College of Science, Engineering and Technology
Research Focus Areas for 2025

All supervisors' contact details may be found at:
https://www.unisa.ac.za/sites/corporate/default/Colleges/Science,-Engineering-&-Technology

1. School of Computing

Supervisor	Contact details	Research area
Prof E Kritzinger	Kritze@unisa.ac.za	Information Security Education / Cyber Safety Awareness
Prof H Lotriet	Lotrihh@unisa.ac.za	Socio-technical aspects of the adoption and use of information systems in organizations and society. Design, adoption and use of information systems in relation to the UN sustainable development goals. Adoption and use of technology in ODeL.
Prof P Mkhize	mkhizpl@unisa.ac.za	Knowledge management, Strategic Information System
Prof E Mnkandla	mnkane@unisa.ac.za	The world today is overwhelmed with gigabytes of data that are collected and stored in various forms (structured and unstructured). The nature of our real-world problems today is characterised by very complex processes in which mathematical reasoning or traditional modelling are simply inadequate, such complexities are a result of some uncertainties in these processes due to their stochastic nature. Software engineering processes belong to this category of complex processes. The main focus of my research is on ways to improve software quality in software development projects using contemporary technologies or environments such as 4IR, IoT, Big Data, Data Science, Machine Learning, Cloud Computing, etc. Interested students for MSc and PhD, Postdoctoral fellows and other research collaborations should consider projects to improve software quality. Ultimately, when software quality improves; performance of systems improves, business and customers are satisfied, safety and security improve, and there is betterment of the quality of life for humans.
Prof F Bankole	Bankofo@unisa.ac.za	Expert Systems, Telecommunication Systems, Database Systems, Decision Support Systems, Multi-Criteria Decision Analysis. ICT impact
Prof K Padayachee	Padayk@unisa.ac.za	**Option 1**: Insider Threat Management [PhD (Information Systems)/Masters (Computing)/ Masters (Information Technology Management)] An 'insider threat' is an internal threat that uses the authority granted to them to attack an

		organisation's IT infrastructure (e.g., unauthorised extraction, duplication, or exfiltration of data, tampering with data, deletion of critical assets, etc.) **Option 2**: Computing Education [PhD (Computing Education)/Masters (Computing Education)] Computing Education encompasses the teaching and learning of computing, and the development of new techniques for teaching and assessing it (some pedagogical, some computational).
Dr M. Sibiya	Sibiym@unisa.ac.za	**Currently working on:** My research primarily centers on the application of AI algorithms in machine learning, deep learning, natural language processing, large language models (LLMs), and reinforcement learning. I am currently supervising PhD students in these areas. Additionally, I am conducting research on utilizing Tiny Machine Learning to monitor air quality with the aid of drones and embedded systems (Currently working on my own and willing to accept 1 Masters student). **Additional but not currently working on:** Robotics, IoT, Fuzzy Logic and computer vision (Segmentation, YOLO algorithms, CNNs and Vision Transformers)
Prof S Eybers	eeyberss@unisa.ac.za	Applied Data Science, referring to all managerial, "soft" or non-technical aspects of data and data management related topics such as human centered Artificial Intelligence (AI), data governance, data management, learning analytics, virtual reality in education or any other related topic.
Prof S Singh	Singhs@unisa.ac.za	digital-government
Prof BL Tait	taitbl@unisa.ac.za	Biometrics, Blockchain, Aspects of security with focus on network security, and measurement and control systems using Arduino and similar technologies
Prof M van der Merwe	Vdmertm@unisa.ac.za	e-Learning, m-Learning, Psycho-physiological aspects of Human Computer Interaction, Open Source movement.
Prof E van der Poel	Evdpoel@unisa.ac.za	Computational Creativity, Machine Learning. Artificial Intelligence, Explainable Artificial Intelligence
Dr H Abdullah	Abdulh@unisa.ac.za	Data/Information Privacy Protection, Privacy Laws and Regulations, Privacy Risk Management, Privacy Compliance

Dr D Bisschoff	DBischof@unisa.ac.za	Designing Banking Technology for the Aged and Disabled
Ms P Buthelezi	mathimp@unisa.ac.za	Digitalisation, digitisation & artificial intelligence implementation. Information systems in raising awareness (awareness tech). Technology in business and society: Fin-Tech & Tech-Fin; Mobile bullying.
Prof B Chimbo	chimbb@unisa.ac.za	**Human Computer Interaction (HCI)**: -User Experience & Interaction -Child-Computer Interaction - Design of Technology for Education -HCI4D; ICT4D -Virtual, Augmented and Mixed Reality (xR) in Education -4IR Research; eHealth
Prof L Khoza	Khozalt@unisa.ac.za	Area 1: Digital transformation in Agile projects. Area 2: Scaled Agile in software projects. Area 3: IT Project Management. Area 4: Agile Software Project Success.
Dr B Chipangura	Chipab@unisa.ac.za	Mobile Centric Access to Information; Self quantification technologies; Adoption of Information technologies; e-learning/m-learning
Prof J Chigada	chigajm@unisa.ac.za	Information Security/Cybersecurity culture, Data governance, protection of personal information, Knowledge management
Prof A da Veiga	dveiga@unisa.ac.za	Information security culture / cyber security culture / data privacy culture / Protection of personal information
Dr C Dongmo	dongmc@unisa.ac.za	Formal methods, Software Engineering.
Dr A Kgopa	Kgopaat@unisa.ac.za	Smart farming, mobile healthcare services, mobile learning and cloud computing
Dr PM Gouws	gouwspm@unisa.ac.za	Robotics, programming, 21st century skills development, lifelong learning through MOOCs, robotics education, access to science engagement and education, engaged scholarship, Fourth Industrial Revolution skills and learning
Mr K Halland	Hallakj@unisa.ac.za	Applied Logic, Description Logics and Ontology Engineering
Dr S Mamorobela	mamorsp@unisa.ac.za	Knowledge management Systems, Expert Systems, Knowledge Management strategies for Small and Medium Enterprises, Information Security as it relates to knowledge sharing; Social media impact on Knowledge Management; Enterprise Architecture; Work Integrated Learning and the future of work in the 4th Industrial Revolution era.
Prof G Howard	Howargr@unisa.ac.za	Autonomous or Self-driving Organisations || IT Innovation ||

		Digital Transformation/IT-Organisational Change/Organisational Transformation and IS/IT || Fourth Industrial Revolution (4IR) technologies and Organisations || Fourth Industrial Revolution (4IR) technologies and Education || Artificial Intelligence in Education || Smart Sustainable Cities || Green Information Systems/Information Technology/Computing (Green IS/IT/ICT) || ICT for Sustainability (ICT4S) ||
Dr S Mtsweni	mtswees@unisa.ac.za	Knowledge Management, Software Projects, Human issues within software projects, Ethics, Knowledge Hiding, Knowledge Quality, Information Overload, Quiet Quitting,
Prof M Mujinga	mujinm@unisa.ac.za	Information Security, Usable Security, Cloud Computing Security
Mrs CL Hlengwa	hlengcl@unisa.ac.za	**Human Computer Interaction (HCI) for Vulnerable / Special Groups** HCI and Culture User Experience & Interaction Eye Tracking Technology Design of Technology for Education HCI4D ICT4D Decolonization of Technology Indigenous Knowledge Systems and Technology Rural e-Health
Dr V Mzazi	hornevz@unisa.ac.za	Areas: e-health. Epidemiology research. Primary health care. Public health medicine. Quality assurance and clinical practice guidelines. Community outreach primary health care. M-health. ICT4Health. Preference: I would like to work with students that are interested in projects that have an in-depth engagement with the health system, rather than a superficial one.
Mr E Ochola	ocholeo@unisa.ac.za	Routing Protocols in Mobile Wireless Ad Hoc Networks, Ad Hoc Networks Security
Dr M Phahlane	phahlmm@unisa.ac.za	Adoption and use of information systems by organizations and individuals.
Dr S Ssemugabi	ssemus@unisa.ac.za	User experience, e-Learning, e-Skills, e-Service quality, Application of mobile technologies for development.
Prof CJ Van Staden	vstadcj1@unisa.ac.za	User experience, m-learning, e-learning and eModeration
Dr P le Roux	Lrouxp@unisa.ac.za	e-Learning and e-Assessment in Computing; Emotional User Experience
Dr T Masombuka	masomkt@unisa.ac.za	Software engineering, Agile software development, DevOps,

Dr AE Van Der Poll	Vdpolae@unisa.ac.za	Dr. Emil van der Poll, an Information Systems researcher, specializes in qualitative research centered on the sociotechnical and sociocultural aspects of information technology utilization and integration in both organizational and societal contexts. He is actively looking to mentor students passionate about investigating the design, development, adoption, and application of artificial intelligence concerning indigenous knowledge and underrepresented communities. Additionally, he welcomes postgraduate candidates eager to explore the use of game-based learning and augmented reality to improve teaching and learning in computing education.
Mr S Mhlana	mhlans2@unisa.ac.za	ICT and education, e-learning
Ms P Mvelase	mvelap@unisa.ac.za	Emerging technologies, cyber-physical systems/IoT, Data Analytics.
Mr L Nxumalo	nxumals@unisa.ac.za	Knowledge Management, Software development communities of practice
Mrs D Scholtz	scholid@unisa.ac.za	Cyber Safety, Cyber Security, Information Security, Education
Mr E Tabane	tabane@unisa.ac.za	Internet of things (IoT), Web of Things (WoT), Internet of everything, Digital skills Ai, Generative Ai, General Ai, Ai cyber security Machine Learning, Deep Learning (CNN + LSTM) Ai ethics Responsible Ai Ai framework/ Conceptual frameworks Ai governance Data Science Ai Agent deployment Prompt engineering Big data / Big Data analytics LLM
Dr L Motsi	motsil@unisa.ac.za	Information Systems, E-health, E-learning
Dr A Thomas	Thomaa@unisa.ac.za	Automated processing of diagrams, diagram specifications, visual syntax specifications Artificial intelligence in programming education
Prof S Vallabhapurapu	vallas@unisa.ac.za	Development of resistive switching computer memory ReRAM devices, Green Computing, 4IR (4th Industrial Revolution)
Dr R van der Merwe	VDMerwer@unisa.ac.za	Data Science, Technology in Education, Computer Supported Collaborative Learning, Natural Language Processing
Mrs R Vorster	Rvorster@unisa.ac.za	Green Computing, Sustainable IT, Green Information Systems Information Privacy Culture, Organisational Data Protection Culture, Information Management
Ms DR Mokwana	mokwadr@unisa.ac.za	4IR, Cyber Physical systems, IoT, Big data, Cloud computing

Mrs M Serote	serotm@unisa.ac.za	E-Learning, m-Learning, ICT and education
Miss TG Moape	moapetg@unisa.ac.za	Computational Linguistics, Natural Language Processing
Ms ME van Heerden	Vheerme1@unisa.ac.za	E-Learning, m-Learning, Teaching/Learning Programming
Mr M Maloma	Malommc@unisa.ac.za	e-learning Educational technologies Information Systems
Mrs NE Mwim	Mwimen@unisa.ac.za	Cybersecurity Cybersecurity culture E-health

2. Department of Chemical Engineering

Supervisor		Brief description of research focus areas
Prof LL Jewell	jewelll@unisa.ac.za	Fischer Tropsch Catalysis Environmental Catalysis
Dr R Sigwadi	sigwara@unisa.ac.za	Nanoparticles Nanofibers Nanocomposite membrane for fuel cell application Nanocomposite membrane for iron redox flow battery (grid) application
Dr TY Leswifi	leswity@unisa.ac.za	Water and wastewater treatment Adsorption technology Nanotechnology for water treatment Biorefineries Hydrogen energy
Prof S Makgato	emakgass@unisa.ac.za	Coal desulphurization Coke quality improvement Coke quality Clean coal technologies Waste to Energy Emissions reduction techniques Industrial boilers optimization
Ms C Mateescu	mateecm@unisa.ac.za	Environment, Air quality, water, WIL
Mrs MP Nkobane	nkobamp@unisa.ac.za	Nananoscience Nanotechnology. Nano metal oxides
Ms A Osman	Osmana@unisa.ac.za	Water Footprinting Water Accounting Sustainability
Ms MCS Moroenyane	Moroemc@unisa.ac.za	Fuel cell technology Water and wastewater treatment
Dr K Mphahlele	emphahk1@unisa.ac.za	Nanoparticles Nanofibers Micro-modeling of crack propagations in fibre reinforced polymers

Dr T Seadira	seadit@unisa.ac.za	Catalysis, Renewable Energy, Catalytic Wastewater Treatment
K Ledwaba	ledwakm@unisa.ac.za	PEM Fuel cell and Microbial Fuel cell Atomic layer deposition for ultrathin film Pt- based electrocatalyst Two-dimensional (2-D) highly complex nanostructures Energy and Hydrogen storage
Mr A Mavukwana	mavukae@unisa.ac.za	Process Synthesis Computational studies Renewable energy
Dr A Mavhungu	mavhuf@unisa.ac.za	Water and wastewater treatment Adsorption Technology Membranes for wastewater treatment
Dr N Khesa	khesan@unisa.ac.za	ASPEN plus simulation, Exergy analysis, Power to gas, Oxy-combustion carbon capture and sequestration on coal fired power plants, Sorbent enhanced water gas shift (SEWGS) pre-combustion capture on natural gas combined cycle (NGCC) power plants, Heat recovery steam generator HRSG preliminary design and sizing
Dr S Motshekga	motshsm@unisa.ac.za	Water and wastewater treatment Nanotechnology for water treatment Polymer nanocomposites Nanoparticles

3. Department of Civil Engineering

Supervisor		**Brief description of research focus areas**
Prof F Ilunga	Ilungm@unisa.ac.za	• Hydrology and water resources engineering • Applications of Artificial Intelligence in water Engineering • Applications Multicriteria decision methods in Water • Applications of multicriteria decision methods in Engineering Education • Open distance and e-Learning • Dam engineering • Hydropower engineering • Fuzzy Logic applications in water resources engineering • Stochastic methods for multidisciplinary research • Entropy applications in Hydrology and water resources • Remote sensing and cloud computing applications in water resource management
Prof B Ikotun	Ikotubd@unisa.ac.za	• Concrete Optimization • Research into using industrial, agricultural and household wastes

		as supplementary cementitious materials/construction materials. • Cement hydration optimization • Nanotechnology and concrete • Sustainable green concrete researchGeopolymerisation in concrete • Research on mortar materials for 3D printing • Concrete Durability
Dr Walied Hussein Elsaigh	hussiwam@unisa.ac.za	Concrete Pavements, Concrete pavement modelling, Concrete materials, Accelerated Pavement testing, Pavement materials, Beneficial reuse of waste materials in construction.
Prof E Onyari-Benecha	onyarek@unisa.ac.za	Water resources engineering Computational hydraulics Contaminant transport Flood hydrology Water quality modelling
Mr B Verhoek	verhob@unisa.ac.za	Pavement design and materials. Asphalt performance modelling.
Mr A Zimbili	zimbiao@unisa.ac.za	Structural Engineering Design Construction and Building Design Marine structures and oceanography Sustainable development by reusing wastes in concrete
Mr Mohale LM	mohallm@unisa.ac.za	Waste and Asphalt/Construction materials Construction/Project Management Occupational, Health and Safety
Ms MA Rikhotso	rikhoma@unisa.ac.za	Concrete made from waste

4. Department of Mining Engineering

Supervisor		**Brief description of research focus areas**
Prof F Mulenga	Mulenfk@unisa.ac.za	Mine-to-mill Optimisation Rock drilling and blasting Mine design and planning Engineering simulation
Dr P Dikgwatlhe	dikgwim@unisa.ac.za	Mineral Economics Mining Engineering Mineral Resource Management Engineering Management
Dr N Chimwani	chimwn1@unisa.ac.za	Mine-to-mill Optimisation Mineral Processing Mining Wastewater Treatment Metal Recovery from Mineral Processing Waste
Dr NM Chiloane	chilonm@unisa.ac.za	Rock/Geotechnical Engineering Numerical Modelling Stability Analysis of Structures

		Characterisation of Seismicity and Blast-Induced Damage Geomechanical Properties of Cementitious Material Systems Optimisation
Dr VC Madanda	netshvc@unisa.ac.za	Mining Engineering Geomechanics and Geotechnical Engineering Geotechnical Instrumentation and Monitoring Tunnelling
Dr T Chauke	chaukt1@unisa.ac.za	Geostatistics Geometallurgy Geomodelling Geospatial Engineering Machine Learning Application in Mining
Mr L Maseko	masekla@unisa.ac.za	Coal Mining Mine Ventilation
Ms AA Mkonde	mkondmm@unisa.ac.za	Geology Surface Mining Climate Change Environmental Geology Mineral Economics
Ms RG Thage	thagerg@unisa.ac.za	Mine Design and Planning Mineral Resource Management Mine Surveying
Ms LL Yende	yendel@unisa.ac.za	Photogrammetry Global Navigation Satelite Systems Surface Mine Surveying
Mr. PP Pule	pulepp@unisa.ac.za	Mine Subsidence Mine Surveying Grade Control
Mr. TJ Mosia	mosiat@unisa.ac.za	Rock Engineering (Drilling)
Ms T Mushwana	mushwt@unisa.ac.za	Rock Drilling and Blasting Mining Engineering
Mr. SA Madanda	emadans@unisa.ac.za	Rock Drilling and Blasting Surface Mine Fleet Optimisation
Mr N Mndawe	mndawnr@unisa.ac.za	Surface Mining Blasting Blast-Induced Ground Vibrations

5. Department of Electrical Engineering

Supervisor		**Brief description of research focus areas**
Prof Z Wang	wangz@unisa.ac.za	**Control Theory and Control Engineering**: Active Disturbance Rejection Control, Model Predictive Control, and Intelligent Control. **Artificial Intelligence:** Evolutionary Optimization, Machine Learning, Industry 4.0, Medical Diagnosis, and Image/Video Processing. **Energy system:** Smart energy system, Digital twin, Net zero energy. **Others:** Chaos, Embedded System, and so on.

Prof P Umenne	umennpo@unisa.ac.za	Telecommunications, Micro-Electronics, Network modelling, simulation, network protocols, OPNET. Femtosecond laser fabrication Josephson Junctions
Mr WP Nel	Wnel@unisa.ac.za	• Engineering Management • Management of Technology • The adoption and diffusion of innovation
Prof M Sumbwanyambe	sumbwm@unisa.ac.za	• MANETs • Wireless technologies. • Short range wireless communication and wireless sensors for the control for renewable energy and energy efficiency purposes. • Pricing and resource management in radio access technologies. • Energy efficiency and renewables. • ICT usage in e-health, e-commerce, e-education and e-governance. • Telecommunication technologies and game theory • Network optimization. • Information technology and their use in social and economic development. Engineering management. • Bio-mimicry and innovation in ICTs. • Artificial intelligence and risk management
Prof A Yusuff	yusufaa@unisa.ac.za	• Modeling, optimisation, visualisation and analysis of energy and power systems for assessment of different scenarios of investments optimal time, risks, and opportunities. • Aggregation and Integration of electric power generation devices based on renewable energy sources to electric power system. • Application of Computational Intelligence and Evolutionary schemes in power system: Neural Network and Fuzzy Logical, Particle Swarm Optimisation, Genetic Algorithm.
Prof EN Mbuli	mbulien@unisa.ac.za	• Transmission and Distribution Planning. • Transmission and Distribution Systems. • Capacity Uprate of Transmission and Distribution Lines. • Power Electronics in Planning (FACTS, DFACTS, and HVDC). • Integration of Renewable Energy Sources. • Energy Efficiency. • Applications of Statistics, Optimisation, and Multi-Criteria Decision Analysis. • Energy Management.
Dr TS Hlalele	hlalets@unisa.ac.za	• Application of Artificial Intelligence and ML to Power Systems • Integration of Renewable Energy Sources into the Grid • Smart Grids • Power System Protection

		• Engineering Education
Dr SC Motepe	motepsc@unisa.ac.za	• Application of Artificial Intelligence in Power Systems: Neural Networks, Adaptive Fuzzy Neural Network, Deep Belief Networks, Recurrent Neural Networks • Renewable energy: Integration of renewable sources into the grid, load sharing with renewable sources penetration, • Load Forecasting • Digital technologies and smart reporting • Smart Grids
Dr EA Feukeu	efeukeea@unisa.ac.za	• Electrical, Electronics and Telecommunication Systems • Wireless communication and wireless sensors • Free Space Optical (FSO) communication • Vehicular Visible Light Communication (VVLC) • Vehicle-to-Vehicle (V2V), Vehicle-to-everything (V2X), Dedicated Short Range Communication (DSRC) • LIDAR (Light Detection and Ranging) • Smart systems, Telemetry, and Internet of Things (IoT) • Artificial Intelligence (Machine Learning) application in Telecommunication Systems • UAV (Drone) Technology analysis, design, development, and implementation.

6. Department of Chemistry

Supervisor		Research focus areas
Dr ME Aphane	Aphanme@unisa.ac.za	**Environmental and Food Chemistry**: • Extraction of elements from South African Coal Fly Ash. • Utilization of Coal Fly Ash for beneficiations. • Synthesis and applications of Silica nanoparticles and Alumina nanoparticles derived from coal fly ash.
Prof H Clayton	Clayths@unisa.ac.za	**Medicinal Chemistry and Drug discovery:** • Organometallic Chemistry • Structural Chemistry • Computational Chemistry
Dr BS Dladla	dladlbs@unisa.ac.za	**Computational Chemistry, structural Chemistry and material sciences**: • Modelling of ionization constants (pKa) • Modelling and Synthesis of porous materials for separation of fluid mixtures
Prof S Dube	dubes@unisa.ac.za	**Environmental and Food Chemistry**: • Target and non-targeted emerging contaminant analysis in aquatic environment

		• Fabrication of nanomaterials from natural blends for applications including environmental, sample preparation and health • Development of miniaturized and microextraction sample preparation techniques in response to green analytical chemistry • Food safety in food of animal origin • Development of GCxGC HRT and LC-MSMS methods for various applications
Dr N Magwa	magwanp@unisa.ac.za	**Computational Chemistry, structural Chemistry and material sciences:** • Hydrometallurgy • Organic Inorganic hybrid complexes for OLEDs and medicinal applications • Organic-inorganic hybrid crystalline porous materials for various applications • Molecular Modeling
Dr. ED Moema	moemaed@unisa.ac.za	**Environmental and Food Chemistry:** • Development of environmentally sustainable sample preparation methods for the determination of pollutants in complex matrices • Food safety
Prof N Mketo	mketon@unisa.ac.za	**Environmental and Food Chemistry:** • Development of greener microwave and micro-extraction sample preparation methods for pre-concentration and extraction of inorganic and organic pollutants in various samples (water, food, petrochemicals, coal, soil, sediments, etc.). • Synthesis and characterization of nanomaterials generated from waste for adsorptive removal, degradation and recovery of valuable elements from complex matrices.
Prof T Motaung	motaute1@unisa.ac.za	**Computational Chemistry, structural Chemistry and material science**s: • Synthesis and characterization of physical and viscoelastic properties of polymer blends, composites, nanocomposites for smart material development. Also interested in organic polymer wastes streams and possible treatments for practical applications. • Industrially driven projects for closing the gap between industries and higher learning education.
Prof MJ Mphahlele	Mphahmj@unisa.ac.za	**Medicinal Chemistry and Drug discovery:** • The main thrust of my current research is directed towards the design and synthesis of biologically relevant heteroatom-containing organic compounds as potential multifunctional drugs against biochemical and biological targets associated with type 2 diabetes mellitus (T2DM)

		• Spectroscopic (NMR, IR, UV-Vis, Raman & HR-MS), single crystal X-ray diffraction (SC-XRD) and computational methods are applied to structural problems.
Dr M Smith	Smithm2@unisa.ac.za	**Medicinal Chemistry and Drug discovery:** • Crystallography • Crystal and Co-Crystal Engineering of active pharmaceutical ingredients • Metal-organic crystals of active pharmaceutical ingredients • Pharmaceutical Drug Design
Mr KG Lesenyeho	lesenlg@unisa.ac.za	**Environmental and Food Chemistry:** • Synthesis of various antioxidant derivatives • Development of GC-MS methods for BD oxidation
Dr RC Chokwe	chokwrc@unisa.ac.za	**Medicinal Chemistry and Drug discovery:** • Development of analytical methods to enable quality control of medicinal products in the market. • Indigenous knowledge systems • Fabrication of nanomaterial for environmental and medicinal applications • Use of Machine Learning in drug discovery
Mr KC Tapala	tapalkc@unisa.ac.za	**Medicinal Chemistry and Drug discovery:** • Organometallic Chemistry • Classical Coordination Chemistry • Structural Chemistry • Computational Chemistry
Dr HK Kgomo	kgomohk@unisa.ac.za	**Environmntal and Food Chemistry** • Water and wasterwater pollution • Fabricating and characterization of bio-based materials for the removal of various polluntats in water
Ms L Benade	benadll@unisa.ac.za	**Medicinal Chemistry and Drug discovery:** • Organometallic Chemistry • Catalysis • Structural Chemistry • Computational Chemistry
Prof VE Pakade	pakadve@unisa.ac.za	**Environmental and Food Chemistry**: • Surface modification of biowaste for improved properties and their use in environmental remediation and food safety • Soil ameriolation by biowaste to improve food quality and immobilize pollutants • Synthesis, characterization, and application of polymer composites in aqueous adsorption of pollutants from different matrices • Development and optimization of sample preparation methods for use in water and food
Ms NH Zulu	Zulunh@unisa.ac.za	**Medicinal Chemistry and Drug discovery:** • Organometallic Chemistry • Bioinorganic Chemistry

7. Department of Mathematical Sciences

Supervisor		Research focus area
Prof EF Doungmo Goufo	dgoufef@unisa.ac.za	Epidemiology
Prof T Dube	Dubeta@unisa.ac.za	Categorical Algebra and Topology, Pointfree Topology
Dr P Ghosh	ghoshpp@unisa.ac.za	Topology, Algebra, Pointfree Topology, Category Theory
Prof O Ighedo	Ighedo@unisa.ac.za	Pointfree Topology
Prof H Jafari	jafarh@unisa.ac.za	Fractional Differential Equations
Prof SJ Johnston	johnssj@unisa.ac.za	Special functions & Orthogonal Polynomials
Prof A Kubeka	Kubekas@unisa.ac.za	Cosmology
Dr J Manale	Manaljm@unisa.ac.za	Differential Equations, Symmetry Analysis, Lie Algebra
Dr M Moremedi	Moremgm@unisa.ac.za	Fluid Dynamics
Dr Z Mpono	Mponoze@unisa.ac.za	Group Theory
Prof J Munganga	Mungajmw@unisa.ac.za	Fluid Dynamics, Epidemiology
Prof I Naidoo	naidoi@unisa.ac.za	Pointfree Topology
Prof M Khumalo	khumam@unisa.ac.za	Numerical Analysis, Integral Equations, Fractional Differential Equations, Generalized Contractions
Prof T Nazir	talatn@unisa.ac.za	• Functional Analysis • Fixed Point Theory and Approximation Theory with Application • Dynamical Systems • Optimization Theory • Applications of Partial Differential Equations
Prof A Adem	ademar@unisa.ac.za	Differential Equations, Lie Symmetries

8. Astronomy

Supervisor		Brief description of research focus area
Dr Z Mguda	mgudazm@unisa.ac.za	Supermassive black hole mass measurement and galaxies cluster environments
Prof JO Chibueze	chibujo@unisa.ac.za	Radio astronomy and astrophysics, interferometry and aperture synthesis, masers, high-mass star formation, galaxy evolution and Galaxy Clusters

9. Department of Physics

Supervisor		Research focus area
Prof M Braun	Braunm@unisa.ac.za	**Theoretical Atomic and Molecular Physics:** Computational Physics focusing on the method of finite elements in its applications to molecular

		physics. Interest in inverse scattering, especially for its application to geophysical prospecting.
Prof ML Lekala	Lekalml@unisa.ac.za	**Theoretical Nuclear and Particle Physics**: Theoretical study of the properties of few-particle systems. This include studies of structure of and reactions involving these systems at Particle, Nuclear, Atomic and Molecular level. We employ the Faddeev and Faddeev-Yakubovsky formalisms for rigorous benchmark calculations using High Performance computing. Inverse scattering theory and its applications in few-body physics. Applications of few-body methods to study exotic systems such as hypernuclei and superheavy elements. Computational Physics, where we develop efficient numerical methods to solve the aforementioned systems.
Prof GJ Rampho	ramphjg@unisa.ac.za	**Theoretical Nuclear and Particle Physics:** Theoretical studies of properties of exotic nuclei and ultra-cold gasses. Structural and reaction properties of as well as interaction models in halonuclei, hypernuclei and Bose-Einstein condensation. Mathematical Physics focusing on constructing analytical solutions of quantum mechanical equations and numerical solutions of integrodifferential equations for few-body and many-body systems.
Prof AE Botha	Bothaae@unisa.ac.za	**Theoretical Condensed Matter Physics:** Computational Physics, focusing on nonlinear dynamic models of various physical systems, involving the study of chaotic behavior, parametric resonance and various synchronization effects. Specific areas of active research: Monte Carlo Modelling of Spin Systems, Chaos theory and the 'close to the edge' phenomenon and Systems of Josephson junctions and related models.
Prof MS Dhlamini	dhlamms@unisa.ac.za	**Experimental Condensed Matter Physics:** Development and engineering of new improved materials for applications in energy and health sectors to address global warming and finding cure/treatment to life threatening diseases. Synthesizing and characterizing new inorganic host materials containing lanthanide ions and metal ions to explore their viability as new photonic materials. Develop long persistent phosphors, up-converting phosphors and soli-state supercapacitors with long cyclability.
Prof VS Vallabhapurapu	Vallavs@unisa.ac.za	**Experimental Condensed Matter Physics:** Superconductivity, Novel Magnetism, Electron Spin Resonance, Low field microwave absorption, Nanotechnology for water purification and Enzyme based catalysis, Conductivity in polymer and bio-polymer nano composites and Resistive Switching phenomenon. Applied physics and devices such as

		Josephson Junctions at nano scale, Microwave Spintronics and ReRAM for emerging computer memory devices and Green computing.
Prof SC Ray	raysc@unisa.ac.za	**Experimental Condensed Matter Physics:** Experimental soft matter Physics. Synthesis and characterization of 0-D materials like carbon nano-balls, 1-D materials (Carbon nanotubes), 2-D materials (Graphene and graphene nanoflakes) and 3-D materials (Amorphous carbon, Graphite and diamond-like carbon). I study these materials for electronic and magnetic properties for future spintronic applications.
Prof BM Mothudi	mothubm@unisa.ac.za	**Experimental Condensed Matter Physics:** Development of nanostructured materials used to enhance the properties of long persistent phosphors, solar cells and selective solar absorbers. Use various synthesize methods such as green synthesis, combustion, solid state reaction and sol-gel. Fabrication of multilayer thin-film solar absorbers suitable for concentrating solar power (CSP) plants and nanostructured graphene hybrid solar cells. Optical, electrical and structural properties of nanostructured materials.
Prof SJ Moloi	moloisj@unisa.ac.za	**Experimental Condensed Matter Physics:** Develop devices with improved properties for various applications. Preparation and characterization of the materials prior the device fabrication to investigate a change in structural, magnetic, optical and electrical properties.
Dr B Mukeru	mukerb1@unisa.ac.za	**Theoretical Nuclear and Particle Physics:** Study structure and reactions of halo nuclei and loosely bound nuclei with application in medicine, biology and security. Use High Performance Computing (HPC) and Linux clusters for theoretical investigation of these systems.
Dr MM Tibane	tibanmm@unisa.ac.za	**Theoretical Condensed Matter Physics:** Development of allows by computational modelling and simulation of transition metals and graphene-based materials. Density functional theory to predict the alloy stability based on the structural, electronic, magnetic, thermodynamic and mechanical properties.
Dr PS Mbule	mbuleps1@unisa.ac.za	**Experimental Condensed Matter Physics**: Nanomaterials for renewable energy and I specialize in the synthesis and characterization of these materials for the application in organic solar cells, Dye sensitized solar cells and perovskite solar cells. Fabrication of transparent conductive oxides (TCOs) thin films via wet chemistry and surface technologies involving a variety of physical vapor deposition methods.
Dr LL Noto	notoll@unisa.ac.za	**Experimental Condensed Matter Physics**: Develop novel materials and enhancing their properties to suit

		applications in persistent luminescence and solar cells. Synthesis and characterisation of materials with applications in sun re-chargeable light bulbs and solar cells.
Dr MJ Sithole	sithomj@unisa.ac.za	**Experimental Condensed Matter Physics:** Preparation and studies of physical and chemical properties of zinc compounds such as zinc layered hydroxide salts (ZLHS) for photonic and gas sensing applications. Use low cost methods such as template-less and surfactant-free aqueous chemical growth (ACG) to synthesize zinc compounds.
Prof J Kriek	Kriekj@unisa.ac.za	Use of technology in the teaching and learning of physics; including gamification, tiktok, simulations, facial expressions, AI for conceptual understanding of physics and science concepts.

10. Department of Statistics

Supervisor		Research interest / field of expertise
Prof LK Debusho	debuslk@unisa.ac.za	Spatial and Spati-temporal Modelling Modelling of Environmental Data Generalized Linear Mixed Models
Dr G Kabera	kaberg@unisa.ac.za	Optimal Experimental Designs Survival Analysis Analytic Hierarchy Process
K Malandala	malank@unisa.ac.za	Stochastic Volatility models Measures of risk and machine learning.
Ms MA Managa	managma@unisa.ac.za	Biostatistics Demography
Mr TP Mohlala	mohlatp@unisa.ac.za	Reliability theory; Point and Poisson Processes; Maintenance theory; Stochastic process in finance
Prof P Ndlovu	ndlovp@unisa.ac.za	Construction of optimal designs for nonlinear estimation and quantile regression Time series
Prof PM Njuho	njuhopm@unisa.ac.za	Application of meta-analysis to agricultural studies Scientific data management strategies and software use Linear mixed models Design of small and large-scale surveys studies Epidemiology and health related studies Design of experiments for replicated and non-replicated trials Biometrical approaches to agricultural-based (on-station and on-farm) experiments Statistical analysis of gender related studies
Prof JO Olaomi	olaomjo@unisa.ac.za	Operations Research Patient Flow problems (Queuing theory) Scheduling / Network problems (Shortest route, CPM, PERT)

		Mathematical programming - Linear, Integer and Dynamic Time Series Econometrics Endogeneity problems Outliers investigations in Time Series Data or in Structural Equation problems Modelling of economic variables Causality Problems Modelling structural equation problems Estimations in the presence of Least Squares violations Canonical Correlations Time series modelling
Prof E Ranganai	rangae@unisa.ac.za	Quantile Regression: Theory and applications Robust Regression and Regression diagnostics Time series: Time domain and frequency domain techniques, Long Memory including GARCH and FIGARCH TYPE Models. These would include applications in renewable energy, precious metals etc
Prof E Rapoo	Rapooe@unisa.ac.za	Stochastic Processes Stochastic Differential Equations Stochastic epidemiology Distance Education Mathematics and Statistics Education
Dr BP Ntsime	ntsimbp@unisa.ac.za	Symmetry Analysis, Differential Equations

11. Institute for Nanotechnology and Water Sustainability (iNanoWS)

Supervisor		Research Focus Area
Prof Thabo T.I Nkambule	nkambtt@unisa.ac.za	His research interests are in the Urban Water Cycle, Conventional, Advanced and Integrated Water Treatment Technologies, Natural Organic Matter in Engineered Water Treatment Systems and Nanotechnology for Water Treatment. His research focus is specifically on Natural Organic Matter (NOM) in South African waters, studying its characterization, treatability and method development for effective NOM removal from water.
Prof TAM Msagati	msagatam@unisa.ac.za	His research interests line in (i) The development of analytical tools for the analysis of environmental contaminants, (ii) research on food supplements, food composition and food/pharmaceutical packaging, (iii) aquatic toxicology, (iv) marine and environmental toxicology, and (v) remediation of contaminated aquatic environments using membrane filters and different types of filters.
Prof AT Kuvarega	kuvarat@unisa.ac.za	His research interests are in the areas of advanced oxidation processes and nanostructured catalytic membranes for energy and environmental applications, specifically degradation of organics and inactivation of microbes in water by utilising renewable

		solar energy. He also has interests in the design of water treatment technologies that utilise solar energy to produce point of use water from wastewater.
Dr ME Managa	managme@unisa.ac.za	Her research interest lies in porphyrinoids conjugated to nanostructured materials for Photodynamic antimicrobial chemotherapy (PACT) application. Acquiring pure water free of contaminants (pollutants) and pathogens is a matter of concern which calls for new, effective, and low-cost water disinfection techniques. Photodynamic antimicrobial chemotherapy (PACT) represents a potential, alternative for the inactivation of microbial cells and has already shown to be effective.
Prof L-A de Kock	dkockla@unisa.ac.za	Her research interests are in the development of hybrid materials with supported nanoparticles and their application in wastewater remediation, resource recovery and potential antimicrobial activity at both laboratory and pilot scale.
Prof U Feleni	felenu@unisa.ac.za	Her research specialisation is on electrochemically tuneable nanocomposite chalcogenide materials and their applications in the development of electroanalytical bio/sensors for biomedical and environmental analyses.
Prof MJ Madito	maditmj@unisa.ac.za	His research interests are in the synthesis, modification, and characterization of nanomaterials for science innovation and technology. His current focus is on the development and integration of high-power energy storage devices for sustainable water and renewable energy management.
Dr NW Hlongwa	hlongnw@unisa.ac.za	His research interest is on developing a nanoelectrochemical sensor for monitoring water, as well as materials for energy storage devices. Part of his research involves finding an economical way to desalinate water.
Dr KE Sekhosana	sekhoke@unisa.ac.za	His research interests include electrochemical sensing, with the main focus being the development of extensive pi-electron conjugated systems based on sandwich-type lanthanide phthalocyaninato complexes incorporated into other nanomaterials for advanced electrocatalysis of water pollutants.
Prof X Fuku	fukuxg@unisa.ac.za	His research interests are in electrochemical energy conversion and storage, catalysis, nanotechnology, and green economy. His research focuses on the development of electrochemical devices for off-grid photocatalytic water and wastewater treatment, the detection of toxins and organic pollutants in water, and the conversion of wastewater to bioenergy using microorganisms. The research also focuses on the development of enhanced electrocatalysts and bioinspired co-catalysts for the electrochemical conversion of water and CO_2 into sustainable green

		hydrogen and other useful chemicals for agricultural and energy applications.
Prof MM Motsa	motsamm@unisa.ac.za	His research interests are in the development and application of membrane technology for contaminated water treatment. The main focus is on the engineering of new generation membranes with improved performance. As well as the preparation of sustainable and energy efficient integrated systems for water reclamation from heavily impaired water sources such as municipal wastewater and seawater.
Dr NN Gumbi	gumbinn@unisa.ac.za	Her research interests are on the development of polymeric membranes, with particular emphasis on tailoring membrane structure-property relations for applications in wastewater treatment.
Prof EN Nxumalo	nxumaen@unisa.ac.za	His research focuses on novel nanostructured membranes, mainly their fabrication, analysis, advanced characterization and application in various fields such as water treatment, energy, seawater desalination and ultra- and nano-filtration. His work further entails the synthesis and advanced characterization of heteroatomic nanomaterials, engineered nanoparticles and nanofibers for diverse applications such as photo- and catalytic applications for use in membrane processes and membrane systems.
Prof RM Moutloali	moutlrm@unisa.ac.za	His research interest are on the design and synthesis of polymers for the fabrication of filtration membranes for water treatment. Of particular importance is the process scale-up, optimization, demonstration, and integration with other treatment technologies such as adsorption and advanced oxidation processes.
Prof BB Mamba	mambabb@unisa.ac.za	His general research interests involve developing advanced technologies for water treatment, which include nanotechnology and membrane technology. The main interest is the removal of organic micro pollutants in water and improving the efficiency of conventional technologies in dealing with new emerging pollutants through integrating existing technologies with nanotechnology to create sustainable solutions for maintain and preserving water resources.
Prof TAM Msagati	msagatam@unisa.ac.za	His research interests line in (i) The development of analytical tools for the analysis of environmental contaminants, (ii) research on food supplements, food composition and food/pharmaceutical packaging, (iii) aquatic toxicology, (iv) marine and environmental toxicology, and (v) remediation of contaminated aquatic environments using membrane filters and different types of filters.
Dr TJ Malefetse	maleftj@unisa.ac.za	His research interests include (i) Wastewater-based Epidemiology (WBE for public health monitoring), (ii) Circular Economy of Urban Water and Wastewater

		Research Platform which covers microbial biotechnology for water treatment and nutrient recovery and sludge research which focusses on sludge characterization and investigation of costs resulting from sludge transport and treatment.
Prof LM Madikizela	madiklm@unisa.ac.za	His research interests lie in environmental monitoring, analytical method development, sample preparation, plant uptake of water pollutants and adsorption studies.
Ms NM Magwaza	magwan@unisa.ac.za	Her research interest is in microbial contamination in the aquatic environment.
Prof H Atagana	atagahi@unisa.ac.za	My research interest is in Environmental Biotechnology with focus on bioremediation of contaminated soil and water. Emphasis is on microbial degradation of recalcitrant organic pollutants of petroleum or similar origins, and phytoremediation of soil and water contaminated with organic compounds and heavy metals.
Prof MM Nindi	nindimm@unisa.ac.za	My research is aligned to Environmental and Analytical research thematic area. It focuses on emerging contaminates in aquatic environment, food safety involving green sample preparation and fabrication of nanomaterials using biopolymers for remediation of metals and organic contaminates in aquatic environment.
Dr G. Mamba	mambag@unisa.ac.za	1) Advanced oxidation processes for water and wastewater treatment and disinfection: ❖ Ozonation/photocatalytic ozonation ❖ UV/persulfate/catalytic oxidation ❖ Fenton/photo-Fenton ❖ Sonocatalysis ❖ Piezocatalysis 2) Water and wastewater sludge beneficiation 3) Self-cleaning surfaces (coatings)
Prof LW Snyman	snymalw@unisa.ac.za	His research interests are in: • Physical processes: thermal , optical • Opto-Electronics • Nano and Micro-Electronics • Electronic Control System Development
Prof MA Kebede	mesfiak@unisa.ac.za	His research fields of interests are: • Energy storage and conversion • Gas sensors • Applications of nanostructured materials
Prof AA Muleja	mulejaa@unisa.ac.za	His research fields of interests are: • Nanotechnology • Membrane Reactors • Process Synthesis/Engineering • Water/Wastewater Treatment • Chemical Reaction Engineering
Dr I Kamika	kamiki@unisa.ac.za	His research interests include: • Microbial diversity and environmental microbiology of extreme ecosystems (e.g.

		mine water, sub-soil brine, highly saline soil and water). • Biotechnology: Bioremediation- inorganic pollutants and persistent organic pollutants • Environmental pollution: Emerging organic pollutants. • Functional metagenomic analyses: • Environmental resistome: antibiotic resistance microbes and genes • Microbial enzyme production, organic degradation pathway • Enteropathogenic microbes in water and their related public health concerns. • Nanotechnology for wastewater treatment: Nanogenotoxicology and Nanotoxicology
Dr MP Mubiayi	emubiamp@unisa.ac.za	His research interests lie in materials characterisation, engineering, water and wastewater treatment.
Dr TS Munonde	munonts@unisa.ac.za	His research interests include: • Sample preparation and method development for metal and pharmaceutical analysis in the environment. • Detection and monitoring of environmental contaminants. • Water quality assessments using sensors and computer modelling. • Waste derived nanomaterials for water and energy applications. • Advanced nanomaterials as catalysts for water splitting and energy storage.
Dr CS Tshangana	tshansc@unisa.ac.za	Her research interests are on the materials synthesis and characterization, membrane science, water treatment, and catalysis.
Dr TN Moja	mojatn@unisa.ac.za	His research interests include neutralization of acid mine drainage and remediation of heavy metals from wastewater.
Dr D Ramutshatsha-Makhwedzha	ramumd@unisa.ac.za	Her research interests include: • Nanomaterials synthesis and characterization • Detecting and monitoring of organic and inorganic pollutants in water treatment • Development of sample preparation method • Remediation technologies for endocrine-disrupting chemicals (EDCs) in wastewater

12. Industrial Engineering

Supervisor		Research Focus Area
Prof IA Gorlach	gorlaia@unisa.ac.za	• Automation for Auto Industry • Industrial Robotics

		• Autonomous Vehicles • Smart Manufacturing and IoT
Prof C Mbohwa	cmbohwa@yahoo.com mbohwc@unisa.ac.za	• Energy; Bioenergy and Biopower • Renewable Energy • Sustainable Energy Systems • Waste Beneficiation and Circularity • Future Technologies • Water-Energy-Food-Climate Nexus • Fourth Industrial Revolution Digitalisation Technologies Applications • System Algorithms and Modelling • Biomedical Engineering and Healthcare Systems • Sustainability Engineering and Systems • The Circular Economy • System and Technology Transitions • Scholarship of Teaching and Learning • Scholarship of the New Product/Service
Prof N Ndou	nndou@unisa.ac.za	• Laser Cladding and Additive Manufacturing Process • The study of parametric, laser beam power, laser scanning speed, calibration of mass flow rate, and powder particle size distribution. • The material characterization of wear testing, indentation testing, electron microscopy, and optical microscopy • Lean Manufacturing • Productivity Improvement • Supply chain Management / Logistic • System Dynamics
Prof K Ramdass	ramdakr@unisa.ac.za	• Lean six sigma • Value engineering • Systems engineering • Work study • Ergonomics and workplace dynamics • Engineering education • Quality management • Statistical Process Control • Supply Chain Management
Dr HS Phuluwa	ephuluhs@unisa.ac.za	• Demanufacturing operation methodology • Circular economy • Advance manufacturing • Sustainable Manufacturing • Green economy • Quality Management • HumanRobot collaboration • Facility Layout and Material Handling • Press tool industry • Business Process Reengineering • Waste management strategies • Reconfigurable Manufacturing Systems

		• Additive Manufacturing Process • Manufacturing operations processes • Predictive Analytics tools • Simulations • Optimization • Logistics Engineering
Mr N Mosia	mosian@unisa.ac.za	• Public healthcare • Productivity • 4IR • Engineering Design and Analytics
Mr S Chikumba	Chikus@unisa.ac.za	• Nano-thermal-fluids • Thermo-physical and mechanical property studies • Friction-stir welding (material and heat transfer) • Material characterisation using Nano-indentation • Work study • Energy • Lean six sigma • Value engineering • Systems engineering • Work study • Ergonomics and workplace dynamics • Engineering education • Quality management • Statistical Process Control • Supply Chain Management
Miss Z Mpanza		• Lean six sigma • Value engineering • Systems engineering • Work study • Ergonomics and workplace dynamics • Engineering education • Quality management • Statistical Process Control • Supply Chain Management
Miss K Masenya		• Lean six sigma • Value engineering • Systems engineering • Work study • Ergonomics and workplace dynamics • Engineering education • Quality management • Statistical Process Control • Supply Chain Management

13. Department of Mechanical Engineering

Supervisor		Research Focus Area

Prof V Vasudeva Rao	vasudvr@unisa.ac.za	• Nano-thermal-fluids • Thermo-physical and mechanical property studies • Friction-stir welding (material and heat transfer) • Material characterisation using Nano-indentation • Thermal contact resistance/conductance • Electrical contact resistance • Contact mechanics • Cooling of electronics using jet impingement • Heat pipes • Non-conventional energy systems
Prof C Enweremadu	enwercc@unisa.ac.za	• Alternative fuels (biodiesel, biogas, bioethanol) • Solar energy (solar radiation, solar PV soiling mitigation) • Thermal storage
Dr L Mthembu	mthemls@unisa.ac.za	• Finite Element Model Updating and Computational Intelligence • Data-mining, • Artificial intelligence
Dr T Sithebe	Sithet@unisa.ac.za	• Analysis of a rapid manufactured / 3D printed products for use in medical use, such oral care.
Prof HM Ngwangwa	ngwanhm@unisa.ac.za	• Infrastructure and structural health monitoring • Structural damage detection using operational response changes • Biomechanics of musculoskeletal soft tissue • Design and development of biomimetic systems
Prof M Pita	pitam@unisa.ac.za	• Material Processes & Thermal Sciences
Dr F Masubelele	masubft@unisa.ac.za	• Maintenance practices
Mr TT Lekwana	lekwamtl@unisa.ac.za	• Hydrodynamic instabilities • Computational Hemodynamics • Atherogenesis • Fluid-Structure-Interactions • Aeroacoustics

14. Institute for Catalysis and Energy Solutions (ICES)

Supervisor		Research Focus Area
Prof X Liu	liux@unisa.ac.za	Fischer Tropsch synthesis, clean fuel production, CO2 capture and utilization, energy storage materials, photocatalysis, electrocatalysis, machine learning for materials design, distributed energy conversion process
Prof Y Yao	yaoy@unisa.ac.za	Fischer Tropsch, Desulphurization of Diesel, CO2 utilization, Solid Oxide Fuel Cell, Machine Learning for materials design
Prof C Sempuga	sempubc@unisa.ac.za	Process synthesis, gasification, biogas, waste to energy, energy conversion.
Prof. N. Palaniyandy	palann@unisa.ac.za	My research activities are in the fields of “Energy” and “Design & Manufacturing.” My focuses in the field of

		"Energy" are experimental studies of Portable devices, and transport phenomena in micro- and nano-structures energy materials for system design & integration. My current research focus is on, Lithium-, Sodium-, Zinc-ion batteries, Lithium- and Aluminum-air batteries, and Supercapacitors. Various cathode, anode, and electrolyte materials and different synthesis techniques, such as $LiMn_2O_4$, $LiMn_{1.5}Ni_{0.5}O_4$, V-based, and LiFePO4 cathode, Sn-based oxides, and alloys, Mn-based oxides anode, and Ceramic composite electrolyte materials.
Dr M Moreroa-Monyelo	Emorerms@unisa.ac.za	Application of micro and biotechnology during water treatment Bioinformatics Adsorption Renewable energy Re-use of waste material Industrial wastewater treatment
Prof B Patel	patelb@unisa.ac.za	Process synthesis, design, integration and intensification Sustainable design of biorefineries, energy systems, and chemical processes Biomass and waste conversion using gasification, pyrolysis and hydrothermal carbonization/liquefaction
Dr Busiswa Ndaba	Ndabab@unisa.ac.za	Second generation biomass conversion to biofuels Bioethanol, Biobutanol, Biogas production Biocatalysts (microorganisms and enzymes), Circular Bioeconomy, Green/biosynthesis of nanoparticles for Bioenergy and Agricultural applications
Prof T Mokrani	Tmokrani@unisa.ac.za	Nano composite membranes for fuel cell Novel polymeric membranes for fuel cell Membranes for gas separation Membranes for water treatment Heterogeneous catalysis Electrocatalyst Natural gas conversion
Dr M Mathaba	Mathamj@unisa.ac.za	Hydrogen Production: Electrocatalysis Photocatalysis Membranes for acid mine drainage treatment
Dr M Ngcobo	Ngcobm1@unisa.ac.za	Catalysts development and synthesis of transition metal complexes, and their applications. Ethylene oligomerization reactions to produce value-added products. Biomass conversion to biogas, biofuel, and bioenergy. Development of 3-dimensional catalytic stirrers for various organic transformation reactions.
Prof. N.S. Bingwa	Bingwns@unisa.ac.za	Prof. Bingwa's research focus area is on structural engineering of mixed-metal oxides of the perovskite forms for application in heterogeneous catalysis. His focus areas are (i) identification of novel catalytic

		descriptors, (ii) synthesis of fuel additives from bioderived molecules catalyzed by perovskite oxides and, (iii) carbon dioxide utilization using catalytic pathways.
Prof P.R. Makgwane	Makgwpr@unisa.ac.za	Heterogenous catalysis, photocatalysis, and electrocatalysis with emphasis on advanced functional materials design for applications in technology-oriented developments of (i) Energy platform {Hydrogen production and storage; Nitrogen fixation and Carbon dioxide (capture & conversion) and Biogas valorisation} and (ii) Chemical conversion platform (biomass chemicals and biofuels additives).
Prof P.F Msomi	Msomipf@unisa.ac.za	Polymeric membranes for fuel cell and Batteries Composite membranes for fuel cell and Batteries Supercapacitors Electrocatalysts for fuel cells and batteries Water treatment Computation Chemistry Nanomaterials Membranes as Seperators for batteries and electrolyzer Ionic Diodes
Dr PR Khangale	Ekhangp@unisa.ac.za	Fischer-Tropsch synthesis, clean fuel production, CO_2 capture and utilization, Process synthesis
Dr WK Maboya	maboywk@unisa.ac.za	Her research interest is in the development of nanostructured electrocatalytic, photocatalytic and photo-electrocatalytic materials for various chemical and electrochemical processes. Electrochemical detection of various water contaminants.
Prof MK Mathe	mathemk@unisa.ac.za	His research interest is in the electrodeposition of nanostructured semiconductor thin films for energy applications, the electro-analytical chemistry of energy materials for fuel cells and batteries, energy storage technologies and recycling for a circular economy, machine learning and AI in energy materials development including their applications to 3D printed solid state batteries. Energy solutions industrialisation including safety and performance testing of battery systems.

15. Research Projects in Science Engineering and Technology areas

Supervisor		Brief description of research focus area
Prof EE Ebenso	ebensee@unisa.ac.za	Physical Chemistry with emphasis on Corrosion inhibition studies and Electrochemistry
Dr N Chimwani	chimwn1@unisa.ac.za	Comminution, Energy minimization in minerals processing circuits,

16. Science Education

Contact person for all Science Education degrees: Prof J Kriek kriekj@unisa.ac.za