

AWARDS, HONOURS AND ACHIEVEMENTS

- German Society for Oil, Gas and Coal Collegium Medal for contributions to catalysis (1999)
- Brigadier Stokes Memorial Award by the South African Institution of Mining and Metallurgy for distinguished contributions in mineral processing (2010)
- Foreign Member of the United States National Academy of Engineering (2017)
- Lifetime Achievement Award from the Catalysis Society of South Africa

DEFINING MOMENT

When he was elected a foreign member of the United States' National Academy of Engineering, he was the only foreign member from the African continent at the time. "Personally, I greatly valued this recognition."

WHAT PEOPLE MIGHT NOT KNOW

He spent 23 years on the executive of the Western Province Cricket Association, one of only five life members. He was deeply involved in the development of cricket in the townships before unification, as well as in the unification of white and black cricket. "I made friends across colour and religious divides through cricket – I never would have had the chance otherwise," he says.

GOOD RELATIONSHIPS CATALYSE GREAT CHEMISTRY RESEARCH

"If you do world-class research and work on your relationships with industry, companies will keep funding your research. In the end, it comes down to the chemistry of people." Cyril O'Connor of the University of Cape Town's (UCT) Department of Chemical Engineering believes his academic career flourished through hard work and spending the time and energy needed to build strong relationships with industry and academia around the globe.

This hard work has paid off – he has built two world-class research centres at UCT, both of which have made key contributions to the mining and chemical industries in South Africa and globally. Now a Senior Research Scholar at UCT, after serving as Dean of Engineering and the Built Environment for 12 years, he leads several international societies and was recently inducted into the United States' National Academy of Engineering.

His research has always aimed to solve problems in two different industrial spaces: mining and the chemical industry. In both cases, he works on making industrial processes more efficient and cost-effective. "After my PhD, I was invited to apply for a position at UCT Chemical Engineering as a lecturer and researcher," says O'Connor. "At the same time, I went for interviews at SASOL and the National Institute of Metallurgy (NIM), now known as Mintek. Both said that if I got the job at UCT, they would want to do some research with me."

Less than a year later, O'Connor had established two research centres – the Centre for Catalysis Research and the Centre for Minerals Research. Both continue to thrive today, each led by former PhD students of O'Connor's, and each currently boasts major global reputation in terms of research output and quality.

The Centre for Minerals Research focuses on flotation and comminution, two of the most important processes used in the beneficiation of minerals. Flotation is a process to separate valuable minerals from ores, while comminution refers to the process of reducing solid materials to a smaller particle size through grinding or other mechanical means. In the area of flotation, O'Connor's group has focused mainly on the beneficiation of ores containing platinum. Given that South Africa has almost 90% of the world's known platinum reserves, this research has made significant contributions to what is South Africa's most important minerals sector.

MONEY WILL FOLLOW IF RESEARCH IS GOOD

The centre works with many global mining companies to develop new processes and improve on existing ones. Contrary to the protective attitudes that many modern research organisations take towards intellectual property, O'Connor believes that carrying out world-class research is much more important than making money from patents. He says that the money will follow if the research is good enough.

O'Connor states that his centres have been funded by some companies for more than 30 years, and that his success comes down to reliably producing



world-class research and adding value to a company. "We don't count our success by how much the industry made using our technology. You know it's working when they keep coming back to fund your research. The key is to build a world-class reputation and keep it that way. Lose your status as a world leader at your peril."

On the catalysis front, O'Connor's work started with SASOL in the 1980s, trying to find ways of improving processes to convert olefins into useful fuels. "At the time, SASOL needed to balance the supply and demand for petrol and diesel in the national liquid fuels pool; they wanted to do this by converting olefins (a by-product of SASOL's oil-from-coal process) into diesel."

Today, SASOL focuses on using olefins to produce polymers, and thanks to O'Connor's work, SASOL is one of the world's largest producers of polymers. O'Connor has strong ties with the Engler-Bunte Institute at the University of Karlsruhe in Germany, home to one of the world's leaders in catalysis research. That relationship demonstrates the value of collaboration well. O'Connor went on a sabbatical to the university in 1992 and began to establish close working relationships there. In turn, several students came out to do research in his group at UCT, and some have stayed on to become senior academics in chemical engineering. Through that long history of working together, the Centre for Catalysis Research is now a world leader in the Fischer-Tropsch process that SASOL has become famous for.

Another research focus in the Centre for Catalysis Research is zeolites, a type of mineral that acts as a natural sponge and filter. Zeolites are widely used in the chemical and petrochemical industries. O'Connor has been involved

in the leadership of the International Zeolite Association, an indication of his pioneering work in the field. "Under economic sanctions, we couldn't get samples of the zeolite we needed for catalysis research," he explains. "We figured out how to make our own, and when we could access samples again in the 1990s, we didn't need them anymore."

O'Connor is also a committed and passionate teacher. In fact, he started his academic career with a teacher's diploma, aiming to teach science and mathematics. One of his lecturers asked him why he wasn't at a university and that started him on the path toward academia. "I moved to Cape Town and started teaching. At the same time, I was running a hostel and studying through the University of South Africa (Unisa) towards a BSc with majors in chemistry and mathematics. "I didn't get much sleep," he says with a laugh.

After obtaining the BSc, he got a bursary to study chemistry honours at UCT and his supervisor suggested a PhD in physical chemistry. Then came the offer of a lecturing post in chemical engineering. He continued to lecture at UCT for decades, even when he was Dean and acting Deputy Vice-Chancellor, and believes that it is critical that academic leaders remain active in the classroom. "If you aren't in the classroom, at the coalface, you don't know what's happening in your organisation. I feel strongly that top academic leaders must be active researchers and teachers as well."

Throughout a lauded and successful career, O'Connor has remained humble and committed to the most important part of his work: the people. "I want everyone to know, it wasn't just me, it was a team. Building a team and working with others is much easier and more fulfilling than being a lone ranger."

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Academy of Science of South Africa (ASSAf)

Academy of Science of South Africa (ASSAf)

Academy of Science of South Africa (ASSAf), (2019). Legends of South African Science II.

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