

...the biggest challenge of the job:
"The work is experimental. This means that things don't always work out how you had hoped!"



The Public Understanding of Biotechnology (PUB) Programme was launched in 2003 by the Department of Science and Technology to ensure a clear, balanced understanding of the scientific principles and issues related to biotechnology and to promote public engagement through dialogue and debate to enable informed decision making.

CAREERS IN BIOTECHNOLOGY



PUBLIC UNDERSTANDING OF BIOTECHNOLOGY

PUB is an initiative of DST and implemented by SAASTA

...the biggest challenge of the job:
"The personal frustration that comes from knowing that although we have succeeded in creating an improved plant through genetic engineering, it might never be sold commercially because of consumer resistance."



Around the world, making sugar is a very competitive industry. In South Africa, half of the sugar produced is exported, but it is difficult to make a profit due to the low sugar prices worldwide. New ways have to be found to keep our sugar production competitive. One way is to grow types of sugarcane that are best suited to the South African growing conditions.

Who can help our sugarcane growers by making their plants resistant to pests and diseases?

The Agricultural Biotechnologist!

Meet Sandy Snyman, a Senior Research Officer in the Biotechnology Department of the South African Sugarcane Research Institute (SASRI) near Durban **BSc (Botany and Microbiology), BSc Hons (Plant Pathology), MSc (Biology), PhD (Plant Biotechnology)**

What does Sandy do?

Sandy's job is to improve sugarcane in South Africa. She uses different methods, including Genetic Modification (GM), which changes the genetic "recipe" of the sugarcane. This is when a new gene that codes for a particular characteristic (e.g. insect resistance) is put into the sugarcane plant.

Sandy and her team also use tissue culture techniques in the laboratory. This is when different plant cells are multiplied or grown in a specially prepared hormone medium which provides them with everything they need to grow. These clusters of cells can develop into whole plants. They are also investigating how the amount of sugar in sugarcane can be increased.

What do I need to be an agricultural biotechnologist?

Characteristics: Natural curiosity, methodical and precise by nature

Important school subjects: Biology, Mathematics, Physical Science

Qualifications: MSc – Natural Sciences/Biological and Life Sciences/Biotechnology/Microbiology/Molecular and Cell Biology or similar/M Tech (Biotechnology)

Where can I get a job as an agricultural biotechnologist?

Agricultural research institutes, many of which are linked to the Agricultural Research Council (ARC), universities and commercial companies such as Mondi and Sappi

Related careers: Plant Pathologist, Molecular Biotechnologist, Plant Molecular Biologist, Plant Breeder, Agricultural Scientist



... the challenge of the job:
"It is challenging to work in a field fraught with public fears and misconceptions."

The variety of genes present in different populations (groups of people) throughout the world has changed over hundreds of years. These changes have been caused by natural and man-made disasters, changes in lifestyle and by historical events. Can this history of populations help us to understand the links between certain genetic variations and disease – or health?

Who can explain why one group of people is more likely to get a certain disease and help us use this knowledge to fight sickness and improve health?

The Human Geneticist!

Meet Himla Soodyall, a Human Geneticist at the National Health Laboratory Service (NHLS) affiliated with the University of the Witwatersrand **BSc (Microbiology and Biochemistry), BSc Hons (Microbiology), MSc (Biotechnology), PhD (Human Genetics), Post Doc in Anthropology**

What does Himla do?

Himla studies how DNA, the inherited material that makes us who we are, is passed from parents to children. This helps us understand why certain people are at risk for certain diseases and how this risk developed throughout history. DNA often changes for no reason (mutations). Some mutations can cause disease, while others do not, and geneticists are able to identify those that are and those that aren't linked to disease.

Recently, Himla has been studying the differences in people from all over Africa and how this compares with people from around the world. This can explain why people in certain countries are prone to certain diseases, such as diabetes and types of cancer.

What do I need to be a human geneticist?

Characteristics: Natural inquisitiveness, endurance
Important school subjects: Biology, Mathematics, Physical Science
Qualifications: BSc – Biochemistry/Natural Sciences/Biological and Life Sciences/Biotechnology; Microbiology/ Molecular and Cell Biology/Environmental and Biological Sciences/Chemical and Biological Sciences **Note:** You need an MSc or PhD for higher positions in lecturing and research.

Where can I get a job as a human geneticist?

Laboratories conducting medical diagnostic services, universities, medical research laboratories

Related careers: Pathologist, Geneticist, Clinical Geneticist, Genetic Counsellor



Micro-organisms are tiny living things that cannot be seen by the naked eye. Despite their size, they can be used to make many valuable products such as anti-biotics and alcohol.

They can also be used to speed up chemical reactions (catalysts). Since large amounts of these products are needed they must be made in the most economical way, meaning that the micro-organisms need to work as hard as they possibly can.

Who understands micro-organisms and can get them to work optimally to make many products?

The Fermentation Scientist!

Meet Sani Gumede, Fermentation Scientist at the CSIR in Johannesburg **B Tech (Biotechnology)**

What does Sani do?

Once Sani's colleagues have found a specific micro-organism to make a specific product, Sani has to get the micro-organism to do the best possible job of making it. To do this, he starts by growing the micro-organisms in glass flasks in the laboratory. Different organisms like different temperatures, different "food", and different pH-levels and Sani has to get this recipe right. He then scales up the process to large fermenters and later to the huge scale that the factories will use.

What do I need to be a fermentation scientist?

Characteristics: Creative, detail-driven, team player and patient
Important school subjects: Biology, Mathematics, Physical Science

Qualifications: B Tech (Biotechnology); BSc – Natural Sciences/Biological and Life Sciences/ Biotechnology/ Microbiology/Molecular and Cell Biology

Where can I get a job as a fermentation scientist?

Universities, distilleries, research organisations, some private companies

Related careers: Microbiologist, Biotechnologist, Biochemist, Bioprocess Engineer



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