

College of Science, Engineering and Technology

Research focus areas for 2021

All supervisors' contact details may be found at:

<https://www.unisa.ac.za/sites/corporate/default/Colleges/Science,-Engineering-&-Technology>

1. School of Computing

Internal supervisors	Research area
Prof Ernest Mnkandla	1. The focus of my research is to investigate ways to improve software quality in software development projects using contemporary technologies or environments such as 4IR, IoT, Big Data, Artificial Intelligence, Agile Development, Cloud Computing, DevOps, etc. 2. I also strive to find better ways to apply ethics principles to the development of these technologies by inspiring values and ethics in the 4IR technological developments, prioritising the values of society and bringing economic value to businesses
Prof Alfred Coleman	ICT in health (e-health) and Business Informatics & Knowledge Management
Prof Kirstin Krauss	Critical Social Theory, ICTs and Education, ICTs and community engagement, Ethnography, Information Systems Leadership, Information Systems Theory and Theory development, Supervision Practices in Information Systems
Prof Elmarie Kritzinger	Information Security Education
Prof Hugo Lotriet	Prof Lotriet is a researcher in Information Systems. His focus is on socio-technical aspects of the adoption and use of information systems in organizations and society. His main areas of focus are on the adoption and use of IS in organizations, society and developing countries. He is a qualitative researcher (i.e. the use of non-statistical research methods and approaches). He would be particularly interested in students who wish to study the design, adoption and use of information systems in relation to the UN priority areas such as: Sustainable development; Peacekeeping; Dealing with natural and other disasters; Migrants and migration; Making education accessible to all; e-Government resistance; Climate change.
Prof Peter Mkhize	Knowledge management, Strategic Information System
Prof Ian Sanders	Algorithms; Computational Geometry; Image Processing; Computer Science Education as related to formal languages and automata
Prof Hossana Twinomurinzi	Digital skills, digital government, digital transformation and digital development (ICT for development - the role of ICT in making the world a better place - social and economic transformation)
Prof Judy van Biljon	Human-Computer Interaction, specifically usability and user experience; Knowledge visualisation; Information and Communication for Development (ICT4D); Human-Computer Interaction for Development (HCI4D); Digital technology for teaching and learning

Prof Felix Bankole	Expert Systems, Telecommunication Systems, Database Systems, Decision Support Systems, Multi-Criteria Decision Analysis. ICT impact
Prof Adele Da Veiga	Information security culture / cyber security culture / data privacy culture / POPIA culture
Prof Marianne Lookk	Secure Knowledge Management; Access Control in a Data Mining environment; Secure Data Mining
Prof Shawren Singh	digital-government
Prof Bobby Tait	Biometrics, Blockchain
Prof Mc Donald van der Merwe	e-Learning, m-Learning, Psycho-physiological aspects of Human Computer Interaction, Open Source movement.
Prof Etienne van der Poel	Computational Creativity, Machine Learning. Artificial Intelligence
Dr Hanifa Abdullah	Information privacy/data privacy protection, Information privacy protection awareness, Information privacy compliance, Information security Governance, Risk and Compliance (GRC)
Dr Danie Bisschoff	Designing Banking Technology for the Aged and Disabled
Ms Portia Buthelezi <i>Only available as co-supervisor</i>	Information security management, user security awareness, information privacy
Dr Bester Chimbo	User Experience & Interaction, Eye Tracking Technology, Child-Computer Interaction; Designing for children with children and other special user groups; Design of Technology for Education; HCI4D, Information Systems Leadership
Dr B Chipangura	Mobile Centric Access to Information; M-Learning; E-Learning; Software usability and user experience (Human Computer Interaction)
Dr Cyrille Dongmo	Combining semi-formal and formal specification techniques - Requirements Engineering - Goal-Oriented Requirements Engineering (GORE) Methods - Formal Software Requirement Specification with Z/Object-Z - User Requirements Notation (URN). Specific topics: 1- Reverse engineering jUCMNav (URN process, formal method, tool development) 2- Virtual system for street work seekers: making street work permanent employees (Software Engineering, virtual company creation, smart cities)
Dr Patricia Gouws	Robotics, programming, social media
Mr Ken Halland <i>Only available as co-supervisor</i>	Applied Logic and Description Logics
Dr Grant Howard	IT-Organisational Change Organisational Transformation and IS/IT Fourth Industrial Revolution (4IR) and Organisations Smart Sustainable Cities Green Information Systems (Green IS) Green Information Technology (Green IT) Green Computing ICT for Sustainability (ICT4S) Information Systems (IS) for community engagement (IS4CE)
Dr Jabulisiwe Mabila <i>Only available as co-supervisor</i>	Sustainable integration of ICTs for development and application of emerging technologies e.g. in education
Mr Pheeha Machaka <i>Only available as co-supervisor</i>	ICT4D; WSN; Mesh Networks; Wi-Fi; Soft Computing; Artificial Intelligence;

Dr Jan Mentz	Enterprise Architecture, Enterprise Modelling, Enterprise Architecture Frameworks, reference architectures, cloud computing, Enterprise Governance and information systems in business.
Mr Samuel Mtsweni <i>Only available as co-supervisor</i>	Information Systems, Information Systems Development, Information System Development Projects, Software Development, Software Development Projects, IS Adoption and Usage, Agile Project Management , Knowledge Management
Dr Mathias Mujinga	Information Security, Usable Security, Cloud Computing Security, IS Service Quality
Dr Vincent Mzazi	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 indepth engagement with the health system, rather than a superficial one
Mr Elisha Ochola	Routing Protocols in Mobile Wireless Ad Hoc Networks, Ad Hoc Networks Security
Dr Mampilo Phahlane <i>Only available as co-supervisor</i>	Adoption and use of information systems by organizations and individuals.
Mr Colin Pilkington	Computing education, Virtual learning environments
Dr Marthie Schoeman	Computing education, visualization, ODL , e-learning
Dr Sam Ssemugabi	Human-Computer Interaction, User experience, e-Learning, e-Skills, e-Service quality, Application of mobile technologies.
Mrs Sreedevi Vallabhapurapu <i>Only available as co-supervisor</i>	Development of Environmental friendly and Energy efficient ReRAM type memories for 'Green computing'. Memory is heart of computer. current memories like flash and other hard disc consumes lot of power and generates heat and also e-waste polluting environment.Green computing is the environmentally responsible and eco-friendly use of computers and their resources. In broader terms, World is moving towards 'Green Computing' . Here in South Africa we are developing this at UNISA.
Ms Ronell van der Merwe <i>Only available as co-supervisor</i>	Data Science, Citizen Science, Natural Language Processing, Object Oriented Databases
Dr Corne Van Staden <i>Only available as co-supervisor</i>	User experience, m-learning, e-learning and eModeration
Mrs Ruthea Vorster <i>Only available as co-supervisor</i>	Green Computing, Sustainable IT, Green Information Systems Information Privacy Culture, Information Management
Mrs Petra le Roux	ODL e-Learning and e-Assessment; Computer Science education : Programming; Psychological Aspects of Computing and Information Systems
Mr Themba Masombuka <i>Only available as co-supervisor</i>	Software engineering, Agile software development, DevOps,
Mr Siphe Mhlana <i>Only available as co-supervisor</i>	ICT and education, e-learning

Ms Tebatso Moape <i>Only available as co-supervisor</i>	I am looking for students to supervise in Computational Linguistics. Computational Linguistics is a combination of Linguistics, Machine Learning and Artificial Intelligence. Research in this area includes the development of Machine Translation Systems, Part of Speech Taggers, Language Modelling, Morphological analyzers, etc.
Ms Promise Mvelase <i>Only available as co-supervisor</i>	Emerging technologies, cyber-physical systems/IoT, Data Analytics (Big data/small data), Cyber-infrastructure (Software and advanced networks, computing systems, advanced instruments and data repositories, visualization environments)
Mr Lindelani Nxumalo <i>Only available as co-supervisor</i>	Knowledge Management
Mr Kokisa Phorah <i>Only available as co-supervisor</i>	I am looking for Honours and Masters degrees students. I can organize co-supervision for PhD students with collaboration with researchers of high caliber from University of Pretoria, Rhodes University and AIMS (Cape Town)/ University Stellenbosch. 1. Application of ML/AI of different sectors 2. Developing predictive models using ML and AI 3. Data Sciences 4. Natural Language processing 5. Deep learning 6. Image ausing ML and AI Others 1. ICT in education and eLearning 2. EA 3. E-health
Mrs Dorothy Scholtz <i>Only available as co-supervisor</i>	e-Learning, Project Management, Information Systems, ODL
Mr Elias Tabane <i>Only available as co-supervisor</i>	Internet of things(IoT), Web of Things (WoT), Digital skills
Ms Anitta Thomas <i>Only available as co-supervisor</i>	Diagram specifications, automated processing of diagrams

Email addresses of School of Computing supervisors as well as supervision slots open per supervisor can be found at <http://osprey.unisa.ac.za/supervisors.php>

External supervisors	Research area
Prof Mariki Eloff	Computer and Information Security, Project Management: eloffmm@unisa.ac.za
Prof Les Labuschagne	IT Project, Programme and Portfolio Management: labus@unisa.ac.za
Prof Andre Van der Poll	vdpoll@unisa.ac.za : Formal Specification Techniques, Automated Reasoning, Combining Formal and Semi-formal Specification Techniques, Formal Methods in Business Applications; Formalisms in Cloud Computing (CC); Formalisms in Business Intelligence (BI)
Prof Zengzhui Wang	wangz@unisa.ac.za Artificial Intelligence: Neural network, Particle Swarm Optimization, Ant colony optimization algorithms, Genetic Algorithms, Energy (power system) Optimization, and Evolutionary Multi-Objective Optimization; Intelligent Control: Optimal Control, Fuzzy and/or Neural Network Control, Fault Diagnosis and Fault Tolerant Control; Encryption, Complex networks, etc.

2. Department of Civil and Chemical Engineering

Name of supervisor	Brief description of research focus areas
Prof LL Jewell	Fischer Tropsch Catalysis Environmental Catalysis
Prof B Patel	Process synthesis and modelling Biomass conversion to fuels and products
Dr T Mokrani	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
Prof Scurrrell	Heterogeneous catalysis Natural gas conversion Advanced methods in catalyst synthesis (microwave radiation, cold plasma) and characterization Sustainable hydrogen from biomass / biofeeds

3. Department of Electrical and Mining Engineering

Name of supervisor	Brief description of research focus areas
Prof Z Wang	Artificial Intelligence: Neural network, Particle Swarm Optimization, Ant colony optimization algorithms, Genetic Algorithms, Energy (power system) Optimization, and Evolutionary Multi-Objective Optimization; Intelligent Control: Optimal Control, Fuzzy and/or Neural Network Control, Fault Diagnosis and Fault Tolerant Control; Encryption, Complex networks, etc.
Prof F Mulenga	<ol style="list-style-type: none"> Mineral processing: Comminution (Milling and Crushing), particle size analysis (Sieving, Industrial screening, and Classification), flotation, mineral beneficiation (Gravity concentration, and Dense Medium Separation DMS) Modelling and simulation of minerals engineering processes: Metallurgical Accounting, Process Control in Minerals Processing plants (Concentrators), Mineral liberation and Image processing for polished sections, Discrete Element Modelling (DEM) and Computational Fluid Dynamics (CFD), Flow sheet design, simulation and optimization with MODSIM (as preferred software package), Attainable Region (AR) analysis Open pit mining: Rock Mechanics, Open pit mine planning, Mine Sequencing
Mr P Umenne	Telecommunications, Micro-Electronics, Network modelling, simulation, network protocols, OPNET. Femtosecond laser fabrication
Mr L Nickola	Plane automation
Mr WP Nel	• Engineering Management

	<ul style="list-style-type: none"> • Management of Technology • The adoption and diffusion of innovation
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4. Institute for the Development of Energy for African Sustainability (IDEAS)

Name of supervisor	Brief description of research focus area
Prof Matambo	Bio-Technology
Prof Liu	Fischer Tropsch
Dr Moyo	Fischer Tropsch
Dr Yao	Fischer Tropsch
Dr Sempuga	Process synthesis / Gasification
Dr Fox	Process synthesis / Gasification
Dr Bhondayi	Flotation
Dr Chimwani	Comminution

5. Department of Chemistry

Name of supervisor	Broad research focus areas
Prof H Clayton	Inorganic Chemistry
Prof S Dube	Analytical Chemistry
Prof MJ Mphahlele	Organic Chemistry
Prof MM Nindi	Analytical Chemistry
Prof GJ Summers	Organic Polymer Chemistry
Prof CA Summers	Organic Polymer Chemistry
Dr B Dladla	Physical Chemistry
Dr N Mketi	Analytical Chemistry
Dr M Smith	Physical Chemistry

6. Department of Mathematical Sciences

Name of supervisor	Research focus area
Prof J Botha	Matrix Theory and Linear Algebra
Dr EF Doungmo Goufo	Epidemiology
Prof T Dube	Categorical Algebra and Topology, Pointfree Topology
Dr P Ghosh	Topology, Algebra, Pointfree Topology, Category Theory
Dr L Godloza	Associative Rings
Dr O Ighedo	Pointfree Topology
Prof H Jafari	Fractional Differential Equations
Prof SJ Johnston	Special functions & Orthogonal Polynomials
Dr A Kubeka	Cosmology
Dr J Manale	Differential Equations, Symmetry Analysis, Lie Algebra
Dr M Moremedi	Fluid Dynamics
Dr Z Mpono	Group Theory

Dr J Munganga	Fluid Dynamics, Epidemiology
Prof I Naidoo	Pointfree Topology

7. Department of Physics

Name of supervisor	Research focus area
Prof Braun	Computational Physics
Prof Lekala	Computational Physics
Prof Rampho	Computational Physics
Prof Botha	Computational Physics
Prof Dhlamini	Experimental Physics
Prof Vallabhapurapu	Experimental Physics
Prof Ray	Experimental Physics
Dr Mothudi	Experimental Physics
Dr Moloji	Experimental Physics
Dr Mukeru	Computational Physics
Dr Tibane	Computational Physics
Dr Mbule	Experimental Physics

8. Department of Statistics

Name of supervisor	Research interest / field of expertise
Prof PM Njuho	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
Ms MA Managa	Biostatistics, Demography
Mr TP Mohlala	Reliability theory; Point and Poisson Processes; Maintenance theory; Stochastic process in finance
Dr F Rapoo	Stochastic Processes
Ms S Muchengetwa	Multivariate analysis i.e. logistic regression, factor analysis, cluster analysis, correspondence analysis, MANOVA, multiple regression, discriminant analysis, log linear analysis, missing value analysis, sampling techniques, distribution theory
Prof JO Olaomi	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

	<p>Outliers investigations in Time Series Data or in Structural Equation problems</p> <p>Modelling of economic variables</p> <p>Causality Problems</p> <p>Modelling structural equation problems</p> <p>Estimations in the presence of Least Squares violations</p> <p>Canonical Correlations</p> <p>Time series modelling</p>
Prof N Ndlovu	Construction of optimal designs for nonlinear estimation
Dr Ranganai	<p>Quantile Regression</p> <p>Regression diagnostics</p> <p>Time series: Time domain and frequency domain</p>

9. Nanotechnology and Water Sustainability (NanoWS)

Project Leader	Name of project	Brief description of the project
Dr Alex Kuvarega	<p>Photocatalytic mixed matrix membranes for removal of organic pollutants in water</p> <p>Oxide and chalcogenide based photocatalysts for removal of pollutants in water</p>	<p>Photocatalytic nanoparticles will be incorporated into polymeric membranes and the mixed matrix membranes evaluated for the removal of organic pollutants under visible light irradiation.</p> <p>Oxide and chalcogenide based photocatalysts for removal of pollutants in water</p>
Dr Hlengilizwe Nyoni	Determination of patulin in food and the evaluation of their cytotoxicity.	<p>Reports have shown that there is a loss food due to spoilage. The invasion of fungi such as Penicillium, Aspergillus and Botrytis in food mainly cause the spoilage and these microbial species produce mycotoxins such as patulin. Patulin is a highly toxic compound regarded as cytotoxin, carcinogen, mutagen and exhibits immunotoxins, neurotoxins, gastrointestinal effect on animal. This study seeks to quantitatively determine patulin; isolate and identify the patulin producing - fungal species from various foods and drinks. The work involves development of an analytical method for determining the presence of patulin in foods; isolation and identification of fungal species from selected foods and evaluation of cytotoxicity of patulin in cells</p>
Dr Kebede K Kefeni	Synthesis and characterization of trace transition metal doped magnetite surface modified by biocompatible organic moiety appropriate for cancer treatment	<p>Magnetite nanoparticles will be synthesised using hydrothermal method and doped with selected trace transition metal and loaded with anticancer drug. The surface will be modified with biocompatible organic moiety and detailed characterisation of the nanoparticles and composite will be performed. Finally, the in vitro study will be conducted for possible killing cancer cells.</p>

	<p>Acid mine drainage (AMD) based research: Possible recovery of valuable chemicals from AMD and tailing</p>	<p>Acid mine drainage (AMD) is considered as one of the potential environmental pollutant in many countries. Despite the severe environmental impacts of AMD, there are several valuable resources available in AMD. Therefore, the aim of this project is to develop cost effective remedation of AMD along with recovery of usefull resources.</p>
<p>Prof Edward Nxumalo</p>	<p>Superhydrophobic electrospun carbon-polymer nanofiber mats for oil/water separation</p> <p>Graphene-Based Heterostructures for Water Remediation</p> <p>Carbon-Based Flat Sheet and Hollow Fiber Membranes for Ultrafiltration</p> <p>Fabrication of porous membranes containing boron nitride nanotubes</p>	<p>In this study, environmental friendly and highly hydrophobic polymers will be utilized in the fabrication of nanofibrous mats using an facile electrospinning process. Doped carbon materials will be used as supports due to their stability and hydrophobicity to yield structurally stable morphologies with desirable pore sizes of the resultant nanofibrous mats will be systematically investigated. These nanofibrous mats with specific pore sizes will subsequently be applied in the separation of oil/water emulsions.</p> <p>This work entails the use of carbon nanomaterials and in particular doped GO nanosheets as functional particles to blend carbon nanofibers using various polymeric species. This process will significantly improve their chemical, mechanical, rejection properties, porosity, hydrophilicity, water flux and anti-fouling properties. The mats will be used to remove various species from water supplies as explained in subsequent sections.</p> <p>The overall goal of this research is to explore to produce hetero-structured graphenes containing different dopants (N, P or PN) using sustainable approaches. These doped GO nanosheets exhibiting desirable properties will be used as additives or nanofillers for flat-sheet polymer membranes (UF, NF or RO) and hollow fiber membranes, supports for electrospun nanofiber mats and supports for magnetic metal oxide NPs for the adsorption of heavy metals and degradation of micropollutants from water. Further, a point-of-use water filter incorporating the newly developed materials at different layers will be fabricated and tested for purifying drinking water.</p> <p>In this wok, a porous membrane containing desirable BN nanotubes will be fabricated. Due to the partial charges on the B and N atoms of BN nanotubes, electrostatic interactions are expected to be dominant and become the source of selectivity for ion transportation. These BN polymeric membranes will have high capacities and ultrafast uptake</p>

	Nitrogen doped carbon nanofiber membranes decorated with MnO ₂ nanoparticles as electrode materials for supercapacitors	<p>characteristics for dissolved molecular species and toxic metal ions</p> <p>The project entails the synthesis of MnO₂ nanoparticles/doped porous carbon nanofibers that possess desired characteristics such as high surface area, high energy density and power density, high electrical conductivity and long cycle life; to be applied materials in hybrid supercapacitors.</p>
Prof Ajay Mishra	<p>Photocatalytic nanomaterials for organic waste remediation</p> <p>Heavy metal uptake and stabilization by novel pristine and functionalized biopolymeric materials</p>	<p>Industrial water pollution is one of the major setbacks of industrialization, with the textile industry as the main contributor, accounting for about 20 % of industrial pollution. During the dyeing process, it is estimated that more than 10 % of the dyestuff used is lost into the wastewater. Organic wastes are the most extensively used where dyes constituting over 60 % of all dyestuff produced. Semiconductor photocatalysis is an important AOP, which has a good potential as an environmental clean-up tool for organic pollution remediation with nano-titanium (IV) dioxide (TiO₂) as the gold standard. However, its reliance on ultra violet (UV) light for activation rules out the possibility of using sunlight as a source of energy, since UV light constitute a small fraction of the solar spectrum. The main aim of the project is to develop photocatalytic nanomaterials for organic waste remediation which will involve a visible light driven photocatalyst based on rare earth doped graphene and titania. This photocatalyst nanomaterials will be evaluated for the degradation of various organic waste from both synthetic and waste water solutions.</p> <p>Heavy metal ions are well known toxic materials which pollute water and cause serious health problem. These heavy metals are non-biodegradable and have widespread environmental endangerment. Thus is very much necessary to remove such type of heavy metals which mainly disposed by the various industries in the form of industrial waste disposal. Industrial waste often cause serious water, air and soil pollution. The present proposal is mainly focused on the removal of heavy metals (cadmium, lead and mercury) from the waste water using biopolymers due to their abundant availability, low cost, high biocompatibility, biodegradability, nontoxic behaviour and ease of chemical modification.</p>
Prof Shivani Bhardwaj-Mishra	Modification of the extended Spiegler–Kedem model for simulation of multiple	There is a pressing need for simulation tools in NF because the complexity of the transport mechanisms, coupled with the wide range of different nanofilters and plant designs available, makes it extremely difficult to

	<p>solute systems in nanofiltration-based water desalination process</p> <p>Developing carbides from organic / inorganic waste</p>	<p>choose the right membrane and plant design for a given application in a reliable and cost effective way. The challenge addressed by the present work is to develop a mathematical model to include more complex multi-component separations and to validate the model's predictions using separations of real industrial interest.</p> <p>Carbides are strategic materials and have many industrial applications. Focusing on waste minimization and sustainable solution for the pollution, many organic and inorganic waste could be evaluated for developing variety of carbide materials and analyse for commercial applications</p>
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10. Science and Technology Education

Name of supervisor	Research interest / field of expertise
Prof Jeanne Kriek	Use of technology in the teaching and learning of physics; conceptual understanding of physics concepts; effective use of simulations in physics
Prof Keshnee Padayachee	Collaborative e-learning; Open, distance and e-learning (ODEL); Information Security
Prof David Mogari	Problem solving in mathematics; Socio-cultural aspects of mathematics
Prof Harrison Atagana	Science Education and Environmental Education

11. Research Projects in Science Engineering and Technology areas

Project Leader	Name of project	Brief description of the project
Dr G Danha	Minerals Processing	Optimization of comminution, leaching, flotation or integrated processes in the beneficiation of low grade mineral ores, for example: PGMs, gold, base metals
Prof T Mokrani	Nanocomposite membranes development for fuel cell applications Gas conversion	Organic / Inorganic nanocomposite proton conductor membranes
Prof B Patel	Process synthesis and modelling	Process synthesis and modelling Biomass conversion to fuel and products
Prof M Scurrall	Catalysis	Heterogeneous catalysts prepared by advanced radiation or plasma methods for energy conversion and their characterization using advanced spectroscopies.
Prof L Jewell	Catalysis	Heterogeneous catalysts prepared by advanced radiation or plasma methods for energy conversion and their

		characterization using advanced spectroscopies.
Prof Francois Mulenga	Minerals Processing	Simulation of blasting, crushing and milling using discrete element method, computational fluid dynamics and phenomenological models
Prof Zenghui Wang	Control and Automation	Automation: Control Theory and Control Engineering
Prof V Vasudevarao	<ul style="list-style-type: none"> Two Phase Flows in nuclear reactors Thermal Contact Conductance Nano-Thermal Interface Materials Nano-Thermo-Fluids and Compact Heat Exchangers Cooling of Electronics Jet impingement Cooling Thermo-physical Properties of Advanced Materials Combined studies of Electrical and Thermal Contact 	<ul style="list-style-type: none"> Two Phase flow in a nuclear reactor simulating the two phase flow conditions in a laboratory scale set-up and collect s valuable data. Accurate measurement of Thermal contact conductance. Development and testing of materials. Development and testing fluids for their effective use in transportation industry. Thermal management of advanced electronics. Investigation of the geometric parameters on the cooling effectiveness.
Prof Chris Enweremadu	<ul style="list-style-type: none"> Solar thermal collectors Concentrated solar thermal applications Applications of Solar Organic Rankine Cycle Alternative fuel research 	<p>Design, mathematical modelling, simulation and analysis of solar thermal collectors with sensible thermal storage system. Design, modelling, simulation, techno-economic analysis and efficiency of the system.</p> <p>Development of sensible thermal storage hybrid rock bed material for Concentrating Solar Thermal (CST) applications. Modelling, simulation, thermal characterisation, techno-economic analysis and efficiency of the system.</p> <p>Solar Organic Rankine Cycle for low grade waste heat recovery – design, development, techno-economic analysis and application in combined heat and power systems.</p> <p>Engine performance, combustion and emission characteristics of various types of green fuels (biodiesel, biogas and bioethanol)</p>
Prof David Johannes Kruger	<ul style="list-style-type: none"> Process Optimisation Systems Thinking Systems Improvement Process development 	

	<ul style="list-style-type: none"> • Complex Theory • Lean Manufacturing/ Production • Lean Six Sigma • Process Quality • Engineering Management • Lean Supply Chains • Lean Project Management • Improve Public Health through Lean Application 	
Dr K Ramdass	Optimization of complex processes or systems	
Dr Harry Ngwangwa	<ul style="list-style-type: none"> • Condition monitoring of gearing and ball-bearing systems using advanced signal processing and artificial intelligence methods • Development of battery charging system by harvesting mechanical vibratory energy. • Vibration control in machine tools for quality improvement 	
Dr Rendani Maladzhi	<ul style="list-style-type: none"> • Motivation • Small and Medium Enterprise operations 	
Dr Linda Mthembu	<ul style="list-style-type: none"> • Nature inspired optimization • High dimensional data visualization • Nature inspired algorithm dynamics 	
Prof Fulufhelo Nemavhola	<ul style="list-style-type: none"> • Computational modelling of infarcted tissue in remodelling heart • Mechanical testing and mathematical modelling of liver tissue • Mechano-biology of soft tissue • Design of accurate shoulder implants suitable for variety of individuals 	
Dr N Ndou	<ul style="list-style-type: none"> • The material characterization of wear testing, indentation testing, electron microscopy and optical microscopy • Developing of modelling processes of Heat flow • The study of parametric, laser beam power, laser scanning speed, calibration of mass flow 	The experimental development of processes for laser based additive manufacturing processes of fully functional Titanium alloy components used in structural applications in the aerospace industries.

	rate and powder particle size distribution	
Dr T Sithebe	<ul style="list-style-type: none">• Analysis of a rapid manufactured / 3D printed products for use in medical use, such oral care.	