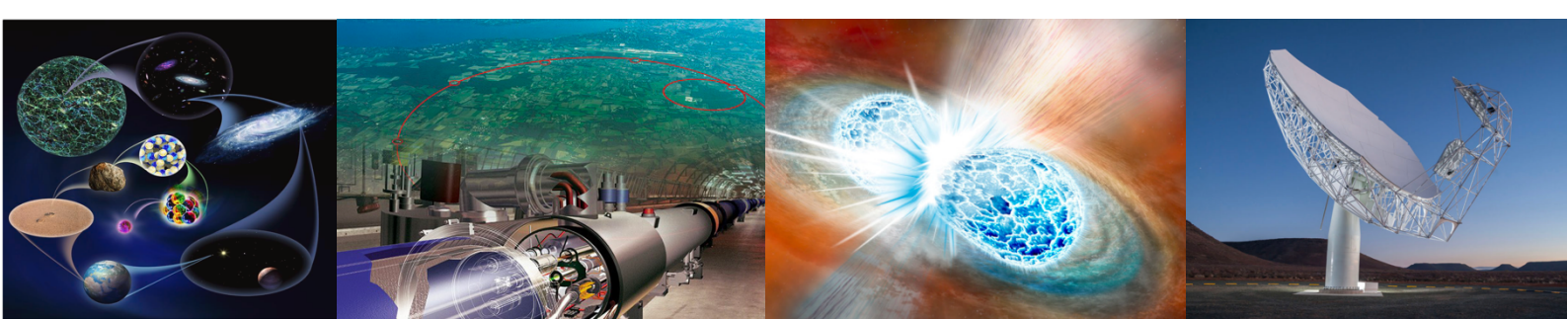


Faculty of Science

Q2CAfrica programme at Nelson Mandela University in Gqeberha, South Africa invites applications for Postdoctoral positions

- in Theoretical and Computational Relativistic Heavy Ion Collisions and Astrophysics
- in Complexity Science (aka Complex Systems Science)



The Quarks to Cosmos Africa (Q2CAfrica) Programme at Nelson Mandela University focuses on the theme "Connecting Quarks to the Cosmos, Connecting People with the Universe," with two focus areas:

- exploring Matter Under Extreme Conditions in Heavy Ion Collisions and Astrophysics.
- understanding the Fundamental Principles of Complex Systems, from Quarks through Cell Biology, to Human Societies, and onwards to the Cosmos.

This interdisciplinary and transdisciplinary initiative seeks to bridge the fields within the sciences: particle and nuclear physics, astrophysics, gravitation, and cosmology, promoting innovative research opportunities for researchers, post-doctoral fellows, and postgraduate students in physics, mathematics, statistics, scientific computing, and data science. Complex systems science further bridges the fields of natural sciences, social sciences, and the humanities.

We are seeking talented and motivated scientific candidates for four postdoctoral positions at Nelson Mandela University. Three postdoctoral fellows to work in the fields of theoretical high-energy nuclear-particle physics and theoretical astrophysics while incorporating machine learning (ML) and Quantum Information Science and Technology (QIST). One postdoctoral fellow to work in theoretical and computational complex system science. The positions include participation in the National Institute of

Theoretical and Computational Sciences (NITheCS) programmes, as well as the SA-CERN/Theory, and SA-JINR/Theory research activities.

Currently, we are developing relativistic fluid dynamics models and transport models for relativistic heavy ion collisions and astrophysics incorporating viscosities and conductivities in the presence of electromagnetic and gravitational fields. We seek to understand the transport properties and the equation of state in the systems under study. The research will be performed in collaboration with students and researchers at Nelson Mandela University and at other South African institutions and across Africa.

Main responsibilities

For the postdoctoral positions, responsibilities include:

- conducting original research, developing technical and analytical skills, collaborating with other researchers in SA/Africa and abroad,
- staying updated on the scientific literature on the theoretical description of heavy ion collisions and astrophysical processes while incorporating machine learning (ML) or QIST or complex systems science,
- publishing research findings,
- presenting at local and international conferences,
- teaching and mentoring honours and undergraduate-level students,
- supervising postgraduate and undergraduate students involved in the project,
- giving introductory and topical courses on theoretical and computational sciences during summer study and research programmes,
- writing research grant proposals for funding,
- science engagement with the public

Requirements and qualifications expected from the candidates:

PhD in relevant theoretical and computational sciences (high energy particle physics, high energy nuclear physics, applied maths, machine learning and QIST, data science and complex systems science),

- experience in the field of theoretical and computational heavy-ion physics and/or astrophysics,
- experience in the field of theoretical and computational complex systems science,
- advanced experience in scientific computing,
- availability for regular travel within SA/Africa and abroad
- available to teach undergraduate students and to give topical courses to postgraduate students and interns
- excellent English oral and written communication skills

- strong team player with statistical and analytical skills and interested in working in a highly interdisciplinary team
- research experience with simulations in numerical relativity, relativistic hydrodynamics and magnetohydrodynamics, and relativistic transport/microscopic theory will be prioritised
- candidates with knowledge and experience in modelling core-collapse supernovae, neutron star mergers/collisions or heavy ion collisions will be particularly prioritised
- candidates with knowledge and experience in modelling complex social/economic/environmental systems will be prioritised

Our offer:

- research work in a multi-disciplinary team of experts embedded in the local, continental, and international communities
 - an international environment, in which you can develop your talent and realise ideas and innovations within a competent team of experts
 - income according to the postdoc pay scale
 - possibility of joining teaching and mentoring activities at Nelson Mandela University
- The successful applicants will be part of a vibrant environment at Nelson Mandela University, Gqeberha, South Africa. Gqeberha is a lively and friendly city in South Africa. The positions are available starting on 01 April 2025, for an initial duration of one year with possible extension to the second year.

Nelson Mandela University wishes to reflect the diversity of society and welcomes applications from all qualified candidates regardless of personal background.

The application should comprise:

Certified copy of the Identity document/passport

Certified copies of qualifications

A full comprehensive CV,

A publication list,

A brief research summary and a proposal.

Three letters of reference

APPLICATION PROCESS

Postdoctoral applicants should send the accompanying documents to the email address below. Applications will have to be sent by 20 September 2024. Unfortunately, late applications cannot be considered incomplete applications will be rejected. For those awaiting graduation, an institutional letter stating that the requirements for the qualification have been fulfilled. Doctoral candidates awaiting the outcome of their thesis examination must attach a letter from their current institution confirming that their doctoral thesis is under examination.

Please send your application to:

Ms Dolly Ntintili: dolly.ntintili@mandela.ac.za