



FACULTY RESEARCH GROUP LEADERS

Organic Polymer Technologies and Environmental Research Group

The Organic Polymer Technologies and Environmental Research Group focuses on advancing knowledge in organic chemistry, polymer bio composites, and environmental sciences. Their primary objective is the development of sustainable and eco-friendly polymers for addressing global environmental issues such as pollution and waste management. Through innovative polymer synthesis and detailed characterization, the team aims to create materials that are not only functional but also environmentally responsible. With projects spanning biodegradable polymers, solid waste management, and resource recovery, this group plays a crucial role in promoting a circular economy. Prospective collaborators will find opportunities to contribute to a greener future, while students can engage in cutting-edge research that merges chemistry and environmental science. This group is ideal for those passionate about sustainability and technology-driven environmental solutions.

Group members:



Leader:

Dr. Mohau Phiri

(PhD in Chemistry) - mohaup@vut.ac.za –
Research area: Biodegradable polymer; Green
composites; Solid waste management

- **Prof Joe Modise (PhD in Chemistry)** - joe@vut.ac.za – Research area: Membrane technology; Wetland Management; Air and water quality.
- **Dr Kgomotso Mtshatsheni (PhD in Chemistry)** - kgomotsom@vut.ac.za – Research area: Environmental pollution; Wastewater treatment; Adsorption studies.
- **Dr. Bambo Mokaeb (PhD in Chemistry)** - mokaeb@vut.ac.za – Research area: Membrane technology; Polymer Nanocomposites; Purification technologies.
- **Dr. Mabaso Nozipho (PhD in Chemistry)** - noziphom@vut.ac.za – Research area: Wastewater treatment; Biosorption studies; Water quality monitoring.
- **Dr. Marrengane Zinhle (PhD in Biotechnology)** - zinhlem@vut.ac.za – Research area: Environmental Pollution; Biological water monitoring; Microorganism studies.
- **Dr. Magoba Rozwivhona (PhD in Environmental)** - rozwivhonam@vut.ac.za – Research area: Environmental Sciences; Geographic information; Surface water hydrology.
- **Ms Bucibo Malesole (MTech in Chemistry)** - malesole@vut.ac.za – Research area: Water quality monitoring, Wetland management.



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Material Science Research Group

This research group focuses on exploring the properties, compositions, and structures of matter through nanomaterials such as nanoparticles, MOFs, and biodegradable nanocomposites. Their primary research is directed towards applications in water treatment and solar cells, addressing the global demand for sustainable energy and clean water. By synthesizing materials that can improve solar energy efficiency and purify water, the group is at the forefront of solving some of the world's most pressing environmental and energy challenges. With numerous accolades in both research and teaching, the group not only contributes significantly to scientific progress but also nurtures the next generation of researchers. Prospective students will have the opportunity to delve into nanomaterial development and sustainable technologies, while collaborators can work on impactful projects that address global environmental issues

Group members:



Leader:

Prof. T. Xaba

(PhD in Chemistry) – thokozanix@vut.ac.za –
Research area: Material Science

- **Prof ND Shooto (PhD in Chemistry)** – ntaotes@vut.ac.za – Research area: Material Science
- **Prof A Pholosi (PhD in Chemistry)** – agnes@vut.ac.za – Research area: Material Science
- **Prof MJ Klink (PhD in Chemistry)** – michealkl@vut.ac.za – Research area: Material Science
- **Dr M Mlambo (PhD in Chemistry)** – mbusoml@vut.ac.za – Research area: Material Science
- **Dr NN Mabaso (PhD in Chemistry)** – noziphom@vut.ac.za – Research area: Material Science
- **Dr KNG Mtshatsheni (PhD in Chemistry)** – kgomotsom@vut.ac.za – Research area: Material Science



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Cell Biology, Medicinal Plants, and Drug Discovery Research Group

This research group is focused on unlocking the therapeutic potential of medicinal plants by exploring their antimicrobial, antioxidant, anticancer, and wound-healing properties. The group's research delves into extracting and characterizing bioactive phytochemicals to understand their biological activities and how they interact with cellular pathways. By integrating traditional herbal medicine with modern scientific techniques, the group aims to contribute to drug discovery, offering natural alternatives to treat conditions such as cancer, chronic inflammation, and antibiotic resistance. Additionally, the group studies immune responses, particularly using macrophages and dendritic cells, to explore how plant-derived compounds can enhance or regulate immune functions. This interdisciplinary team is committed to advancing global healthcare solutions, providing students and collaborators opportunities to contribute to innovative treatments. Their work paves the way for new therapies that could offer safer, more accessible options for managing health challenges both today and in the future.

Group members:



Leader:

Dr. Samkeliso Takaidza

(PhD in Biotechnology) – samkelisot@vut.ac.za –
Research area: Medicinal plants

- **Dr U Terblanche (PhD in Biotechnology)** – unisa@vut.ac.za – research area: Medicinal Plants
- **Prof CC Ssemakalu (DTech in Biotechnology)** – corneliuss@vut.ac.za – Research area: Immunology
- **Dr N Laloo (PhD in Biotechnology)** – laloon@vut.ac.za – Research area: Immunology
- **Ms NM Molefe (MTech in Biotechnology)** – nnanam@vut.ac.za – Research area: Medicinal plants.



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Agricultural and Environmental Biotechnology (AEB) Research Group

The AEB Research Group applies biotechnology to address critical issues in sustainable agriculture, water security, and environmental remediation. Their focus areas include biocontrol of pests, bioremediation, biofertilizer production, and water quality improvement. The group is committed to advancing sustainable solutions through applied research, bridging the gap between biotechnology and environmental health. Their work on bio- and phyto-remediation strategies and involvement in community projects like the restoration of urban wetlands positions this group as a leader in addressing environmental sustainability challenges. Prospective students and collaborators can participate in projects that have real-world impact, making contributions to both scientific knowledge and societal well-being.

Group members:



Leader:

Dr. Taraw Walmsley

(PhD in Microbiology)- taraw@vut.ac.za

- **Dr C Babu (PhD in Biotechnology)-** cindy@vut.ac.za, Research Area: OMICS
- **Dr H Mokgope (PhD in Biotechnology)-** hermanmo@vut.ac.za – Research area: Water Bioremediation



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4IR ICT Research Group

The 4IR ICT Research Group focuses on advancing knowledge in key areas of computer science, particularly in Information and Communication Technologies (ICT) for Education, Development, and Machine Learning. The group is dedicated to developing robust, scalable computing solutions that address societal challenges, such as digital literacy, privacy, and security, as well as contributing to technological innovation. Their work spans across creating and improving machine learning algorithms, advancing big data analytics, and developing digital tools for education and governance. By exploring the ethical implications of AI and improving access to technology, the group seeks to empower communities and promote socio-economic development. This group offers a dynamic environment for prospective master's and PhD students who are passionate about the intersection of technology and societal impact, as well as collaborators seeking to explore innovations in AI, ICT, and digital education

Group members:



Leader:

Prof. Tranos Zuva

(DTech Computer Sciences and Data Processing) -
tranosz@vut.ac.za -
Research area: Machine learning

- **Prof Rene Van Eck (PhD in ICT)** – rene@vut.ac.za -Research area ICT4Development
- **Dr Naume Sonhera (PhD in Information Systems)-** nqume@vut.ac.za -Research area: ICT4Education
- **Dr Andrew Brown (PhD in Information Technology)** – andrewb@vut.ac.za - Research area: Machine learning
- **Dr Ramadile Moletsane (PhD in Information Technology)** – ramadilem@vut.ac.za – Research area- ICT4Development
- **Dr Penuel Makelana (PhD in ICT)** – penuelm@vut.ac.za – Research Area: ICT4Development