**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 |