

## Confirmed topics for the 2026 NITheCS Internship Programme

**Prof Martin Chanza** (North-West University)

1. Enhancing Bank Profitability through Digital Banking and Artificial Intelligence: A Data-Driven Analysis

**Prof Amartya Goswami** (University of Johannesburg)

1. Rings and related structures

**A/Prof Will Horowitz** (University of Cape Town)

1. Brownian Motion of a 5D String
2. Non-holonomic Constraints in Classical and Quantum Mechanics

**Prof Yin-Zhe Ma** (Stellenbosch University)

1. Can we measure the Fermi constant with astronomical data?
2. Search the signal in the cosmic dawn (early Universe)

**Prof Regina Maphanga** (Council for Scientific and Industrial Research)

1. Hybrid Physics-Informed Neural Network for Predicting the Intrinsic Stability of Perovskite Materials
2. Generative Design of Metal Hydrides for Hydrogen Storage
3. Photovoltaic Materials Discovery: Power Conversion Efficiency and Stability Prediction
4. Machine Learning for Electrocatalysts Surface Modelling

**Prof Azwinndini Muronga** (Nelson Mandela University)

1. Relativistic Matter Across Laboratory and Cosmic Scales
2. Quantum Science, Quantum Computing & Intelligent Systems
3. Complex Systems Science
4. Theoretical & Computational Science Across Domains
5. Science Education & Mathematical Sciences Development

**Prof Kingsley Obodo** (University of KwaZulu-Natal)

1. Understanding novel MXenes as anode materials using DFT approach and ML
2. Exploring inverse perovskite for improved solar performance conversion efficiency using DFT and ML
3. Heterostructure studies of novel properties such as catalysis, photovoltaics using DFT method and ML approaches

**Prof Francesco Petruccione** (NITheCS & Stellenbosch University)

1. Introduction to open quantum systems
2. Introduction to quantum computing

**Dr Cerene Rathilal** (University of KwaZulu-Natal)

1. Compactifications in Locales
2. Introduction to Topological Data Analysis

**Prof Ruan Veldtman** (Stellenbosch University)

1. Game theory for modelling tri-trophic interactions built by introducing weed biocontrol agents
2. Citizen science monitoring of invasive insects – WaspApp in the making
3. Sustainable use of Lepidoptera: drone remote sensing and population outbreak mapping
4. Value of taxonomy and collections: museums, digitised records and citizen science