FINAL GRADUATION LIST

GRADUATION DATE: 14 JULY 2025
TIME: 09:30

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

DEAN: PROFESSOR T MAJOZI BScEng(UND) MScEng(UND) PhD (UMIST) CEng PrEng FIChemE FAAS MASSAf FWISA FSAAE

Doctor of Philosophy

ASHRAF, Muhammad Ahsan *School of Electrical and Information Engineering*
THESIS: An empirical study and application of machine learning to assess the impact of wearable devices exposure on Humans in underground mine environment
Dr. Ashraf's research assessed the safety of wearable wireless devices used by underground miners. He investigated radio-frequency exposure and its effects on human tissues in harsh mine environments. Using simulations and machine learning, he showed how to predict exposure risks and proposed safe usage guidelines, helping to improve miners' health and safety underground.
Supervisor: Professor T Celik

BAMISAYE, Olufemi Sylvester *School of Chemical and Metallurgical Engineering*
THESIS: Hot deformation, Corrosion and Oxidation Behavior of TiNbTaVW and CrNbTaVW Refractory High Entropy Alloys for High-temperature Applications
In the search for new high-temperature structural materials, two refractory high entropy alloys (TiNbTaVW and CrNbTaVW) were developed and tested. These alloys offer superior hardness, corrosion resistance, and high-temperature strength compared to the commercial IN718 nickel superalloy. Predictions aligned with actual performance, suggesting their potential for future applications
Supervisors: Dr N Maledi, Professor J Van Der Merwe and Professor M Bodunrin

DE JAGER, Peta *School of Architecture and Planning*
THESIS: Race, Gender, and Distinction in the transformation of South Africa's architecture profession
Formal registration in the architectural profession in South Africa has not kept up with the increasing number of graduates, especially women and black individuals. Using Pierre Bourdieu's theoretical frameworks and rich data from 2000 to 2019, this thesis critically mapped graduates' perceptions of belonging in the profession and worked towards initiatives for enhancing both retention and transformation.
Supervisors: Professor H Le Roux and Professor R Genga

HIGGINSON, Antony James *School of Chemical and Metallurgical Engineering*
THESIS: Robust optimisation of ethanol yield during fermentation using neural networks
This research developed a method to increase the conversion of sugar during fermentation to produce ethanol. Robust optimisation was used to determine the optimal parameters to maximize sugar conversion for each batch, despite uncertainties in the process. A model was developed using Artificial Neural Networks that was used to predict the limiting ethanol concentration, and robust optimisation was used during fermentation to maximize sugar conversion without increasing downstream processing costs
Supervisors: Professor K Harding and Professor K Brooks

MAHOMED, Irshaad *School of Mechanical, Industrial and Aeronautical Engineering*
THESIS: Acceleration effects on 3-D Aerodynamics of slender bodies
This thesis is in the field of unsteady aerodynamics of accelerating bodies. It investigates the shock wave dynamics of accelerating slender bodies at different angles of incidence with emphasis on transonic flight. The unsteady aerodynamic coefficients were determined and compared to constant flight velocity coefficients to identify the effects of acceleration.
Supervisors: Dr I Gledhill, Dr H Roohani and Professor B Skews

MAMABOLO, Botang Adolph *School of Chemical and Metallurgical Engineering*
THESIS: Techno-economic analysis and optimization of a Fischer-Tropsch Micro Reactor for synfuels production from unconventional feedstocks
Developed a first-principles mathematical model for a microchannel Fischer-Tropsch reactor, focusing on hydrodynamics and key operating parameters affecting syngas conversion. The study demonstrated how micro-scale design influences reactor performance and showed the potential for more efficient fuel production through improved understanding of multi-phase flow dynamics
Supervisor: Dr S Babaee

MATSEKE, Dikeledi Anna *School of Construction Economics and Management*
THESIS: A framework towards an Effective Claims Management process in Mega Projects in South Africa
The candidate advances global understanding of Claims Management in megaprojects within socio-political challenges like those in South Africa. Using an interdisciplinary approach, the candidate integrates Cultural Historical Activity Theory and General Systems Theory to develop the Matseke A-Z Mega-project Claims Management Decision-Making Framework, offering insights applicable to South Africa and other developing countries.
Supervisor: Dr N Khatleli

MUDZANAPABWE, Nathan Togara *School of Chemical and Metallurgical Engineering*
THESIS: Towards developing a viable circuit for beneficiating ultrafine chrome and PGM tailings to recover chromite
Nathan investigated the recovery of chrome from difficult to process ultra fine chrome containing tailings wastes. The tailings were characterized, and a series of recovery tests were performed using singular spiral, magnet and shaking table mineral separators and combinations of these. The circuit which gives the most significant recoveries of commercial grade chrome, was established and the economic viability analysis suggests that its adoption can benefit the chrome industry greatly.
Supervisor: Professor V Sibanda

NGOMANE, Luyanda *School of Construction Economics and Management*
THESIS: Design of a Capability Maturity Framework for Resilient Infrastructure Management in Category B4 Municipalities in South Africa
This study examined how a self-improvement evaluation tool might help the predominantly rural South African municipalities develop resilient infrastructure management capacities. This study deployed the capacity maturity theory which promotes continual improvement in managing infrastructure portfolios. The study proposed the use of a capacity maturity framework (CMF) to standardise municipal infrastructure management towards resilience.
Supervisor: Dr N Khatleli

NYAMAYOKA, Lumbumba Taty-Etienne *School of Electrical and Information Engineering*
THESIS: Optimal design and operation control of electric vehicle battery swapping station incorporating hybrid renewable energy and grid power system
The research focuses on designing electric vehicle battery swapping station powered by wind and solar energy. These stations offer faster, cleaner, and more affordable charging while helping reduce pressure on the power grid. The proposed system supports a greener transport future by cutting energy costs, improving reliability, and making it easier for adaptation towards electric vehicles.
Supervisor: Professor D Dorrell and Dr L Masisi

REDDY, Denesh *School of Mechanical, Industrial and Aeronautical Engineering*
THESIS: Optimizing the throughput of a complex multimodal freight network
An intermodal hub-spoke transportation network was examined based on the location and volumes of freight. A mathematical model to handle train lengths and departure decisions was developed and optimised to minimise operations cost. The primary benefit of this work would be to use operational modifications to extend the life of existing infrastructure by finding inaccessible capacity.
Supervisors: Professor B Lacquet and Professor M Ali

VILAKAZI, Amanda Qinisile *School of Chemical and Metallurgical Engineering*
THESIS: The extraction and recovery of rare earth elements, aluminium, titanium, and iron from South African coal fly ash
In this study, the candidate developed a two-stage leaching and purification process to recover smelter-grade alumina, rare-earth concentrate, high-purity titanium dioxide, and iron-based coagulant from coal fly ash. The process offers a sustainable and economically viable solution for multi-resource recovery, demonstrating the potential of converting industrial waste into valuable products for metal production and wastewater treatment.
Supervisors: Professor S Ndlovu and Dr L Chipise

ZERMATTEN, Carrie Melisa *School of Mining Engineering*
THESIS: Value creation and risk management in mining operations through an integrated reporting framework of geotechnical data, uncertainty and materiality
Mining companies in South Africa are required to report extensively on various issues, including Mineral Resource and Mineral Reserve. However, based on very detailed research carried out, it is shown that there is no similar requirement regarding geotechnical conditions, which influence whether the deposit can be mined safely and economically. The outcome of the research is an integrated reporting framework, using geotechnical data, uncertainty and materiality as fundamental principles, which will facilitate improved value creation and risk management in mining operations.
Supervisor: Professor T Stacey