

RESEARCH FOCUS AREAS (RFAs)

SUMMARY

The Research and Postgraduate Support Directorate focuses on managing the university’s research activities and supporting the academic and research staff through research management and development systems, organizing research capacity building initiatives, and providing research support. The division enhances the universities profile by facilitating the development and implementation of strategic research and postgraduate support policies that stimulate sustainable growth and increase the research base. Importantly, among the strongholds of the division are the established and emerging Research Focus Areas.

ESTABLISHED RESEARCH FOCUS AREAS

| ESTABLISHED INSTITUTES | |
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| <p>INSTITUTE FOR SYSTEM SCIENCE</p> <p>The Institute of Systems Science (ISS) was created from an existing Centre of Excellence to accomplish the following:</p> <ul style="list-style-type: none"> Conduct high calibre research into real-world questions using multidisciplinary computational and mathematical systems methods. Develop simulation and mathematical methods to help understand these questions. <p>Effect a technology transfer of the methods and perspectives used to a broad group of South Africans. People at all levels of education from high school to PhD level are targeted with appropriate courses.</p> | <p>TEAM LEADER Professor Kevin Duffy</p> <p>HOST Institute for System Science</p> <p>CONTACTS kevind@dut.ac.za +27 (0) 31 373 2828</p> |
| <p>INSTITUTE FOR WATER & WASTEWATER TECHNOLOGY (IWWT)</p> <p>The Institute is led by an award-winning NRF rated scientist, Prof Faizal Bux. The institute encompasses a dynamic group of researchers involved in innovative research. Core research areas in the institute are wastewater treatment technology, algal biotechnology and environmental biotechnology. The Institute offers post graduate programs in a wide spectrum of disciplines in Science and Engineering. The Institute is host to one of two NRF South African Research Chair Initiative (SARChI) research chairs in wastewater treatment in SA.</p> <p>Projects are designed and developed in order to meet the ever-growing needs of the water sector in South Africa. These projects have a high applied value which increases the marketability students conducting the research. The Institute comprises of well-equipped laboratories with state-of-the-art high-end equipment. We conduct short courses and training on a routine basis for staff from</p> | <p>TEAM LEADER Prof Faizal Bux</p> <p>HOST Institute for Water and Wastewater Technology</p> <p>CONTACTS faizalb@dut.ac.za +27 (0) 31 373 2346 https://www.dut.ac.za/iwwt</p> |

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| <p>municipalities, water utilities and industry to improve their skills and keep abreast on the latest technology developments in the water and energy sector.</p> | |
| <p>ESTABLISHED CENTRES</p> | |
| <p>INTERNATIONAL CENTRE OF NONVIOLENCE (ICON) ICON's mission is to make strategic interventions in education that challenge structural violence. These processes work to bring key changes in society – specifically supporting the creation of a culture of non-violence.</p> <p>Majority of the research projects in the programme are based on action research, which means that students not only explore a problem but design and implement an intervention to bring about change.</p> | <p>TEAM LEADER Professor Geoffrey Harris</p> <p>HOST Peace Studies / ICON Faculty of Management Sciences</p> <p>CONTACTS geoffreyh@dut.ac.za +27 (0) 31 373 5609 http://www.icon.org.za/current/</p> |
| <p>THE URBAN FUTURES CENTRE (UFC)</p> <p>The centre's aim is to be an intellectual and practical hub geared towards shaping urban spaces that are vibrant, resilient, accessible, egalitarian, caring and well-designed.</p> <p>The UFC sees its role as an action-oriented research hub operating at the highest international standards. It aims to think about, and shape, the future of cities in innovative ways; imagining, with a fresh lens, what cities such as Durban could and should look like in the next 50 to 100 years. The centre strives to achieve imaginative (non-traditional) solutions to urban challenges using a cross-disciplinary and networked approach.</p> <p>The UFC therefore brings together scholars, city officials and civic groupings to think through urban dilemmas and to find creative, participatory and humane ways of resolving them. The UFC tests out 'solutions' through practical interventions, utilising the wide range of DUT's capacity, skills, resources and partnerships, and to involve urban dwellers, particularly the most vulnerable and marginalised, in problem identification, resolution and planning.</p> | <p>TEAM LEADER Professor Monique Marks</p> <p>HOST Urban Futures Centre Faculty of Engineering and the Built Environment</p> <p>CONTACTS moniquem@dut.ac.za +27 (0) 31 373 2180 http://www.dut.ac.za/faculty/engineering/urban_futures</p> |

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| <p>OTHER ESTABLISHED AREAS</p> | |
| <p>AFRICAN INDIGENOUS KNOWLEDGE SYSTEMS RESEARCH The focus of the research is on Indigenous Knowledge Systems particularly African Traditional Medicine. The research is largely based on the following aspects:</p> <ul style="list-style-type: none"> • Theory and philosophy of African Traditional Medicine | <p>TEAM LEADER Professor Nceba Gqaleni</p> <p>HOST Faculty of Health Sciences</p> |

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| <ul style="list-style-type: none"> • Science and other ways of knowing • Traditional medicine in the context of HIV and AIDS, STIs and TB • Commercialisation of traditional medicine | <p>CONTACTS nceba5850@gmail.com +27 (0) 31 373 2453</p> |
| <p>COMPOSITE RESEARCH GROUP (CRG) The Composite Research Group has three focuses:</p> <ul style="list-style-type: none"> • Composites, • Bio-Composites and • Nano-Composites. <p>Current research activities include the development of smart materials, nano-sensors, nano-coatings, nano-membranes, and polymer nanocomposites for a variety of applications including aerospace and mass transit systems.</p> | <p>TEAM LEADER Professor Mervyn Kanny</p> <p>HOST Dept. of Mechanical Engineering Faculty of Engineering and the Built Environment</p> <p>CONTACTS kannyk@dut.ac.za +27 (0) 31 373 2230</p> |
| <p>COMPUTATIONAL MODELLING AND BIOANALYTICAL CHEMISTRY Computational Modelling and BioAnalytical Chemistry focus area comprises the following research groups in chemistry: Ionic Liquids, Synthetic Organic Medicinal Chemistry, Phase Equilibria and Environmental Chemistry. These being the primary research areas, have contributed to more than 95% of the research outputs in the Department of Chemistry for this reporting period. It is also noteworthy to mention that Chemistry has been the second most productive department in the FAS in terms of research and innovation. The strategic partnerships in research have been formed with various institutions, both locally and abroad.</p> | <p>TEAM LEADER Professor Vincent Bisetty</p> <p>HOST Department of Chemistry Faculty of Applied Sciences</p> <p>CONTACTS bisettyk@dut.ac.za +27 (0) 31 373 2311</p> |
| <p>ENZYME TECHNOLOGY The Enzyme Technology Research group at DUT, under the leadership of Prof. Suren Singh and Prof. Kugen Permaul, conducts research on the discovery, improvement, production and application of microbial enzymes. These enzymes have applications spanning agricultural, biomedical and industrial sectors. In addition to its expertise in screening, cloning and expression of enzymes and production by fermentative processes, the group is also researching the degradation of biological macromolecules to produce derivatives of industrial importance. Research in the area of Enzyme Technology currently follows a three-pronged approach:</p> <ul style="list-style-type: none"> • Investigation of the fundamental aspects associated with the production of fungal and bacterial enzymes, their characterisation and the modification of their characteristics to enhance industrial applications. • Investigation of the application of selected enzymes to produce various value-added products. | <p>TEAM LEADER Professor Suren Singh</p> <p>HOST Department of Biotechnology and Food Technology Faculty of Applied Sciences</p> <p>CONTACTS surens@dut.ac.za +27 (0) 31 373 2721</p> |

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| <ul style="list-style-type: none"> • Development of Thermomyces lanuginosus as high expression level enzyme factory using molecular and bioinformatics methods and tools. | |
| <p>FOOD & NUTRITION SECURITY</p> <p>The focus of the research is to:</p> <ul style="list-style-type: none"> • Evaluate the cross-sectional effect of the three pillars of food security (food availability, food accessibility and food usage) on nutritional status (over-nutrition and under-nutrition) in vulnerable population groups in the greater Durban area and • to plan, develop and implement interventions to address needs identified in various communities. <p>The objectives of the Departmental focus area are in line with national and international policies addressing food and nutrition insecurity.</p> | <p>TEAM LEADER Prof Eric Amonsou</p> <p>HOST Biotechnology and Food Technology Faculty of Applied Sciences</p> <p>CONTACTS eamonsou@dut.ac.za +27 (0) 31373 5314</p> |
| <p>GENDER JUSTICE AND HUMAN HEALTH DEVELOPMENT (GJHHD)</p> <p>The focus area does both research and capacity development. GJHHD is committed to interdisciplinary work and works with colleagues across faculties at DUT. One of the main aims is to increase and strengthen the gender research at DUT, increase the number of women who are publishing but also to have a close link between gender justice research, policy, and intervention both at DUT and the broader society. We have thus appointed Research Associates who are active both in Higher Education and the Public Sector. Current projects and proposed projects include a focus on Gender and Tax, Women Academics and Female Students in a COVID/Post COVID World. New projects being conceptualised are linked to Issues of Mental Health and Suicide in Higher Education and Women.</p> <p>We launched the Research and Doctoral Leadership Academy (RADLA) in 2020. RADLA's focus is to support academics in managing their careers to become full professors, Leaders in Academia, NRF rated and to supervise students successfully. The academy primarily supports academics who have already obtained their PhDs or have registered for a PhD. We assist academics to improve their credentials and thereby become excellent scholars.</p> | <p>TEAM LEADER Prof Cheryl Potgieter</p> <p>HOST Deputy Vice-Chancellor: Research, Innovation and Engagement</p> <p>CONTACTS cherylp@dut.ac.za +27 (0) 31 373 2686</p> |
| <p>GREEN ENGINEERING AND SUSTAINABILITY</p> <p>Green Engineering and Sustainability is based in Chemical Engineering but is essentially a multidisciplinary research area. The group has many divisions dealing with the reduction and/or valorization of waste (domestic, municipal, and industrial) for all aspects be it solid, liquid or gas. The group has several researchers from Chemical Engineering as well as members from other departments within Durban University of Technology.</p> | <p>TEAM LEADER Prof Sudesh Rathilal</p> <p>HOST Department of Chemical Engineering Faculty of Engineering and the Built Environment</p> <p>CONTACTS Rathilals@dut.ac.za +27 (0) 31 373 3732</p> |

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| <p>PLANT BIOTECHNOLOGY</p> <p>The concept of growing crops for health rather than for food and fiber only is slowly changing plant biotechnology and medical related research. The research encompasses vegetative, generative and propagative technologies that extend ways to produce bio-chemical and pharmaceuticals from plants. The research focuses on the following:</p> <ul style="list-style-type: none"> • Bioactive compounds from plants for the treatment or prevention of HIV, TB, Malaria, Diabetes, Cancer and other infectious diseases; • Synthesis of novel pharmaceuticals • Nanotechnology for drug delivery • Value addition by producing novel food commodities. | <p>TEAM LEADER Professor Bharti Odhav</p> <p>HOST Department of Biotechnology and Food Technology Faculty of Applied Sciences</p> <p>CONTACTS odhavb@dut.ac.za +27 (0) 31 373 5330</p> |
| <p>SPACE SCIENCE AND SMART GRID</p> <p>DUT Space Science (SS) program is a capacity building initiative to train/develop expertise in satellite communications, navigation, and positioning, through graduate studies and research in SS and CNS (Communication, Navigation/e-Navigation and Surveillance) for national economic development, with applications in various sectors of the economy such as telecommunication, power and energy, mining, marine navigation and air-traffic. Activities include Satellite & Space-based Engineering; Satellite E-solutions; Stratospheric Platform Systems for CNS: Airships and Aircraft; Intelligent Transport Systems and Augmentation of GNSS Solutions.</p> <p>Also, every facet of human development is woven around a sound and stable energy supply system. DUT Smart Grid RFA engages in research relating to “grid integration of renewable energy using power electronics and innovation for intelligent cities”, using Industry 4.0 tools and applications in electrical power and energy systems, to solve problems of load shedding, security of supply. SGs are electrical grids merging bi-directional power flow with information flow to monitor changes in electricity usage and supply using digital communications technology to detect and react to the usage of the electrical supply and integration into the power grid.</p> | <p>TEAM LEADER Prof Innocent E. Davidson</p> <p>HOST Department of Electrical and Power Engineering Faculty of Engineering and the Built Environment</p> <p>CONTACTS InnocentD@dut.ac.za +27 (0) 31 373 2419</p> |

EMERGING RESEARCH FOCUS AREAS

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| <p>ENERGY</p> <p>The DUT Energy Technology Station known as “KZN Industrial Energy Efficient Training and Resource Centre” (IEETR), is based within the Physics Department, in the Faculty of Applied Sciences. The station was created in July 2012 and is funded by the Technology Innovation Agency (TIA) of South Africa to respond to the need for awareness, innovation, development, empowerment, entrepreneurship, research and technology transfer in energy efficiency and sustainable energy within KZN. Product design, prototype development, training, monitoring and verification in the</p> | <p>TEAM LEADER Dr Ian J. Lazarus</p> <p>HOST Department of Mathematics, Statistics and Physics</p> <p>CONTACTS lazarusi@dut.ac.za +27 31 373 5358</p> |
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| <p>energy field are services offered to industry. The centre has an Energy and Water SETA (EWSETA) accredited training centre and offers a variety of training courses at various exit levels in energy and water. The centre conducts research in various areas of renewable and sustainable energy.</p> | |
| <p>ICT AND SOCIETY ICT and Society is committed to advancing the field of ICT by means of quality research.</p> <p>The core focus of the area research is developing contemporary and futuristic ICT innovations for foreseeable real-world problems and opportunities.</p> <p>ICT and Society supports quality research within the greater Computing discipline and multi-disciplinary master's and PhDs.</p> | <p>TEAM LEADER Professor Oludayo O. Olugbara</p> <p>HOST Faculty of Accounting and Informatics</p> <p>CONTACTS oludayoo@dut.ac.za +27 31 373 5597</p> |
| <p>MATERNAL HEALTH The aim of the project is to respond to the Sustainable and Development Goals (SDGs) # 3 and 4, by decreasing maternal morbidity and mortality rates and ultimately align these goals to the burden of diseases and health systems responses in South Africa & other countries. The focus of the project is to determine the demographic, socio-economic, psychosocial, cultural, antenatal, obstetric, clinical and biochemical characteristics associated with maternal health and birth outcomes.</p> | <p>TEAM LEADER Professor Nokuthula Sibiya</p> <p>HOST Faculty of Health Sciences</p> <p>CONTACTS nokuthulas@dut.ac.za +27 31 373 2032</p> |
| <p>TRANSFORMATION THROUGH THE ARTS AND DESIGN Our aim is to cultivate a faculty of arts and design that promotes multi-inter-transdisciplinary, decolonial and critical approaches to the teaching, output and trajectories of the arts and design, and humanities broadly speaking. Our research focuses on critical and creative arts, cultural work, pedagogy, practice and intellectual discourse that is socially engaged, responsible, historically and spatially situated, as well as dialogically focused in order to engage local and global discursive terrains, debates and movements.</p> | <p>TEAM LEADER Dr Maleshoane Rapeane-Mathonsi</p> <p>HOST Faculty of Arts and Design</p> <p>CONTACTS maleshoaner@dut.ac.za +27 31 373 5837</p> |
| <p>MANAGEMENT STUDIES The focus of this research is on the transformation of business, entrepreneurship and the management of small businesses in South Africa. The focus is a cross-functional research area, which recognises that transformation is critical to aspects of business, large or small. The research areas/projects are selected and designed in accordance with the above focus areas and industry needs. The focus is to build a knowledge base with respect to solutions identified by business in their journey towards sustainability.</p> | <p>TEAM LEADER Prof Fulufhelo Godfrey Netswera</p> <p>HOST Faculty of Management Sciences</p> <p>CONTACTS FulufheloN@dut.ac.za</p> |