**NELSON MANDELA METROPOLITAN UNIVERSITY**

**APPROVED INSTITUTIONAL RESEARCH THEMES**

**2015**

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| **Theme** | **Sub-themes** | **Driver** |
| 1. Science, Mathematics and Technology Education for Society (SMTE).
 | * Promoting access to academic pursuits in SMTES
* Promoting the relevance of SMTES
* Promotion of deeper understanding in SMTES
 | Prof Andre du Plessis |
| 1. Sustainable local economic development
 | * Entrepreneurship, SMMEs and family businesses
* Local economic development
* Tourism
* Automobile Industry/manufacturing
* Ethics and social responsibility
 | Prof Sandra Perks |
| 1. Cyber Citizenship
 | * Cyber security
* Cyber law
* Cyber socializing
* Cyber banking
* Cyber education
* Cyber entertainment
 | Prof Johan van Niekerk |
| 1. Manufacturing Technology and Engineering
 | * Automotive Engineering and Assembly Processes
* Friction Processing as a surfacing, joining and repair technique
* Production Optimisation (Lean manufacturing)
* Renewable Energy Harvesting (Wind and Ocean)
* Supplier Development – Engineering and Manufacturing Industry
* High Precision Fabrication for Medical Applications
 | Prof Danie Hattingh |
| 1. Nanoscale materials characterization, new materials and processes
 | * Nuclear reactor ceramics and metal alloys
* Opto-electronic semiconductor materials and nanophosphors
* Platinum group metals
* Nano particle catalysts
* Steel and oxide dispersion strengthened steel
* Hard metals and diamonds
* Minerals
* Nano materials
* Analysis of diatoms using electron microscopy
* Chemicals – synthesis, properties and processes
* Microscopy of biological microsystems
 | Prof Jan Neethling |
| 1. Strategic energy technologies
 | * Clean coal technologies
* CO2 mitigation
* Energy storage (battery technology)
* Fuel cells
* Renewable energy (Solar, wind and biofuels)
* Transmission, distribution and storage networks for the future
 | Prof Ernest van Dyk |
| 1. Sustainable human settlements
 | * Architecture and urbanism.
* Construction of infrastructure and buildings.
* Governance and management and of human settlements.
* Socio-economic development for sustainable Livelihoods
 | Prof Winston Shakantu |
| 1. Coastal Marine and Shallow Water Ecosystems
 | * Living in the coastal zone
* The Law and Coastal, Marine and Shallow Water Ecosystems
* Biological, geological and archaeological diversity and conservation
* Processes, Ecosystem Services and climate change/global change
* Managing coastal and marine resources
 | Dr Derek du Preez |
| 1. Humanizing Pedagogies
 | * A humanising pedagogy in the context of SA higher education
* Humanising Pedagogy and the interface of theory and practice
* A Humanising Pedagogy and Curriculum transformation (e.g. Teaching and learning, Teaching for social justice, Africanising the curriculum)
* Humanising pedagogy and Leadership in Education
* Humanising Pedagogy and Re-centering the Margins (restorative justice)
* Humanising Pedagogy and Engagement in the context of Higher Education Institutions
 | Prof Denise Zinn |
| 1. Democratization, Conflict and Poverty
 | * Social cohesion
* Food security and social sustainability
* Democracy education, Human Rights and democratization
* Global citizenship, diversity, xenophobia, and social and ecological justice
* Gender violence
* African leadership, ethics and governance
* Conflict Resolution in Africa
* Deep-rooted conflict in Africa
* Post-conflict reconstruction and development in Africa
* Law, equity and justice
 | Prof Lyn Snodgrass  |
| 1. Biodiversity Conservation and Restoration
 | * Conservation Biology
* Animal-Plant Interactions
* Resource Ecology
* Ecophysiology
* Predator Prey Interactions
* Transformation and Restoration Ecology
* Resource economics
* Biodiversity
* Climate Change
 | Prof Graham Kerley |
| 1. Health and Wellbeing
 | * Prevention, management and care of chronic diseases
* Prevention, management and care of communicable diseases
* Prevention, management and care of lifestyle diseases
* Health and wellbeing enhancement through the use of technology
* Community health and wellbeing enhancement
 | Prof Ilse Truter |
| 1. Earth Stewardship Science
 | * Living in the Anthropocene & Catalysts to Social Questions
* The nature of things & how Nature works
* Chaos & Stability─Origin, Evolution, Complexity, Self Organisation, Resilience
* Anatomy of a habitable Planet
* Narratives and Meaning of the Past
* Predicting the Future─risks and uncertainty
* Social and Ecological Capacity for Sustainability─ Ecosystem Services & Ecological Economics
* Evaluating new Technologies in Agro- Bio-Geo- Engineering
* Resources and Value Chains
* Green Activism Engineering─ Clean Energy, Green Creativity & Entrepreneurship
* Memory in Collections & Archives─Valuing & Processing Data/Records in Art & Science
* Co-Evolving Communication and Intelligence─Sound, Signal, Symbol, Music, Language, Math, SMS
* Change in Africa/Eastern Cape─ Heritage, Knowledge & Development
 | Prof Maarten de Wit |