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UCT part of multi-million research project to decarbonise aviation

The University of Cape Town (UCT) is one of the partners in a €40 million (approximately R718 million) three-year research project that aims to develop and improve next-generation catalysts that will play a large role in decarbonising the aviation sector by creating sustainable aviation fuels.

Professor Michael Claeys, the director of the DSI-NRF Centre of Excellence in Catalysis at UCT's Department of Chemical Engineering, is the principal investigator of the UCT team that is partnering on the Catalyst Research for Sustainable Kerosene (CARE-O-SENE) project, which is led by Sasol and Germany's Helmholtz-Zentrum Berlin (Helmholtz Centre for Materials and Energy, HZB).

CARE-O-SENE is a German–South African research project which will see seven German and South African partners working together on fuel catalysis research and technology development. Their goal is to make large-scale production of green kerosene possible by 2025.

"The CARE-O-SENE project is about making the future fuel for aviation," said Claeys. "The aim is to decarbonise the aviation sector and make it sustainable over the long term, by focusing our research efforts on the catalysts that are needed to produce green kerosene on a commercial scale. We are undergoing a huge change in our global energy systems, and every country has to play a role in that. If we can replace kerosene with a defossilised alternative, carbon dioxide emissions will be greatly reduced overall. If we are successful, this research will make it possible for the aviation industry to become carbon neutral."

The project's goal of producing sustainable aviation fuels more efficiently relies heavily on Fischer-Tropsch (FT) technology, which is a way of converting synthesis gas containing hydrogen and carbon monoxide to hydrocarbon products. "While conventionally kerosene is made directly from oil or indirectly from coal or natural gas as fossil-starting materials, sustainable fuels can be made from green hydrogen and carbon dioxide from hard-to-abate industrial, biogenic or atmospheric sources," said Claeys.

"Our catalysts speed up chemical reactions, making it possible to produce more fuel and improve the quality of the end product. I have worked closely with Sasol, the forerunner in industrial FT technology, for many years, and it is a privilege to work with them and our

other international partners on this important project. The technology needed to develop sustainable fuels at large scale from green hydrogen and sustainable carbon sources is an area in which South Africa can become a world leader."

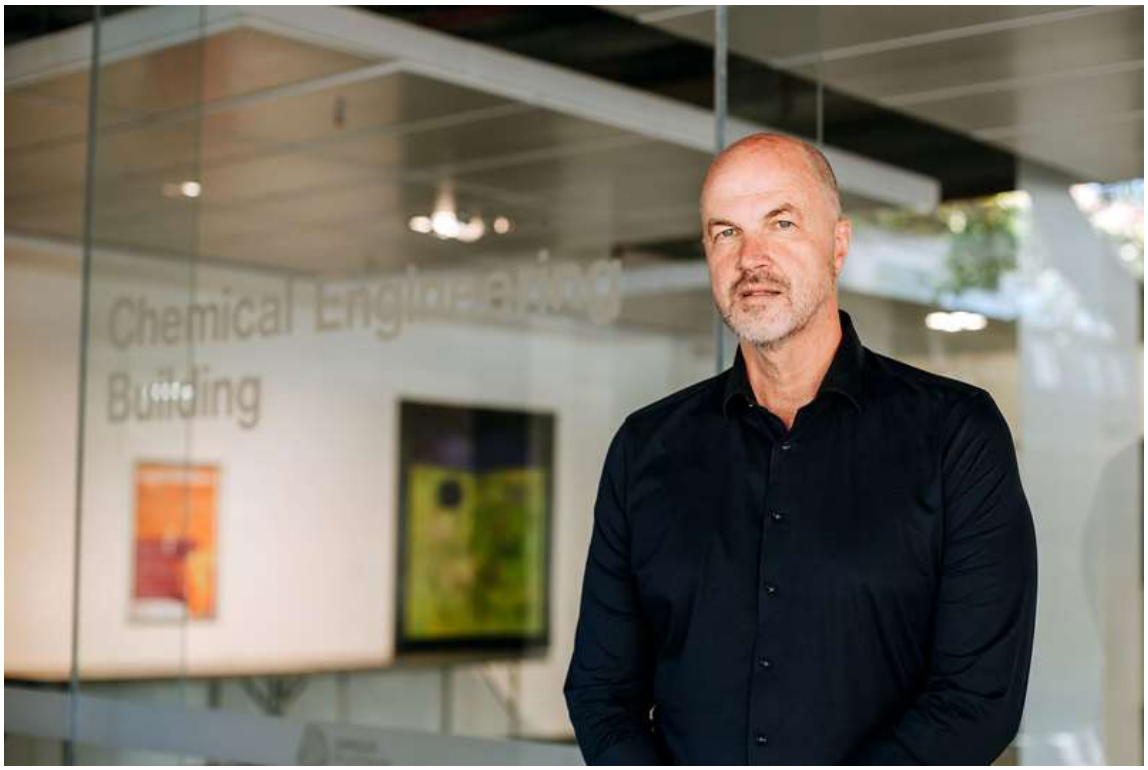
With the project's funding being released in October, the group's research can now get fully under way. Claeys' team will ultimately comprise seven or eight people, including two professors, two postdoctoral fellows, two PhD students, and other researchers. The UCT team's work will focus on finding ways of improving the catalysts being used.

"These catalysts have to be stable over a long period of time so that it makes sense to use them on a large scale. The UCT team studies them at working conditions; we run reactions over the catalysts and have developed tools that allow us to characterise how they change in the reaction environment. We want to understand how the catalyst functions so that we can optimise it and ultimately make it usable on an industrial scale."

According to Claeys, the three-year timeline is unusual for a project of this scale which aims to commercialise a catalyst, but the team has vast experience and expertise on its side.

"Luckily, Sasol is very heavily involved, and they already have a lot of catalysts they've developed. So, our international consortium is building on this expertise. If we were starting from zero, this type of project would take 15 to 20 years. Also, we have to act faster these days in order to make the energy transition a reality."

Story by Sieraaj Ahmed, UCT News.



Professor Michael Claeys. Photo: Candice Lowin

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