



Winter Internship Programme 2026

TOPICS

Topics	Supervisor	Institution
<ul style="list-style-type: none"> Computational Modelling of Thermodynamic Properties of Nuclear Matter Statistical Thermal Models in Relativistic Heavy-Ion Collisions Tsallis Non-Extensive Statistics in High-Energy Particle Spectra 	Dr Dawit Worku	Cape Peninsula University of Technology
<ul style="list-style-type: none"> Complex Systems Science Quantum Science, Quantum Computing & Intelligent Systems Relativistic Matter Across Laboratory and Cosmic Scales Science Education & Mathematical Sciences Development Theoretical & Computational Science Across Domains 	Prof Azwinndini Muronga	Nelson Mandela University
<ul style="list-style-type: none"> Enhancing Bank Profitability through Digital Banking and Artificial Intelligence: A Data-Driven Analysis 	Prof Martin Chanza	North-West University
<ul style="list-style-type: none"> Generative Design of Metal Hydrides for Hydrogen Storage Hybrid Physics-Informed Neural Network for Predicting the Intrinsic Stability of Perovskite Materials Machine Learning for Electrocatalysts Surface Modelling Photovoltaic Materials Discovery: Power Conversion Efficiency and Stability Prediction 	Prof Regina Maphanga	Sol Plaatje University
<ul style="list-style-type: none"> Comparative Study of Numerical Methods and Physics-Informed Neural Networks for the Schrödinger Bound-State Problem Physics-Informed Neural Networks for resonance energy calculations in quantum systems 	Dr Tshegofatso Tshipi	
<ul style="list-style-type: none"> Can we measure the Fermi constant with astronomical data? Search the signal in the cosmic dawn (early Universe) 	Prof Yin-Zhe Ma	Stellenbosch University
<ul style="list-style-type: none"> Introduction to open quantum systems Introduction to quantum computing 	Prof Francesco Petruccione	
<ul style="list-style-type: none"> Citizen science monitoring of invasive insects – WaspApp in the making Game theory for modelling tri-trophic interactions built by introducing weed biocontrol agents Sustainable use of Lepidoptera: drone remote sensing and population outbreak mapping Value of taxonomy and collections: museums, digitised records and citizen science 	Prof Ruan Veldtman	
<ul style="list-style-type: none"> Brownian Motion of a 5D String Non-holonomic Constraints in Classical and Quantum Mechanics 	A/Prof Will Horowitz	University of Cape Town
<ul style="list-style-type: none"> Rings and related structures 	Prof Amartya Goswami	University of Johannesburg
<ul style="list-style-type: none"> Mathematical Modelling of Technology Evolution with Innovation Pressure 	Prof Farai Nyabadza	
<ul style="list-style-type: none"> Graph Neural Networks for Drug Discovery Incorporating Uncertainty Quantification in Machine Learning-based Earth System Modelling Privacy-preserving Natural Language Processing for a South African Low-resource Language 	Dr Makhamisa Senekane	



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<ul style="list-style-type: none"> Analysis and System Characterisation of Radio Telescope Data Analysis of Real-Time RFI Monitoring Data for Radio Astronomy Applications Investigating dark energy properties using DESI baryon acoustic oscillation measurements Probing the expansion of the universe with CHIME fast radio bursts and Supernova data 	Prof Kavilan Moodley	University of KwaZulu-Natal
<ul style="list-style-type: none"> Classical Molecular Dynamics and Machine Learning-Guided Design of Graphene-Reinforced Polyimide Carbon Fiber Composites for Spacecraft Structures in Low Earth Orbit Exploring inverse perovskite for improved solar performance conversion efficiency using DFT and ML First-Principles Study of 2D MXene Reinforcement Effects on the Electronic and Optical Properties of ABPBI Nanocomposites Heterostructure studies of novel properties such as catalysis, photovoltaics using DFT method and ML approaches Understanding novel MXenes as anode materials using DFT approach and ML 	Prof Kingsley Obodo	
<ul style="list-style-type: none"> Compactifications in Locales Introduction to Topological Data Analysis 	Dr Cerene Rathilal	
<ul style="list-style-type: none"> Exploring the Metropolis Algorithm and Its Applications in Physics Stochastic Gradient Descent, Langevin Dynamics, and Matrix Quantum Mechanics 	Dr Anosh Joseph	University of the Witwatersrand
<ul style="list-style-type: none"> Application of Data Science in Oncology Assessing the Feasibility of Renewable Energy Deployment in Rural Limpopo (using open-source IRENA FlexTool) Battery Storage and Grid Flexibility: A Case Study of South Africa's Power Grid (using IRENA FlexTool) Computational Study and Simulations of Energy Materials for Applications in Solar Cells (Perovskites, Dye-Sensitised) and Energy Storage (Sodium-Ion Batteries) Forecasting Energy Consumption Modelling the Impacts of Climate Change Predictive Modelling in Public Health Using Data-Driven Approaches 	Prof Eric Maluta	University of Venda
<ul style="list-style-type: none"> Exploring HPV and Cervical Cancer Through Mathematical Modelling 	Prof Dephney Mathebula	University of Fort Hare

Who can apply?

You are eligible if you are:

- a registered student at a South African university,
- in your Honours year or first year of Master's, and
- studying a theoretical or computational science*

*Astronomy & Astrophysics, Bioinformatics & Quantitative Biology, Data Science, Earth Systems Modelling & Climate Change Modelling, Mathematics, Quantitative Finance, Statistics, or Theoretical Physics

How to join the programme

Visit our website for details. The closing date for applications is **Tuesday, 7 April 2026**.

Got a query?

Please email any questions to Aluwani Guga at aluwani.guga@nithecs.ac.za.

