Aiming for the Top

The Wits 21st Century Research Institutes

Aiming for the Top
Six new centres of research excellence 2
A top 100 university 3
Ambitions of the new Wits institutes 4
Setting high standards 5
Wits University today 6

Evolutionary Studies Institute 8
City Institute 12
Sydney Brenner Institute for Molecular Bioscience 16
Wits Mining Research Institute 20
Global Change and Sustainability Research Institute 24
Institute for Well-being and Development 28
Six new centres of research excellence

The Evolutionary Studies Institute will be a centre of excellence in the palaeosciences, using cutting-edge research techniques to understand South Africa's unique fossil and archaeological record.

The City Institute will study the challenges of urban development in emerging economies, and how cities can foster prosperity, democracy and peace.

The Sydney Brenner Institute for Molecular Bioscience will be a leader in African health research. It will work with the wide genetic diversity of African populations to understand the molecular and genetic roots of disease.

The Wits Mining Research Institute will help a key part of the South African economy to reach its potential while developing communities and safeguarding the environment.

The Global Change and Sustainability Research Institute will combine science and social science in a multidisciplinary approach to Africa's critical social and environmental challenges.

The Institute for Wellbeing and Development will cast new light on the challenges of poverty and inequality with global dimensions.
The University of the Witwatersrand (Wits) aims to be a top 100 global university by its 100th anniversary in 2022. The University’s bold strategy to achieve its top 100 ambition includes the creation of six prestigious new 21st Century Research Institutes to build on its areas of greatest strength. The Institutes represent areas where Wits can exploit a competitive advantage through academic excellence or geographic location.

Each institute will draw upon multiple disciplines in a search for answers to the world’s most important questions and urgent challenges.

The institutes are built upon Wits’ unique academic, geographic and social advantages in research fields in which it already has an outstanding reputation.

They all have the potential to attract significant funding on the basis of a proven ability to deliver social, economic and intellectual impact.

They will be well-funded long-term centres of excellence that are home to the best international researchers. They will inspire students and academics to strive for excellence.

Sustained and strategic interaction with business, government, non-government organisations (NGOs) and communities will enable the institutes to enhance the value and relevance of research, and deepen public understanding of the compelling issues of our time.
Ambitions of the Wits 21st-Century Research Institutes

The new institutes will foster an international reputation through research of the highest quality based on complex multidisciplinary questions. They will generate new knowledge, influence policy and have a sustainable social and economic impact both locally and abroad.

Each institute will be a major intellectual centre with at least 100 academic staff, and teams of researchers working in local and international networks. They will enjoy substantial funding through endowments and grants.

Key to the success of the institutes will be long-term collaboration with industrial, social and academic partners who will enable Wits to build its reputation as an intellectual powerhouse and increase its influence in South Africa, Africa and the world.

The institutes will make the University and the Johannesburg region a world-class centre of intellectual engagement and a preferred destination for top international scholars.

The institutes will contribute to a doubling of Wits’ research output.
Setting high standards

The six new institutes all meet minimum conditions:

• Wits already has a strategic advantage in the institutes’ research disciplines, with a distinct scientific, geographical, sociological or historic edge

• Each institute is based upon Wits’ outstanding reputation as a significant international player in the field

• Each institute is characterised by research excellence and publications of the highest quality

• Research in each institute is multidisciplinary and focused on questions of local and global importance

• Each institute will be financially viable and largely self-funded through grants and endowments

• Each institute will achieve critical mass and at least 100 academic staff

• Each institute will engage with and influence Johannesburg and the Gauteng province through its respective outreach and accessibility
Wits is a major African university. It is one of only three universities on the continent that consistently features in international rankings.

Wits is proud of its four Nobel laureates and 91 Rhodes Scholars.

Wits has more than 40 research projects in other African countries. It is home to 19 prestigious national research chairs and dozens of privately-endowed chairs.
Wits is a leading African university with a world-class reputation for excellence in teaching, research and impact.

The University is located in the inner city of Johannesburg in Africa’s economic heartland of Gauteng, a dynamic commercial province that serves as the gateway to sub-Saharan Africa.

Wits employs, educates and accommodates tens of thousands of people, and is a stable and civic-minded contributor to urban development and revitalisation.

Wits embraces its role as a centre of academic excellence in a developing nation with first world infrastructure and huge social challenges. It has global reach and local impact.

Wits is at the forefront of a changing society. It is committed to sustainable social and economic transformation in South Africa while building its competitive position among the very best universities internationally.

In 2011 the University had 30,000 students and more than 2,000 academic staff. It has produced more than 130,000 graduates, many of whom are leaders in their fields in South Africa and internationally.

Wits is home to 220 nationally-rated scientists and 37 research entities.
The richness and completeness of South Africa’s fossil record makes it a prime laboratory for studying the origins of species through time, including human origins.

An abundance of archaeological sites hold evidence divulging the evolution of modern human behaviour.

Wits owns some of the most important fossil hominid sites in the world. It has large and internationally-acclaimed fossil collections of ancient dinosaurs, therapsid mammal-like reptiles, plants and fossil hominids.
The Evolutionary Studies Institute at Wits will be a South African centre of excellence in the palaeosciences and a global hub for the study of the origins of species. The Evolutionary Studies Institute will adopt a multidisciplinary approach to research incorporating the disciplines of palaeontology, palaeoanthropology, molecular biology, genetics, geosciences, archaeology, geography, biology, ecology and climatology.

Genetic evidence and the geological record are an archive of past biodiversity and reveal the effects of global mass extinctions, making these disciplines particularly relevant as the Earth faces a biodiversity crisis in the midst of the so-called 6th extinction.

Southern Africa, with its rich geological, palaeontological, palaeoanthropological and archaeological record, covers a vast time-period, ranging from the origins of life to recent time, is one of the few regions enabling researchers to understand both past and present changes in biodiversity.

It also preserves a record of Earth from the earliest evidence of life 3.5 billion years ago to the origin of humans and their culture in the last 150 000 years. Wits has an eight decade long and proud tradition of palaeontological and palaeoanthropological research, and has amassed large and internationally important fossil collections that are utilised by researchers around the world.

The University owns and manages important fossil sites in the Cradle of Humankind World Heritage Site area.

The Institute will be the hub of multidisciplinary research programmes that map the history of life on Earth through the fossil record, while also exploring the driving mechanisms of biodiversity changes though time.

The new Institute combines the strengths of Wits’ Institute for Human Evolution, the Bernard Price Institute for Palaeontological Research, and many allied disciplines. It aims to expand and extend South Africa’s position as the global leader in the palaeosciences, be an international training centre, a magnet for leading academics, and the centre of South African efforts to develop a prosperous palaeotourism industry.

Wits’ contribution to the palaeosciences includes the discovery of the oldest dinosaur eggs and nests, the earliest sauropod dinosaurs, description of Australopithecus africanus (Taung skull) in 1925, and the discoveries of Australopithecus sediba and “Little Foot”.

Wits played a key role in having the Cradle of Humankind declared a World Heritage Site.
The City Institute
“Johannesburg has everything a researcher of cities and urban social interaction could ask for. Its layers of history and extremes of achievement and expectation make it a fabulous place to understand and guide metropolitan people, policy and practice.

The huge potential, rapid change, contested democracy and social and economic challenges of Johannesburg make it one of the key global settings for the multidisciplinary study of cities.”
The City Institute at Wits will expand knowledge about cities with a focus on the challenges and potential of urban development in democratic emerging economies.

It will study cities like Johannesburg, with extreme income inequality, rapid growth and social change driven by migration, economic shifts and political instability.

Wits’ location in Gauteng at the economic crossroads of Africa makes it ideal to explore how complicated urban environments can harness their full capacity to become high-performance cities.

Research programmes at the City Institute will build an understanding of changing social forms in cities, and factors contributing to their development and decline.

The Institute will explore how cities can foster development, democracy and peace, with research programmes exploring their physical, social and economic construction.

It will seek insights into contemporary cities through multiple academic disciplines as diverse as anthropology, architecture, engineering, town planning, economics, history, sociology, public health, law, geography, history, music and art.

The City Institute will build on Wits’ relationships with provincial and city governments, and the National Planning Commission, and academic links with developing cities in Asia and Latin America, as well as Europe and North America. Connections between Johannesburg and cities experiencing rapid economic change in Africa will provide a path to rethinking urbanism on the continent.

The Institute will harness the knowledge and capacity of existing Wits research centres in migration, urbanism and the built environment.

The City Institute is located in one of the world’s most fascinating and fast-changing urban centres. Johannesburg is a comparatively new city characterised by extremes in wealth, rapid demographic change and multiple cultures learning to live together in an era of recent and continuing political and economic transformation. It is a high-functioning city with top-level infrastructure and significant wealth alongside poverty, deprivation and urban malfunction.
The World Health Organization has identified lifestyle diseases as the biggest future burden on healthcare resources as African populations move towards urban areas and adopt Western lifestyles.

Infectious diseases like malaria and HIV are in decline but remain a serious health challenge.

Research at the SBIMB investigates the molecular and genomic basis of diseases that are common among African populations. Scientists are collaborating across disciplines and institutional boundaries with several broad aims:

• Uncovering African genomic diversity
• Delineating the molecular epidemiology and evolutionary biology of diseases in Africans
• Understanding diseases in Africans by studying the life-course of individuals
• Discovering the molecular basis of host defence mechanisms in Africans
• Exploring novel drug targets and dynamic responses to treatment
The Sydney Brenner Institute for Molecular Bioscience (SBIMB) aims to become a leader in African health research. It will explore the wide genetic diversity of African populations to understand the molecular and genetic roots of disease.

Scientists will study diseases on the rise in Africa, such as diabetes, hypertension, obesity and cancer, as well as infectious diseases.

The Institute builds on Wits’ strengths in medicine and molecular bioscience, and will draw on the University’s excellent research units covering protein biochemistry, genetics, structural biology, tuberculosis and heart and kidney disease.

It will have strong ties with Wits’ medical and science faculties, and eight South African academic hospitals. It will house nearly 200 researchers in a purpose-built facility on Wits’ Parktown campus, next to the planned Nelson Mandela Children’s Hospital.

The SBIMB already has a functioning Advisory Board and Scientific Advisory Committee, with international academics.

Research disciplines include molecular and cell biology, genomics and bioinformatics. Facilities will be built for integrated high-throughput laboratories with advanced computational capacity. The Institute is establishing a new bio-repository of large collections of DNA samples.

Cross-disciplinary collaboration in world-class facilities will encourage researchers to tackle scientific and medical questions from new perspectives, and to attract the best academic talent drawn by the challenge of identifying and treating disease.

Very little work has been done internationally on African population genetics, which gives Wits and the SBIMB an opportunity to build a leading position in an area which is vital to the development of personal medicine and customised drug design.

The Institute is named after Sydney Brenner, a Wits graduate who jointly won the 2002 Nobel Prize for Physiology or Medicine for discoveries concerning genetic regulation of organ development and programmed cell death.
Mining is where Wits started and the University is located amongst some of the world’s richest mineral resources. The University grew out of the South African School of Mines, which started in Kimberley in 1896, later becoming the South African School of Mines and Technology in Johannesburg in 1911.

Wits has over the past century supplied South Africa and the global mining industry with geologists, mining engineers, metallurgists and managers, and has been generously supported by industry through endowments, student bursaries and research grants.

Africa is renowned for its extraordinary mineral wealth, yet the last two decades have seen limited research in mining, minerals and exploration. New methods of mining and exploration, policy changes, health and safety, environmental impact, sustainability, and the impact on communities have all become crucial issues in African mining. There is an urgent need in Africa to develop increasing numbers of trained postgraduates in the sector.

The Wits Mining Research Institute will be home to Africa’s leading multidisciplinary research in all technical, social, and economic aspects of mining. It will help a key part of the South African economy to reach its potential while developing sustainable communities and safeguarding the environment.

The Institute will reverse a recent decline in South Africa’s mining research output. It will expand mining research from geology and technical studies to include the social impact of mining, community participation, land rehabilitation and labour issues.

The new Institute will stimulate collaboration between disciplines as diverse as law, management, sociology, migration, economics, engineering, healthcare, materials science, geology, energy, environmental science and community development.
Mining is vital to the South African economy and is key to jobs and development. It contributes substantially to the South African GDP and half of export revenue. South Africa has some of the richest mineral resources in the world. More than half a million people are directly employed in mining, and another half million indirectly. Yet the sector underperforms against potential, has limited value-adding beneficiation, and faces threats including cost increases and demands for nationalisation.

Among specific challenges are the extraction of gold in narrow reefs at depths hostile to human survival, and the identification and exploitation of resources in remote and sensitive environments. The mining sector also faces the triple pressures of commercial survival, increasing labour and community benefits from mining, and protecting the natural environment.

The Institute will contribute to the opening of new mining areas, a national mine closure strategy, the development of a minerals beneficiation economy, and the nurturing of skills in a key sector of the economy.

Research will include exploration, safety in mining, economic geology and the efficient extraction of resources, environmental sustainability, deep-level mining, safety and occupational health, and the full spectrum of social impacts and mine rehabilitation.

The Institute will provide independent evidence-based advice to industry and government. It will undertake valuable contract research and development, develop skills and expertise, and increase South Africa’s capacity for mining research and development.
The Global Change and Sustainability Research Institute
“The Institute aims to stimulate a new kind of interdisciplinary thinking and an approach to global change which combines the skills and knowledge of multiple academic disciplines to create resources and policy which have a practical effect outside of the University.”
The Global Change and Sustainability Research Institute combines science and social science in a multidisciplinary approach to Africa’s critical environmental challenges.

Research will seek to understand and address resource depletion, habitat destruction and climate change in the context of human behaviour and development, and the social, economic and political changes required to adapt to global change.

It will study the impact of global change on Africa and its people, and how the continent can respond to it.

The complex issues behind global change will be tackled by the distinct but related academic capabilities of environmentalists, social scientists, climate and energy experts and economists, all working with government, industry and civil society.

The Institute is characterised by a strong focus on environmental science, social science and business studies. It will look at issues of migration, vulnerability and risk, resource extraction and human behaviour related to global change, and working closely with researchers in environmental science, law and policy.

It will study pollution and the health of ecosystems, as well as the building of resilient cities and communities for sustainable urban living.

The Institute will develop a new generation of academics and leaders to address the challenges of global change.
The Institute for Wellbeing and Development
“Poverty is a highly differentiated experience. Even in what appear to be uniformly impoverished communities the distinctions are far greater than we’ve ever understood.

We are bringing exceptional science to the most needy and least understood social infrastructures.”
The Institute for Wellbeing and Development will study rapid and complex changes in health and development, and explore how poor, marginalised and vulnerable people can realise their potential in society.

Wits is already the hub of international research networks looking at poverty, health and disease, migration, livelihoods and the family in rural and urban settings.

The Institute will study the causes and consequences of vulnerability and resilience, and how to intervene most effectively. It will cast new light on social challenges with global dimensions, and will help governments to get the best return on their investment in health, education and related sectors.

The Institute builds on the capabilities and reputation of Wits in public health, child health and clinical medicine, social and political science including population and migration studies, policy and management sciences, molecular biosciences, computing and statistics, applied mathematics, and environmental sciences.

It is based on more than 20 years of internationally significant long-term rural and urban research at the University. The Institute’s work will build on the efforts of an array of academics and hundreds of local field staff already working with households and communities in Wits’ key rural and urban development study areas.

Scientists in these studies already enjoy close partnerships with leading universities and research groups in the US, UK and Europe, and are leaders in comparative developmental research networks in Africa, Asia, and South America.

The location of Wits’ longitudinal research and development platforms in areas of great need enables researchers to get to grips with society’s most intractable problems. They enable academics to go beyond simple descriptions and to analyse the primary causes of development failures. This evidence-based methodology is fundamental to determining where social investment has the greatest impact.

Researchers at the Wits Institute for Wellbeing and Development will play a key role in evaluating the impact of government policy on the ground, and how existing interventions benefit those at whom they are aimed. The Institute will be known for the analytical and technical competence of its research output, and its impact on all deprived people living within middle or low income settings.
Wits aims to be a top 100 global university by its 100th anniversary in 2022.

It has created six prestigious new 21st Century Research Institutes to build on its areas of greatest strength.

- **The Evolutionary Studies Institute** will be a centre of excellence in the palaeosciences
- **The City Institute** will study the challenges of urban development in emerging economies
- **The Sydney Brenner Institute for Molecular Bioscience** will be a leader in African health research
- **The Wits Mining Research Institute** will help a key part of the South African economy to reach its potential
- **The Global Change and Sustainability Research Institute** takes a multidisciplinary approach to Africa’s social and environmental challenges.
- **The Institute for Wellbeing and Development** will cast new light on the challenges of poverty and inequality.

www.wits.ac.za/research