

## AWARDS, HONOURS AND ACHIEVEMENTS

- Honorary Doctorate from University of Oxford (2003)
- Distinguished Teacher Award to spend a year in Baylor University, Texas (1992 – 1993)
- Rhodes Scholarship (1963 – 1966)

## SIGNIFICANT MOMENT

When Jacques Monod, a Nobel Prize winner in medicine for his discovery of gene regulation of enzyme and virus synthesis, told him he was right (and that he, Monod, was wrong). This was about collagen, a very large protein, switching on genes in the nucleus without entering the cell but rather by interacting with its surface.

## WHAT PEOPLE MIGHT NOT KNOW

“During my time in Norway, my colleagues would take my leftover laboratory alcohol and make moonshine. It made me very popular, since alcohol is very expensive in Norway.”

## A LIFE PUNCTUATED BY MOLECULAR MICROBIOLOGY

David Woods learnt the power of generosity and goodwill early in life. After his father, a schoolmaster at Michaelhouse private school in what was then Natal Province, died when Woods was only ten years old, the ‘Old Boys’ donated enough money to pay his and his brothers’ school fees until they matriculated. For university, Woods followed in his father’s footsteps and went to Rhodes University (RU), where he majored in botany and zoology. Here, he attended a course given by Brigid Galloway and learnt about the structure of DNA, discovered less than a decade before. “In South Africa I don’t think anyone else was teaching it at the time. She was very far-sighted. It inspired me.”

In 1963, Woods won a RU Scholarship to go to Oxford University to study for a postgraduate qualification. He studied molecular microbiology and was fortunate enough to attend lectures by Francis Crick, one of the co-discoverers of the DNA molecule. His PhD thesis, *Studies on the Nature of the Killer Factor in Yeast*, focused on a problem of the beer-brewing industry. Sometimes so-called ‘killer yeast’ would come into the brew and stop the fermentation

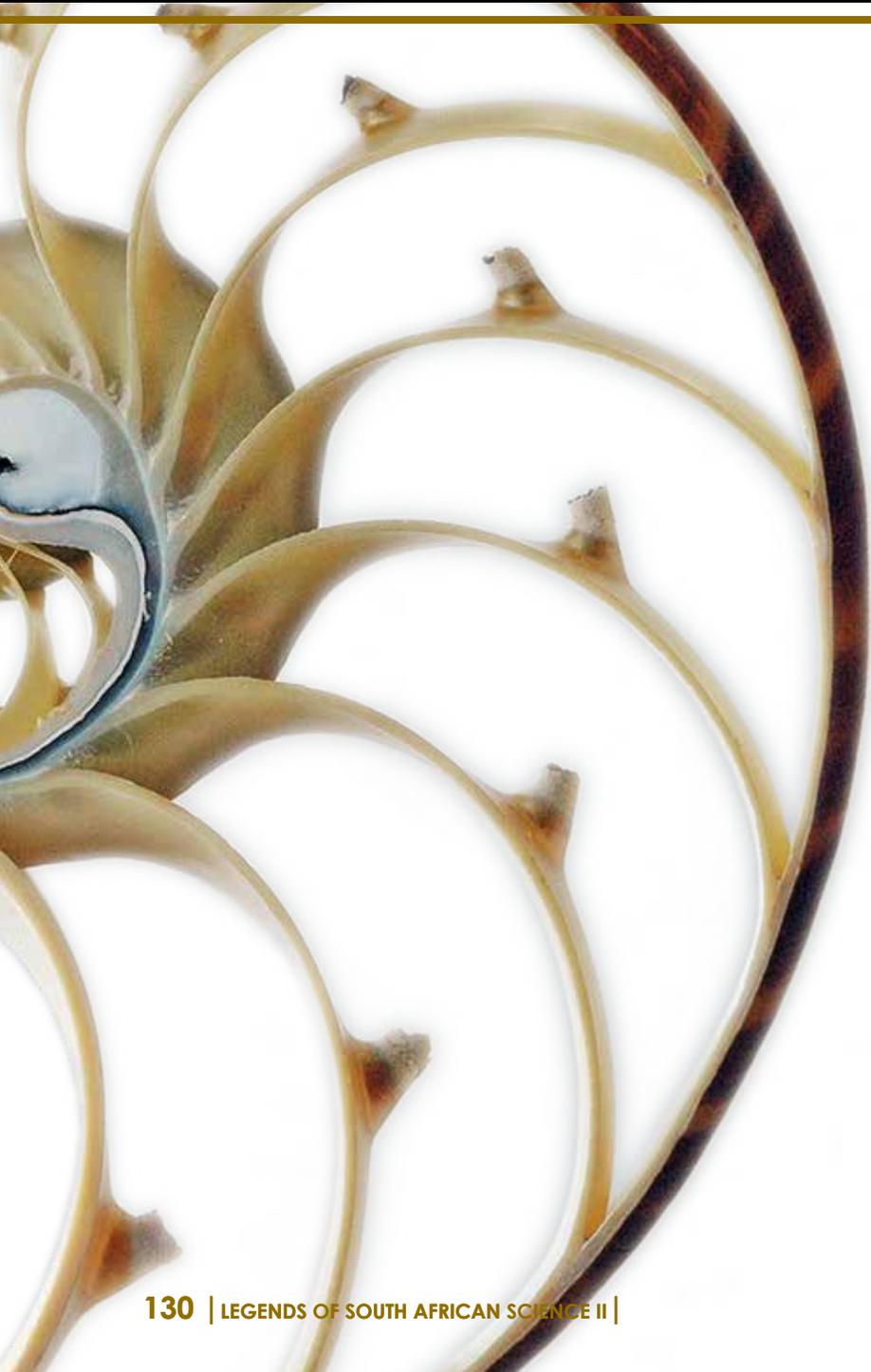
process. It turned out that the process was caused by RNA molecules encoding a toxin that killed other more sensitive yeast strains. The ability to determine whether a brewing strain of yeast was a ‘killer’ or a sensitive strain assisted the brewing industry.

Halfway through Woods’ PhD his supervisor, Allan Bevan, moved to Queen Mary College at the University of London. Woods enjoyed the intellectual freedom the move provided. “It taught me leadership. Many supervisors supervise too closely, but then you just produce a technician,” he says. After his PhD, Woods joined Bevan at Queen Mary for a year, and was about to depart for Rochester University when he was approached by Edgar Twyman from Rhodes with an invitation for him to return for a senior lectureship, and to develop microbiology at the university. It was a good offer and Woods returned to South Africa in 1967.

Back home, Woods worked with the leather industry to solve a major logistical challenge. The abattoirs that provided the hides for tanning were located near large population centres. But the tanning process produced such unpleasant effluent that it was done in far-away small towns, and transportation was a problem as the hides would often rot *en route*. Woods and his colleagues discovered a bacterium that produced collagenase, an enzyme that destroyed the collagen in the hides. His team also pioneered the study of the genetics of anaerobic bacteria which are bacteria that require oxygen-free environments.

Woods travelled for fellowships in Norway and France. In the mid-1970s, at the *Institut Pasteur* in Paris, Woods met Jacques Monod, a Frenchman who had won the 1965 Nobel Prize in medicine jointly with François Jacob and Andre Lwoff for their work on gene regulation. Woods was at the bench, working on the regulation of the gene that produces collagenase. Monod had shown that small molecules get into cells and interact with the DNA that turns on the gene. However, collagen is a huge protein, a triple helix, and is unable to enter a cell. Woods and his colleagues showed that gelatin, the first degradation product of collagen, and the amino acids from collagen, did not turn on the collagen gene. The entire collagen 3D structure was required and it interacted with the cell surface to turn on the collagenase gene.





## MEMORABLE INTERACTION

This led to a most memorable interaction. “Monod had heard about our results and asked me to come and see him. I spent a day with him, during which we argued about it. He would not accept that this signalling could work from outside the cell.” At the end of the day, Monod said he would think about it overnight. “The following morning, when I walked into his office, he said ‘You’re right, I’m wrong.’ And he had brought cake.” For a young scientist in his mid-30s, it was an honour but also a lesson in humility.

After six months at the *Institut Pasteur*, Woods travelled to Trondheim University in Norway for a year-long research fellowship. The reason was Helge Larsen who worked on salted fish and was a world leader on bacteria that require high concentrations of salt – hence the connection with salted hides. But culinarily Trondheim was a stark contrast to French cuisine. “When we got there, we were asked ‘Do you like fish?’ When we said yes, they said ‘that’s good because for four days of the week, you’ll eat fish and potatoes, and for the other three days, you’ll eat potatoes and fish’ – and we did!”

After returning to South Africa, Woods spent another 13 years at RU. Then, in 1980, Woods’s department moved lock, stock and barrel to the University of Cape Town (UCT), which had made him and his colleagues an offer they couldn’t refuse. After a productive eight years at UCT, Woods became Deputy Vice-Chancellor for Research from 1988 to 1996, all the while keeping his research group going. Then, in 1996 Woods was once again approached by RU, this time to apply for its soon-to-be vacant Vice-Chancellorship. Woods applied and was selected. “I wanted to build up research at Rhodes.” This he continued to do until his retirement in 2006.

During his career Woods has produced more than 200 research papers and supervised 42 PhD students. He was Chairman of the Bacteriology and Applied Microbiology Division of the International Union of Microbiological Sciences from 1995 to 1999. He is a Fellow of the American Academy of Microbiology and the Royal Society of South Africa, and a Member of the Academy of Science of South Africa. He has served on several boards and as a consultant for industry, and in 1984 he was awarded an A-rating by the former South African Foundation of Research Development (now the National Research Foundation). In 2003, he was awarded an honorary doctorate by Oxford University, and in 2007 he received another from UR. Today he lives with his wife in Kenton-on-Sea in the Eastern Cape.

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# Legends of South African Science II

**Academy of Science of South Africa (ASSAf)**

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