

Women in animal genetics: Breaking barriers, building legacies

By Chanelle Steenekamp and Japie van der Westhuizen, SA Stud Book

Imagine a scientist – let alone an animal geneticist – whose computer software enabled thousands of animal geneticists to estimate genetic parameters, such as heritabilities and genetic correlations, using algorithms once thought impossible. Imagine further that this same scientist was the author or co-author of 182 peer-reviewed scientific publications, cited more than 10 700 times. This is no mean feat. This was achieved by a lady, born, raised and initially schooled in Germany, who then joined the ranks of one of the leading groups in animal breeding at Edinburgh University (Scotland) and ended up at the University of New England (Australia). Unknown by dairy farmers? Her innovations, and especially computer software, enabled animal geneticists globally to be part of livestock breeding research and development. Karen Meyer's contributions, and that of others, are bearing fruit in modern-day genetic breeding value predictions, where genomic information plays a major role.

One of the breakthrough publications to maximise the computing efforts and speed for multiple solutions in estimating genetic variances and use in best linear unbiased prediction (BLUP) breeding values was published in 1990 in the *Journal of Dairy Science*. The main author is Professor Milena Kovač, a native of Slovenia, who at the time was studying at the University of Illinois Urbana-Champaign in the United States. Prof. Kovač's contribution towards the development of one of the most successful computer software programs, Prediction and ESTimation (PEST), with Professor Eildert Groeneveld (from Germany), has allowed South Africa – like many other countries in Europe and elsewhere – to take part in the BLUP revolution. Prof. Kovač continued with a successful career in animal breeding and genetics at the University of Ljubljana.

In a world evolving at lightning speed, women are not only part of the workforce, but they also play a significant role in redefining it. From boardrooms to barns, classrooms to laboratories, women are rising as leaders, scientists, and changemakers. As was illustrated by the introduction, they are often overlooked in the field of dairy and even the broader field of animal genetics, even though they are leaving a legacy.

For generations, it has been hard for women to be truly recognised for their science achievements. In many societies, they had to balance their careers with caregiving and faced the challenge of being stereotyped. Being able to take their rightful place has always been – and still is – generally more challenging than for men.

PIONEERS IN GENETICS

Women have long played pivotal roles in the advancement of genetics – and, therefore, in the foundation of dairy and animal breeding programme. Three of the many brilliant women whose research continues to shape science and industry alike are:



Barbara McClintock (1902–1992)

As a trailblazing American cytogeneticist, McClintock revolutionised the understanding of genetic behaviour. She uncovered ‘jumping genes’ in the 1940s to 1950s – transposable elements that can move within chromosomes and thereby alter gene expression. She was awarded the Nobel Prize in 1983. Her work paved the way for modern research in genetics, cancer biology, and other biotechnological fields.



Nettie Maria Stevens (1861–1912)

By studying mealworms, she showed that sperm carrying either X or Y chromosomes determine the sex of offspring. This was a paradigm-shifting discovery in 1905, as she revealed the chromosomal basis of sex determination and also validated Mendel’s theories.

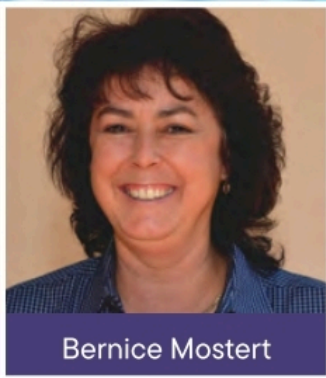


Rosalind Franklin (1920–1958)

A British chemist whose X-ray diffraction images provided the critical data that Watson and Crick used to describe the DNA double helix structure. Proper credit was not given to her in her lifetime – so much so that she was not considered for the Nobel Prize awarded to Watson and Crick. Though posthumous, her legacy as a pioneer in molecular biology is now widely honoured.



Dina Victor



Bernice Mostert



Dr Helena Theron



Suretha Francis & Thalia Brameld

WOMEN IN MODERN GENETICS at SA Stud Book

Women in dairy and animal genetics today are not only scientists. Women also play a crucial role in providing professional advice to farmers and the broader industry, securing proper data handling, developing and assisting in breeding programmes, and as a bridge between modern computer software development and animal science. To a large extent, they are also fulfilling their roles as educators and mentors. They are contributing to the reshaping of industries, including the dairy industry.

SA Stud Book, as the only certified source of genetic merit prediction for the South African dairy industry, employs women making their mark in the breeding of dairy animals. They range from professional and certified natural (animal) scientists to information technology (IT) specialists and women specialising in data handling.

The genetic evaluation of all dairy cattle, as well as participation in the Interbull international evaluations, is in the hands of Dr Bernice Mostert. She is part of the specialist animal science group at SA Stud Book, under the leadership of Dr Helena Theron. An

exciting mentorship programme has led to the appointment of Hannah Kruger, a young animal scientist, who has also join this group.

Donné Kruger, a registered animal scientist, developed and maintains the computer programs linking farm milking systems to SA Stud Book's Logix database, enabling instant reporting back to the farm. Her work is part of Stud Book's IT team, led by Dina Victor. Dina is the country's most experienced IT specialist in livestock recording.

Dairy farmers are directly supported by SA Stud Book's capable technical assistants. Suretha Francis heads this team, which includes Chanelle Steenekamp, responsible for technical services to dairy farmers in the Western and Southern Cape. Thalia Brameld, also a trained animal scientist, manages SA Stud Book's marketing and interaction with farmers and the industry.

The data services team at SA Stud Book consists of dedicated, knowledgeable, and experienced women serving the dairy industry.

All the women making their mark in animal breeding in South Africa are recognised for their important roles in sustaining the dairy industry.



Dr Bernice Mostert, Hannah Kruger, Thalia Brameld, Suretha Francis, Thalia Brameld & Chanelle Steenekamp.