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National Science and Technology Forum (NSTF)

media release

World Radiography Day, 8 November 2024

An inside look into the state-of-the-art Nuclear Medicine Research Infrastructure (NuMeRI) that won the 2024 NSTF-South32 Innovation Award: Corporate Organisation

Radiography is a field of medicine which uses imaging technology to diagnose and treat conditions that affect people and animals. Techniques it encapsulates include fluoroscopy, positron emission tomography (PET), computed tomography (CT), ultrasound, X-ray radiology, and magnetic resonance imaging (MRI), as well as interventional radiology for minimally invasive procedures. World Radiography Day is a global healthcare awareness event celebrated every year on 8 November to mark the discovery of X-rays by Wilhelm Conrad Roentgen in 1895. It's a day to honour radiographers and their vital role in healthcare, ensuring patients receive accurate diagnoses and appropriate treatments. The World Radiography Day 2024 Theme is "Radiographers: Seeing the Unseen," and seeks to increase awareness of the importance of radiography in modern medicine.

Award winning organisation, NuMeRi: The Nuclear Medicine Research Infrastructure (NuMeRI) is a non-profit company consolidating expertise and implementing new nuclear technology strategies for medicine and biosciences. It is one of the 13 research infrastructure facilities established by the Department of Science, Technology and Innovation (DSTI) under the South African Research Infrastructure Roadmap (SARIR). The Department invested R85million towards its establishment. NuMeRI is a one-stop-shop medical nuclear imaging and therapeutic facility dedicated to drug development and clinical research for the benefit of the South African, African and global healthcare sectors. This national infrastructure has the following core partners: University of Pretoria (UP), Steve Biko Academic Hospital (SBAH), NECSA, and iThemba Labs. It supports all universities across the country.

Their research infrastructure network is comprised of the PET Centre for infection Imaging at Tygerberg Hospital (managed by Stellenbosch University (SU)); a facility at iThemba LABS in Cape Town; and the main NuMeRI facility at SBAH (also called the 'centre' or 'hub'). The hub is fully equipped with a cyclotron, a Good Manufacturing Practice (GMP) Radio-pharmacy production facility, and state-of-the-art pre-clinical imaging modalities. It provides support for healthcare research and development to academia and commercial healthcare companies (pharmaceutical and biotechnology).

The various healthcare services they provide include:

- **Clinical Unit:** Medical imaging and therapeutic facility for drug development and research.
- **Radio-pharmacy:** GMP radio-pharmacy to ensure production of both therapeutic and diagnostic, high-quality radiopharmaceuticals.
- **Basic and Translational Research:** For context-specific, tailored diagnostics and therapies for African populations' diseases.
- **Pre-clinical Imaging:** Enables disease modelling, drug development, treatment response assessment, non-invasive and longitudinal studies, translational research, and image-guided interventions.
- **Medical Physics and Radiobiology (MPR):** The MPR division covers radiation protection, medical physics, and radiobiology in nuclear medicine to provide a comprehensive approach for cancer control using radiation science technology and radiobiological data.
- **Node of Infection Imaging:** Is used to identify and locate sites of infection in the body to expedite the development of drugs and address national priority diseases, such as tuberculosis (TB).

Imaging enables a deeper look inside the body to recognise diseases before many other medical equipment or procedures can. This knowledge is used to inform the diagnosis and treatment of diseases. Early detection enables diseases such as cancer, TB and heart diseases, to be treated early and improve the quality-of-life outcome.

Nuclear imaging uses unstable atoms that decay and emit gamma photons. By labelling biological molecules with positron-emitting radionuclides, specialised equipment can then image the position of decay events and the three-dimensional location of the molecule. This advanced imaging made possible with PET scanners, often combined with x-ray computed tomography (CT) systems, can accurately and precisely image the behaviour and distribution of radiolabelled molecules (radiotracers), through the anatomical definition provided by the CT component.

The NuMeRI Node for Infection Imaging (NII), in the Western Cape is a state-of-the-art PET/CT research facility. The Node is hosted by SU's Central Analytical Facilities at Tygerberg Hospital in Cape Town. This Philips Vereos digital PET/CT scanner is the first of its kind in SA and only the second in the Southern Hemisphere. The node is funded by the DSTI, SU and the Bill and Melinda Gates Foundation. It was established mostly for research for early diagnostics considering the many cases of TB in the Western Cape. NuMeRI is poised to help combat this national priority disease.

"We offer a one-stop-shop medical imaging and theragnostics facility, dedicated to drug development and clinical research," explains NuMeRI CEO Prof Mike Sathekge, a renowned nuclear medicine physician.

"This state-of-the-art health research facility is the first of its kind in SA and unparalleled globally."

The NuMeRI NII supports researchers in molecular imaging and analysis, with backing from academic staff at the Divisions of Nuclear Medicine and Radiodiagnosis of the Faculty of Medicine and Health Sciences of SU, who are highly skilled in PET/CT research. It provides a primary clinical training site for them, to bridge the gap between academic research and practical applications.

The NuMeRI team with Professor Mike Sathekge as CEO, was awarded the Innovation Award: Corporate Organisation at the 2024 NSTF-South32 Awards on 11 July. They received the award because their facility represents a paradigm shift in its field, offering a one-stop-shop for medical imaging and theragnostics dedicated to drug development and clinical research.

NuMeRI provides consolidated expertise in nuclear technologies, in medicine and the biosciences, creating significant research, development and innovation capacity and above par patient care in SA. Pleased to receive this significant recognition, Prof Sathekge stated: "It gives the public a glimpse of work that has the potential to change their lives within the next decade." Their seamless conglomeration of preclinical imaging, radiopharmaceutical production, translational research, radiobiology, medical physics, clinical molecular imaging and theragnostics is truly remarkable, and could very well revolutionise biological research.

Prof Sathekge further remarked: "The work done in this facility is changing South African patient outcomes for the better". He and his team are extremely proud of the hope that they present to many patients and medical professionals alike, and NuMeRI's network of facilities and institutions paints a promising picture for the future of nuclear medicine in SA.

Prof Sathekge concluded: "The field of nuclear medicine and radio-pharmacy is afoot globally, and NuMeRI is perfectly positioned at just the right time during the upswing in the industry".

About the NSTF (National Science and Technology Forum): NSTF is an independent non-profit stakeholder body and network – a civil-society forum of over 130 organisations involved in science, engineering, technology (SET) and innovation in SA.

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- Nuclear Medicine Research Infrastructure (NuMeRI) Facility: A World-First for Cancer and TB Drug Development and Clinical Research | University of Pretoria
- PressReader.com - Digital Newspaper & Magazine Subscriptions
- NuMeRI Node for Infection Imaging PET-CT

About the NSTF

The National Science and Technology Forum (NSTF), established in 1995:

- is a broadly-representative stakeholder body for all science, engineering and technology (SET) and innovation organisations in South Africa
- gathers stakeholders around burning issues of national and global interest, across the public and private sectors, including matters of public policy
- includes a network of professional societies in SET and STEM education (STEM = science, technology, engineering and mathematics) - the NSTF proSET membership sector.
- recognises, awards and profiles the outstanding contributions of individuals and groups to SET and innovation through the prestigious NSTF Awards
- runs and supports collaborative projects and youth outreach, including recognition of top performance in mathematics and science, role modelling, bursary and STEM career information
- runs and supports the STEMulator.org which attracts youth and educators to Explore>Discover>Learn the world of STEM including careers. (Established by NSTF pro*SET*)

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