	Social Cohesion:	**Professor Relebohile Moletsane** Pro Vice-Chancellor
09h50	African Health:	**Professor Quarraisha Abdool Karim** Pro Vice-Chancellor
10h10	Big Data and Informatics:	**Professor Francesco Petruccione** Pro Vice-Chancellor
10h30	African City of the Future:	**Professor Rob Slotow** Pro Vice-Chancellor
10h50	Keynote Address: "Health in South Africa: Recent Trends, Challenges and Opportunities"	**Professor Salim Abdool Karim** Director: CAPRISA
11h30	Question & Answer Session:	**Professor Deresh Ramjugernath**
11h50	Closure:	**Dr Albert van Jaarsveld** Incoming CEO: International Institute for Applied Systems Analysis

SOCIAL COHESION

"Addressing Inequality and Promoting Nation Building"

Social cohesion, or "social integration and inclusion in communities and society at large, and the extent to which mutual solidarity finds expression among individuals and communities…" (Department of Arts and Culture, n.d.: 1) continues to elude institutions, communities and the South African society as a whole. Instead, inequalities, exclusions and disparities based on ethnicity, gender, class, nationality, age, disability and other 'differences' continue to engender discrimination, marginalisation and conflict, including violence and crime in various spaces. These inequalities and the factors that contribute to, or emanate from them, need to be addressed through a coherent research (and community engagement) agenda, with stakeholders from various disciplines and sectors participating actively in a mutually beneficial programme aimed at addressing inequality and nurturing social cohesion in institutions, communities and society.

Responding to this challenge, the University of KwaZulu-Natal, in its Strategic Plan 2017- 2021 identifies inequality, and in particular, unequal access to resources, as well as inequality of opportunity to personal and community development, as key challenges to social cohesion and nation-building in South Africa. To contribute towards addressing these challenges and building social cohesion in the institution, in communities and in South Africa broadly, the strategic plan focuses the UKZN research flagship: *Social Cohesion: Addressing Inequality and Promoting Nation Building* on "tackling factors that sustain inequality of opportunity and outcomes, by building capabilities, removing barriers, and redressing the wrongs of the past. Furthermore, UKZN will focus on leveraging successes in these areas for translation into real achievements for our citizens and communities, with an emphasis on the poorest of the poor and marginalized communities" (UKZN Strategic Plan, 2017-2021 p.10).

Approach

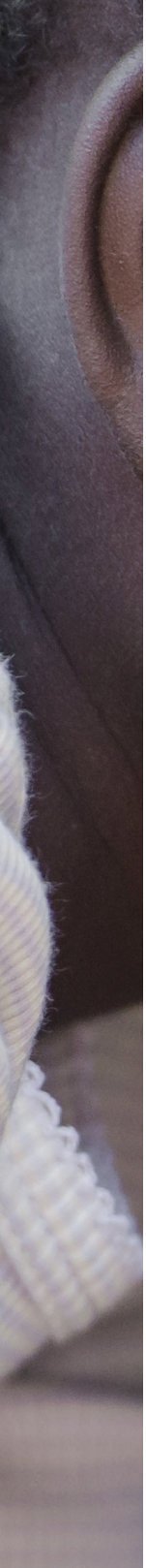
As a research Flagship, *Social Cohesion: Addressing Inequality and Promoting Nation Building* will:

1) Facilitate research to understand the various factors that contribute to and emanate from inequality, as well as to develop programmes aimed at addressing these at institutional, community and societal levels;

2) Function as a hub for community engagement and dialogue, and to facilitate conversations within UKZN, between UKZN and various communities, as well as national and international dialogues aimed at understanding and addressing inequality and promoting social cohesion and nation building;

3) Train and support a cohort of postgraduate students, researchers and practitioners who will contribute towards research and community engagement initiatives aimed at understanding the issues and finding/developing solutions; and

4) Facilitate multi- and inter-disciplinary collaborations within UKZN, and between UKZN and other scholars and practitioners at national and international levels.



AFRICAN HEALTH

"Saving Lives"

Information on mortality and causes of death is central to monitoring health, setting and reaching development goals (such as reductions in infant mortality, child mortality and maternal mortality rates) and in formulating evidence-based health policies. According to the latest report on mortality and causes of death in South Africa, in 2015 five conditions contributed to the largest proportion of deaths in the country: 1) tuberculosis, 2) diabetes, 3) hypertension, stroke and heart disease, 4) HIV and 5) lung infections such as influenza and pneumonia, the latter principally affecting children. The combination of deaths from infectious diseases, non-communicable diseases and mortality from injuries experienced in South Africa has also been described as the quadruple burden of disease that is increasingly common across Africa.

UKZN is already a recognised global leader in some priority areas of medical research such as AIDS and Tuberculosis. The *African Health* Research Flagship project provides an opportunity to build and expand this existing strength to maximally impact the top five causes of death in South Africa. It will bring together researchers from across the Institution to identify potential high impact studies and to provide these with institutional support and linkages. For each of the top five causes of death, a community (group) of researchers across disciplines and areas of study will be brought together to enhance their prospects of success. New knowledge or technologies that contribute to reducing the country's disease burden have the potential to make the greatest impact in saving lives and enhancing UKZN's reputation and impact on health in South Africa, Africa and globally**.**

Approach

The *African Health* Flagship aims to strengthen UKZN's research performance to impact on saving lives through strategic investment in university-wide, cutting-edge research to be world class on a sustainable basis serving as a mechanism for attracting and retaining the best students and staff. Among others, this research flagship investment strategy entails the:

1) Development of a critical mass of expertise, information and infrastructure that transcends individual contributions;

2) Establishment of select trans-disciplinary areas that traverse the boundaries of the existing four Colleges;

3) Establishment of key and strategic national and international partnerships in these key priority research areas;

4) Concentration of internal and external resources to enhance the quality and impact of the knowledge generated; and

5) Structured mentorship and training of science leaders.

BIG DATA AND INFORMATICS

"Computing Solutions"

We are living in exciting times, in which the traditional "offline" world is constantly "online" and where this new "online" world is influencing more and more the "offline" one (O2O). The convergence of cyber-physical systems, the Internet of Things and the Internet of Systems are at the core of the 4th Industrial Revolution (4IR) and are impacting on most scientific disciplines, economies, and industries. At the same time, we are experiencing a 2nd Quantum Revolution, which exploits the "spooky" properties of Quantum Mechanics, to give us access to formidable new technologies, such as quantum metrology, quantum communication and quantum computing, which will be crucial to the success of the Big Data centred 4th Industrial revolution.

UKZN embraces these ground shifting developments and is ready to exploit the countless opportunities that the 4th Industrial Revolution and the 2nd Quantum Revolution are offering. UKZN is already a global leader in some areas of the Mathematical, Physical and Biological Sciences and Engineering, ranging from astronomy to bioinformatics and from quantum information processing to Big Data analytics. Common to these areas is the use of the most advanced classical and quantum computational techniques for generating innovative, competitive and productive solutions.

The Research Flagship, *Big Data and Informatics: Computing Solutions* offers UKZN the opportunity to build on existing strengths to expand to a focused set of high impact research and development studies of relevance to the promotion of the 4th Industrial Revolution in Africa. The Flagship involves the identification and establishment of trans-disciplinary areas of research that traverse the boundaries of existing Colleges and Schools. It will train students that master the fusion of technologies that are blurring the lines between the physical, digital and biological spheres and are ready to take advantage of the disruptive innovations of the 4th Industrial Revolution. The Flagship will develop tools relevant to all Flagships and academic activities of the University.

The University of KwaZulu-Natal aims at becoming the pioneer of the intersection of classical and quantum information processing for Big Data analytics in South Africa. Being able to exploit Big Data as an instrument to create value and to address both local and global challenges, as well as fundamental science questions, requires research and innovation in analysis techniques and technology. The capturing and processing of Big Data are central to the scientific and technological achievements of the Flagship. UKZN wants to be a leader in the science underpinning the convergence of disruptive digital technologies and breakthroughs in the physical and biological sciences and deliver increasingly sophisticated products and services and have a positive impact on socio-economic development in Africa.

AFRICAN CITY OF THE FUTURE

"Most Liveable Cities"

According to UN-Habitat, Africa is urbanising at a rate of 4% per annum, particularly in developing countries. Over the next two decades, cities in Africa will experience higher growth rates than other regions of the world. It has been said by the director of UN-Habitat that urbanisation in the Africa of today is an untapped tool for development and economic growth. This rapid rise in the population of African cities, however, presents a range of socio-economic challenges. Urbanisation has the potential to catalyse Africa's structural transformation, if managed properly. Together with good planning of urbanisation and industrialisation, economic growth and human development can be achieved in a sustainable manner.

Challenges, which need to be addressed, include congestion, infrastructure (water, housing, sanitation, and energy), food security, pollution, social disaggregation, unemployment, service delivery, crime, violence and lawlessness, child and women vulnerability, health issues, environment, proper urban planning and design. These challenges provide an opportunity for all disciplines in the University to come together to work in an interdisciplinary, multi-disciplinary synergistic approach to find solutions which are unique and indigenous to the continent that we reside on. In addition, the *African City of the Future* will encompass concepts such as smart cities, aerotropolis, autonomous vehicles, urban agriculture, as well as the ocean economy for cities that are along the coast.

The proposed research flagship will bring together researchers from across the Institution to work closely with the municipalities, and provincial and national governments to find sustainable solutions to the challenges associated with rapid urbanisation and the vision of developing African cities which are on par or better in terms of liveability than leading global cities.

Approach

In order to have the greatest impact on society, research (knowledge and understanding) and human capital development (teaching and training) need to be aligned with the government frameworks for improving the wellbeing and livelihoods of our people. UKZN plans to work closely with the Provincial KZN Department of Cooperative Governance and Traditional Affairs (CoGTA), which has the mandate for oversight of municipalities within the province, including eThekwini Metro. As the project cuts across government departments, we will also work closely with the KZN Premier's Office, and other departments such as KZN Agriculture and Rural Development and KZN Economic Development and Tourism. The key cities of focus will be eThekwini and Msunduzi Municipalities as partners.

We intend that the research under the flagship is framed for impact, and we will develop clear value chains of research leading to policy improvement (policy briefs), planning improvements (strategic plans), implementation improvements (implementation and business plans), and innovation and entrepreneurship (innovation hub and aerotropolis, start-ups).

Research will be transdisciplinary, developed and implemented in partnership with government and industry practitioners, and include university staff, students, and collaborators from multiple disciplines. Research support will be targeted to improve capacity to implement and deliver transdisciplinary work, as well as to support career development of South African, African staff to become leaders in African cities research.

We will leverage funds through partnership with a few key global institutions, for joint application to large global funders, and to identify a few additional African cities as case studies. This will be facilitated through a consultative process, followed by seed funding for consortia of academics, for postdocs, and for PhD students, as well as a few strategic fractional appointments for international colleagues.

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