College of Fellows 2025

Professor Jeff Murugan
Deputy Vice-Chancellor (DVC) for Research and Internationalisation

Professor Jeff Murugan is a globally recognised scholar in theoretical and mathematical physics, whose original, sustained, and transformative contributions span foundational research, quantum technologies, mentorship, and scientific citizenship. His scholarly achievements have played a crucial role in shaping the interface of quantum field theory and quantum information, as well as advancing national and institutional priorities in research and innovation.

Among his landmark contributions is the co-discovery of the web of dualities in three-dimensional quantum field theories, which has reshaped our understanding of equivalences between diverse physical theories and has become foundational in the study of emergent phenomena in quantum materials. He is also a co-author of the Murugan-Stanford-Witten model, a class of solvable disordered conformal field theories central to current work on quantum chaos, scrambling, and black hole information theory. The name of this model reflects an exceptional level of recognition in a field where such attribution is rare.

Recently, Murugan has pioneered quantum battery theory, constructing models for energy storage and transfer at the quantum level, an area with profound implications for future quantum technologies. His research on quantum complexity has established new metrics for computational and physical complexity in disordered and chaotic systems, impacting both theoretical foundations and applications in quantum computation.

His publication record includes nearly 70 articles in leading journals (eg JHEP, PRL, SciPost), and his influence is reflected in numerous plenary invitations and international appointments, including as a member at the Institute for Advanced Study, Princeton, Associate at the American Museum of Natural History and Simons Associate at the International Center for Theoretical Physics. He has been a chairperson in major international conferences such as the prestigious Strings 2020 and String Math 2020 conferences at the University of Cape Town (UCT); and edited a key volume on quantum gravity, “Foundations of Space and Time” for Cambridge University Press.

Murugan has supervised 11 postdoctoral fellows, seven PhD students, and 14 master’s students, many of whom now hold global academic positions. He founded the Laboratory for Quantum Gravity & Strings at UCT and has built a vibrant and inclusive research culture. As DVC for Research and Internationalisation, and Principal Investigator for NITheCS's quantum technology programme, he has linked cutting-edge research with national development goals.

A distinguished scientist, mentor, and public intellectual, Professor Murugan exemplifies the ideals of the UCT College of Fellows. His election would recognise not only academic excellence but also strategic leadership in advancing African science on the global stage.

Nominator: Professor Haris Skokos