

**NITheCS Colloquium**  
**Monday, 18 July 2022, 16h00 – 17h00 SAST**  
Prof Roger Deane (University of the Witwatersrand)

## ‘The shadow of the supermassive black hole in the centre of our Milky Way’

### ABSTRACT



I will discuss the first Event Horizon Telescope (EHT) observations of Sagittarius A\* (Sgr A\*), the Galactic centre source associated with a supermassive black hole. A variety of imaging and modelling analyses all support an image that is dominated by a bright, thick ring with a diameter of  $51.8 \pm 2.3 \mu\text{s}$  (68% credible interval). The EHT images of Sgr A\* are consistent with the expected appearance of a Kerr black hole with 4 million solar masses.

This provides direct evidence for the presence of a supermassive black hole at the centre of the Milky Way, and for the first time, connects the predictions from dynamical measurements of stellar orbits on scales of  $10^3$ - $10^5$  gravitational radii to event-horizon-scale images and variability.

Furthermore, a comparison with the EHT results for the supermassive black hole M87\* shows consistency with the predictions of general relativity spanning over three orders of magnitude in central mass.

I will close by highlighting Southern Africa's strong geographical advantage in hosting future EHT stations to enable higher precision tests of gravity, particularly of Sgr A\*, which is located in the southern sky.

### BIOGRAPHY

Roger Deane is a Professor at the University of the Witwatersrand (WITS), and an Extraordinary Professor at the University of Pretoria (UP).

He completed his doctorate in 2012 at the University of Oxford and returned home to carry out postdoctoral research at Rhodes University and the University of Cape Town.

In 2018 he moved to UP, where he established the Radio Astronomy Research Group. In late 2020, he took up the DSI/NRF SKA Chair in

Radio Astronomy at WITS, where he serves as Director of the WITS Centre for Astrophysics.

His research interests cover a broad range of energy and spatial scales, from diffuse neutral hydrogen in distant galaxies to the inner accretion disks of supermassive black holes. He uses the power of next-generation radio telescopes such as South Africa's MeerKAT radio telescope, a precursor to the Square Kilometre Array, and Very Long Baseline Interferometers like the Event Horizon Telescope.

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