

| HIMLA SOODYALL |

TOP THREE AWARDS

- National Order of Mapungubwe (Bronze), 2005
- President's Award National Research Foundation, 2000 – 2004
- Vice-Chancellor's Award for Research, University of the Witwatersrand, 1999

DEFINING MOMENT

Soodyall's world changed forever during her first pre-natal genetic diagnosis. "Sitting in the dark room when we still worked with autoradiographs, holding it up against the safely light... it was a case of cystic fibrosis, in a sample taken from a foetus. Both parents were carriers and had an affected child, and we saw that indeed the foetus would have cystic fibrosis as well. Here I was, looking at scientific evidence that changed my mind about the 'sins of the father' dogma that I was raised on. This is science. This is inheritance. This is a biological thing. No devil did this. And it was something I had to embrace since I felt that I was part of an instrument that would be the bringer of bad news to a family. No one trains you or counsels you on how to deal with that."

WHAT PEOPLE DO NOT KNOW

Soodyall often stays up at odd hours to watch tennis, and she always enjoys a joke, saying, "My laughing always gets me into trouble". One joke she didn't enjoy in 2005, was not a joke at all: the Presidency had some trouble getting hold of her to notify her that she had been awarded the National Order of Mapungubwe because she put the phone down on them, assuming it was a prank call.



RECOGNISED FOR ABILITY ABOVE ALL

Professor Himla Soodyall is a renowned geneticist, science communicator and advocate for respect and equality in all things. Originally from a conservative, apolitical family in Durban, Soodyall moved to Johannesburg in 1986 to pursue a Masters degree in biotechnology at Wits which led to her career in human genetics the following year.

Today, her research interests cover human population genetics, human origins, genetic susceptibility to disease and the ethical and social responsibility of science.

Soodyall spent some years in the US, at Pennsylvania State University, which had a big influence on her, both as a scientist and as an individual. She joined the South African Institute for Medical Research (SAIMR), (now transformed into the National Health Laboratory Service [NHLS]), in 1987 as a medical scientist and is also an Associate Professor in the Division of Human Genetics at the University of the Witwatersrand (Wits). Some of her activities include improving health services and policies on inherited genetic disorders, conducting genetic ancestry tests as a service to the public, expanding on population genetic research to understand the affinities of the peoples of Africa and engaging the public on important scientific issues. She is also the General Secretary of the Academy of Science of South Africa (ASSAf), a board member of Genetic Alliance South Africa, a member of the Council of Human Genome Organisation, Chairperson of the Research Development Committee at the NHLS, and a board member of Yazi (Centre for Science and Society in Africa).

With the advancement of recombinant DNA technology in the late 1980s, geneticists saw opportunities to use this technology to engineer 'superbugs' that could clean up crude oil spills, and successfully produce insulin in a Petri dish rather than in pigs. They could also use molecular genetic methods to provide insights into the roots of humanity showing that Africa, more specifically southern Africa, could be the most likely geographic region for the origin of our species.

Indeed, molecular biology was taking off, but South African researchers, despite having relatively easy access to the ancient human DNA that was in high demand the world over, were isolated from the global scientific community.

"We were hit with the academic embargo during the latter part of the apartheid era," recalls Soodyall.

"When I was working on my PhD we had no access to the computer software used to draw phylogenetic trees [diagrams showing the relationship between species based on genetic similarities]. And if you wanted to do statistical analysis on your data, the programmes were simply not available to South Africans," she says.

Soodyall only really became aware of these political hindrances to the tools of genetics research, and of the depth of genetics research itself, when she arrived at Wits to complete her MSc in biotechnology in 1987. Before that, she had been finalising her studies in microbiology and biochemistry at the former University of Durban-Westville (UDW) (now part of the University of KwaZulu-Natal) while living at home with her parents, who were largely apolitical.

It was during her early studies that Soodyall had first heard about recombinant DNA (strands and loops of DNA designed by researchers and created by 'cutting and pasting' genes and regulatory regions together), which could be used to genetically engineer living things. At the time, she didn't have access to this emerging technology, but a bottle of crude oil suspended in water, which had been sitting on the window sill of the head of department for years, sparked something within her.

"I had read a magazine article about a superbug created using recombinant DNA technology. They took genes that coded for enzymes that could break down crude oil and put them inside a bug [bacterium] using circular genetic material called plasmids. They called the result a superbug, and the intention was to produce it en masse and apply it to oil spills."

Because she had read about plasmids in the superbug article, Soodyall tried to find microorganisms containing plasmids in her own Honours project, the main objective of which was to identify microbes that could survive and thrive in crude oil.

"If I look back at my project today I don't think I even saw a plasmid," she says, "but it was so sexy at the time that I was convinced I had!"

She had also read about the artificial production of insulin, a life-saving hormone for diabetics, and decided that she'd like to explore similar biotechnologies further at Wits. Despite not having her exam results yet, but with excellent recommendations from her supervisors at UDW, she was placed on a shortlist for a biotech MSc at Wits.

"I got a call from Prof Helen Garnett, then Head of Microbiology at Wits, asking me to come up to Johannesburg to meet her." She had to be there within a day and in her words, the umbilical cord was still attached at that point, but her father encouraged her to go, so she left her home for the first time, on a bus to the City of Gold.

Once in Johannesburg, a spot opened up in the biotech MSc course. Academically, Soodyall breezed through, but there were other challenges.

"Remember, I was a person of colour so all the apartheid rules of housing segregation applied. But I had to be close to the lab, so if I stayed in Lenasia or Azaadville, where Indians were supposed to stay, how would I get there?"

Instead, she lived with a mixed-race family (white/Indian) in Mayfair for two weeks before she was able to rent accommodation in Hillbrow, then considered a "gray" area, and was able to walk to and from Wits, and later the SAIMR.

Soodyall met Prof Trefor Jenkins at the SAIMR. "I got interested in the history of the peoples of Africa through conversations with Prof Jenkins because he was a true mentor," she says. Jenkins, originally from the UK, became interested in this subject himself through conversations with renowned evolutionary biologist Prof Philip Tobias.

"We all had tea together every day and talked about all sorts of things. I had never done genetics, since I had come through the ranks of microbiology and biotechnology, but I started reading and I had to be a sponge to soak up the basics that I hadn't gotten a grounding in.

"Fortunately I was a good learner, and a hard worker, and I could apply my hands and my mind to understand the technologies."

Her efforts and smarts eventually resulted in a fellowship to Pennsylvania State University (Penn State) in the US. Says Soodyall, "I was thrown into this big league and my growth was exponential". She means as a researcher of course, but also as an individual in terms of her politics and world view.

"I had grown up neutral to politics, but at Penn State I met and engaged with black students from South Africa, who would talk politics and tell me which movies I should watch," she says. "I became more aware of political situations in the country and the foundation and dynamics of the academic boycott, even though I lived through it in the early 1980s."

"But the experience at Penn State felt like being a kid in a candy store. I was in an environment among the leaders in molecular evolutionary genetics. You could walk anywhere and speak to someone whose name you've seen on big academic papers. It was like a *dorpie* going into a big city, that's how I felt."

Knowing those scientific heavy-weights on a first-name basis on one hand inspired Soodyall to work harder than ever to live up to their expectations, but it challenged her personally on the other. "It was very different to my experience as a non-white in South Africa, and to my cultural upbringing where we had strict rules of respect and how you deal with elders irrespective of colour."

Sitting on desks, wearing shorts to work and addressing professors by their first names was all very new. But Soodyall embraced the exposure to American culture, and extended her time there to learn the basics of mitochondrial DNA analysis under Prof Mark Stoneking before finalising her PhD back at Wits.

Two years later Soodyall returned to Penn State to complete another fellowship under Stoneking, and she trained many of his anthropology students while she was there. "I was grateful for the opportunity. People took time to support me and show genuine friendship during these formative years, and having learnt from these experiences I try to do the same for others when and where I can because I wouldn't be in the position I am now given the hiccups I experienced along the way and the environment I came from." The students she engaged with at Penn State are all in top positions today.

Another thing Soodyall took from her experience at Penn State was being recognised for her work regardless of her sex or race.

"In the US people respected and included me in activities because I was a good scientist, and I hope because of my personality. It was an opportunity to find my space outside of the baggage that I grew up with. And while I have on my radar the discrepancies of the past, I never, ever allow that to come into my path."

"If I'm asked to apply for women-in-science awards, I say 'No'. I want to be recognised as a scientist, not because I am a woman. When people ask me to apply for top positions because they want to feature women of colour, I say 'No, I'm not interested'. I do not want my achievements to be associated with demographics, but rather with scholarship."

IN FAVOUR OF TRANSFORMATION

Despite her strong stance on this issue, Soodyall is in favour of transformation among scientists, which is part of her mandate as General Secretary of ASSAf. But real transformation and equality, she says, means being truly recognised for one's abilities above all, regardless of race or sex. "Many things contribute towards transformation and we should endeavour to do this holistically, with an understanding of the past and factors that contribute to inequity."

Soodyall also knows that it's not only women and people of colour who are at a disadvantage in South Africa, but that those suffering with con-

genital birth defects and rare diseases, roughly 15% of the population, are too. She uses her position at ASSAf and as a board member of the Genetic Alliance South Africa to act as a voice for these marginalised members of society, and to make evidence-based recommendations on related national health policies.

This work underlines Soodyall's academic interest in the genetic susceptibility of people to diseases, as well as her advocacy that science should be ethically and socially responsible, and that scientists should engage with the public at all levels as well as with government.

Soodyall herself often promotes and facilitates public engagement with science, particularly through the work she is most known for in the public eye: genetic ancestry testing.

"I strongly believe that in the same way we can make time to go to individuals requesting them to participate in our studies and get informed consent, we have a responsibility as scientists to make time to share the results with the people who make us successful as scientists," she explains. "When we studied the San in the Kalahari, we went back to celebrate Heritage Day with one of the groups we worked with in order to try and bring back the science buzz to the community level."

Although that was some years ago, to this day Soodyall gets calls from individuals who would like to trace their ancestry. "One person having an ancestry test becomes a conversation at a dinner party, and suddenly people are talking about it and more people who have access to resources can do it," she says. "That shows the cascade of how to stimulate interest in the sciences."

One of the simplest metaphors Soodyall uses to explain genetic ancestry and evolution to lay people, is that we are all leaves on the branches of the tree of life, which has a single common trunk. "Our leaf may be placed on a different branch, but we're still part of the same tree. It shows unity and togetherness," says Soodyall.



Despite this clear message that all humans are the same species and descend from a common ancestor, some, including other scientists, have labelled Soodyall's work as racist science. They argue that genetic ancestry talks about identity, which might be used, for example, to show someone is a direct descendant of a particular tribe that occupied a particular piece of land before Europeans arrived. Soodyall has however always insisted that genetic tests have nothing to say about a person's identity, and she fervently advocates against discrimination based on race.

But changing people's opinions about science must always be done from a point of respect, says Soodyall. This is particularly true for sciences that deal with human origins, since many people have their own beliefs shaped by religion and experience.

"I also have my own beliefs, and I don't force them on anybody else. But if I'm asked, I will explain how my position on issues changed and adapted as I began to understand evolution," she says. "People are able to make sense of the world for themselves, so it is only up to me to provide information we have at hand, and whatever they decide to believe in is fine with me."

This rings true within Soodyall's own family – her convictions don't always align with their traditional beliefs, but she says it's important to find a bal-

ance between what one feels strongly about and what one thinks is the right thing to do. "For example, when my mother died I did the rites and rituals because that's what she would've wanted. The most important thing is respect. You've got to have respect for all individuals, all beliefs."

Something that particularly infuriates Soodyall, is the lack of respect many people today show towards their parents. Prior to her passing, Soodyall had cared for her mother during an illness, despite having to travel often as part of her responsibilities as principal investigator on a National Geographic Society project.

"For me it was a privilege and an honour to be able to give back to my mum for the sacrifices she had made in her life and career to give us the opportunity to study," she says, adding that parents unreservedly take care of their children until they 'break the umbilical cord', as she had done when she first moved to Johannesburg nearly 30 years ago.

And looking forward ten or 20 years from now, Soodyall says, "If I were to reflect down the line on what made me come to work every day, it would be a kind of buzz; that buzz of having the fluidity between what is your heart's calling and how that blends into engagement with people around you".

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C. ASSAf Policymakers' Booklets

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Academy of Science of South Africa (ASSAf)

Academy of Science of South Africa

Academy of Science of South Africa (ASSAf), (2017). Legends of South African Science.

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