University of Cape Town · iYunivesithi yasekapa · Universiteit van Kaapstad

SPES BONA

GRADUATION CEREMONY

Faculty of Engineering & the Built Environment

SARAH BAARTMAN HALL

8 September 2025

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

ORDER OF PROCEEDINGS

Academic Procession.
(The congregation is requested to stand as the procession enters the hall)

The Presiding Officer will constitute the congregation.

The National Anthem.

Welcome by the Master of Ceremonies.

Musical Item.

The graduands will be presented to the Presiding Officer by the Dean of the faculty.

The Presiding Officer will congratulate the new graduates.

The Master of Ceremonies will make closing announcements and invite the congregation to stand.

The Presiding Officer will dissolve the congregation.

The procession, including the new graduates, will leave the hall.
(The congregation is requested to remain standing until the procession has left the hall.)

NATIONAL ANTHEM

Nkosi sikelel' iAfrika
Maluphakanyisw' uphondolwayo,
Yizwa imithandazo yethu,
Nkosi sikelela, thina lusapho lwayo.

Morena boloka etjhaba sa heso,
O fedise dintwa la matshwenyeho,
O se boloke,
O se boloke setjhaba sa heso,
Setjhaba sa South Afrika – South Afrika.

Uit die blou van onse hemel,
Uit die diepte van ons see,
Oor ons ewige gebergtes,
Waar die kranse antwoord gee,

Sounds the call to come together,
And united we shall stand,
Let us live and strive for freedom,
In South Africa our land.

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

Dean: Professor A Mainza

DEGREE OF BACHELOR OF ARCHITECTURAL STUDIES

Adams, Sadie René
Babayi, Anele
Bere, Tafadzwa
Booi, Maphelo
Ntoyakhe, Asemahle Rebabaletswe

DEGREE OF BACHELOR OF SCIENCE IN CONSTRUCTION STUDIES

Deepchund, Bhavesh Balveer
De Witt, Samuel Johan
Hani, Siwaphiwe
Hughes, Kevin Royce
Madiba, Andiswa
Mahlangu, Khali
Mashinini, Sinenhlanhla Nontobeko
Naude, Juandre Peter
Ngcukana, Smangele
Patel, Dillan
Rasila, Vhugala
Sithole, Thembelani Buhle

DEGREE OF BACHELOR OF SCIENCE IN ENGINEERING IN CHEMICAL ENGINEERING

Chichava, Sanele
Gumbi, Siphokazi (with honours)
Jeelabdeer, Zaairah
Mdutshane, Sibusiso Blessing
Mhishi, Tavonga Dru Kidada
Nota, Tinayeishe Elohim
Rubidge, Jessica Anne Sykes
Tshivhase, Aluwani
Zhou, Stacy

DEGREE OF BACHELOR OF SCIENCE IN ENGINEERING IN CIVIL ENGINEERING

Gagula, Alulutho
Gardiner, Murray Boyd

Gazi, Athi
Mathobela, Oratile
Menze, Osca
Mutsi, Portia Matshediso
Ntwa, Kagiso Nicolas
Sonday, Yaseen
Thebola, Boitumelo Rosemary
Thobani, Lwazi
Zhou, Reginald Jephias
Zita, Zephanius Nyiko

DEGREE OF BACHELOR OF SCIENCE IN ENGINEERING IN ELECTRICAL AND COMPUTER ENGINEERING

Abraham, Karan Joseph
Bhamjee, Qailah
Chabeli, Kananelo Victor (with first class honours)
King, Joshua Alan
Lushaba, Msimamisi Sakhile
Mashumba, Rumbidzai
Mc Intosh, Adrian Donald (with first class honours)
Mutetwa, Francis Asher
Nkosi, Reginald Tlokomelo
Webber, Danté James
Wu, Si Teng

DEGREE OF BACHELOR OF SCIENCE IN ENGINEERING IN ELECTRICAL ENGINEERING

Kibambo, Loic Boniface Mwimbwa
Kolisi, Elvin
Kratz, Luke Antony
Perumal, Ruviel

DEGREE OF BACHELOR OF SCIENCE IN ENGINEERING IN MECHANICAL AND MECHATRONIC ENGINEERING

Holm, Trent Kenneth (with honours)
Nqwena, Onele
Sonday, Uzayr
Straughan, David Oliver (with honours)
Thomson, Cameron Patrick
Ukaka, Sifiso Sibusisiwe (with honours)
White, Thomas James

DEGREE OF BACHELOR OF SCIENCE IN ENGINEERING IN MECHANICAL ENGINEERING

Acutt, Finn John Hayden
Dube, Lindokuhle Mbongiseni
Hlahatsi, Mandisa Nompumelelo
Isaacs, Mohammed Fareed
Maselela, Thabiso Evence
Matlou, Musa (with honours)
Mdluli, Bandile Ndumiso
Mhlongo, Nkanyiso Minenhle
Moehi, Oarabile Joseph
Mokwana, Tshenollo Clement
Mrisho, Bilal Ayoub
Msimang, Mandisa Lulama
Muthelo, Mpho
Nhlapo, Sizwe Samukelo
Ntloane, Mpho Precious
Sadan, Muhammed Shaa-Iq

DEGREE OF BACHELOR OF SCIENCE IN ENGINEERING IN MECHATRONICS

Diane, Nathanael Mckean
Greenwood, Thomas Luke
Jugdaw, Sayitha
Makena, Obakeng
Meehan, Nicholas
Moodley, Sayuri
Netshituka, Masase
Ntshangase, Masixole
Patel, Akhtar Husen
Vijverberg, Friso Jacob

DEGREE OF BACHELOR OF SCIENCE IN PROPERTY STUDIES

Alam, Nafisa
Ashfield, Thomas Grant
Braaf, Justine Catherine (with honours)
Daniel, Samuel Talbot
Fredericks, Matthew
Golding, Alexander Thomas
Jones, John Maxwell
Khan, Mohamed Uwais
Makgoba, Tshepang
Malindi, Sibusiso
Mokoena, Keketso
Molokwane, Thato
Mphofu, Suprise
Setlogelo, Gololesego
Wessels, Nicholas James

DEGREE OF BACHELOR OF ARCHITECTURAL STUDIES HONOURS

Arendse, Jordan Rachel
Bonthuys, Lauren Megan
Dhliwayo, Dakarai
Kahn, Britani
Manthata, Tebogo Mangoato
Sayed, Ehsaan

DEGREE OF BACHELOR OF LANDSCAPE ARCHITECTURE HONOURS

Hoffman, Warren Frank
Visser, Georgina Samantha

DEGREE OF BACHELOR OF SCIENCE HONOURS IN CONSTRUCTION MANAGEMENT

Bester, Matthew James
Magadla, Sinawo Siseko
Makhokha, Fhatuwani (with distinction)
Musinga, Charlotte
Ram, Kaveer

DEGREE OF BACHELOR OF SCIENCE HONOURS IN GEOGRAPHICAL INFORMATION SYSTEMS

Cele, Ndumiso Hector
Ngcele, Nobuntu Nombuzo
Phogole, Kgaogelo Mathabathe

DEGREE OF BACHELOR OF SCIENCE HONOURS IN MATERIALS SCIENCE

Mmudi, Tshireletso
Sindane, Ntokozo Tinny

DEGREE OF BACHELOR OF SCIENCE HONOURS IN PROPERTY STUDIES

Clarke, Sean Russell
Mamphaga, Rinae
Martin, Maximilian Robert
Sasman, Jordan

DEGREE OF BACHELOR OF SCIENCE HONOURS IN QUANTITY SURVEYING

Daweti, Esona
Kahalwe, Michael Emmanuel
Kgasoane, Naledi Oagile
Lefokotsane, Komane Edwin
Makapela, Zukanye Mihle
Makoni, Makarurama
Masasi, Michael Takunda
Mbekwa, Dineo
Moll, Jessica Ray-Ann
Mukuna, Isaac
Nkonkwana, Lunga
Nukeri, Lufuno Ntsako
Petersen, Abdullaah Solaahuddeen
Wong, Jun-Kay Herman

DEGREE OF MASTER OF ARCHITECTURE

Aziz, Mubeena
Bapela, Bruce
Gold, Jemma
Gubu, Lolwethu (with distinction)
Matsila, Thiko
Rabie, Ebbe Dommisse

DEGREE OF MASTER OF CITY AND REGIONAL PLANNING

Mthembu, Nomfundo
Sikundla, Josiah

DEGREE OF MASTER OF ENGINEERING

Adam, Christopher Ian
Gani, Saajidah Abdool Rehman
Kombani, Ngonidzashe Gideon
Magwa, Luckmore
Mkombwe, Anorld
Mosoy, Florah Charles (with distinction in the dissertation)
Mthembu, Phumelele (with distinction in the coursework component)
Prinsloo, Mishka
Seketema, Nonofo Olefile
Sithole, Simbisai Mfunani
Skunana, Nkululeko Justice

DEGREE OF MASTER OF GEOTECHNICAL ENGINEERING

Kabiito, Nicholas
Luthada, Olympus
Malle, Beatrice Edward (with distinction)
Raliile, Matlotliso Hilda
Seetal, Yashir (with distinction)

DEGREE OF MASTER OF LANDSCAPE ARCHITECTURE

Elamin, Salma Rahmatallah

DEGREE OF MASTER OF PHILOSOPHY

Hope, Julia Serena Fisher (with distinction)
Hübner, Dylan (with distinction)
Madzingaidzo, Raphael Tapiwa
Maharaj, Riddhi Anubhav (with distinction)
Mccann, Josephine Amy
Mntungwa, Phila Rachel
Mokomane, Tlotliso
Mostert, Morney Conrad
Ntola, Siqhamo Yamkela (with distinction in the dissertation)
Truter, Jason Pierre

DEGREE OF MASTER OF SCIENCE IN ENGINEERING

Adeniran, Adebowale Ebenezer
Ahmed, Sadman Sakib (with distinction)
Alexander, Samuel Dean (with distinction)
Alfred, Sean Thabani (with distinction)
Bosch, Pierre Mikhail
Carstens, Lia (with distinction)
Chaole, Nkopo
Chen-Chen, Cornelius (with distinction)
Chidzala, Unaswi (with distinction)
Chitsiga, Takudzwa Brian
Dodia, Irshaad Abdul (with distinction)
Dube, Prince Hawulethu (with distinction)
Ebrahim, Azhar
Ebrahim, Laylaa
Gordhan, Uvir (with distinction)
Hlupo, Andrew
Kadakure, Tinashe Obrian (with distinction)
Lebakeng, Khethisa Eric
Lumbela, Naledi Diana (with distinction)

Makhaba, Limpho Mapulane
Makole, Karabo Moleta (with
    distinction)
Maluleka, Patrick Tshepo (with
    distinction)
Maluleka, Thobani (with distinction)
Manack, Uzair (with distinction)
Manga, Amisha
Martin, Zubair
Matau, Samuel Madimetsa
Mavhungu, Avhashoni Edward (with
    distinction)
Middleton, William Howard (with
    distinction)
Mnjira, Farouq Buliro
Mohamed, Mujaahidah
Mudau, Hope Thendo (with distinction)
Mvimbi, Amandla Power (with
    distinction)
Mwidu, Aaron
Nkosi, Sanele Belinda
Pugin, Devon Jordan
Raeburn, Yael Lauren (with distinction)
Ramasimong, Duduzile
Senyolo, Morokolo Joel
Shabalala, Sanele (with distinction)
Sibanda, Thabo Bhuti
Sievers, Wilco John (with distinction)
Stern, Thomas Dartnall
Tambwe, Olivier Meso (with distinction)
Tawodzera, Nyasha Tanyaradzwa
Tendo, Zindzi Sekyana Nabassagi (with
    distinction)
Vally, Amaan (with distinction)
Vally, Azraa
Van Niekerk, James Paul
Vieira, Simone
Vos, Maxwell Daymond (with
    distinction)
Winter, Adrienne Elizabeth (with
    distinction)
Zhou, Mpumelelo

DEGREE OF MASTER OF SCIENCE IN PROJECT MANAGEMENT

Bingandadi, Mutsa Dean Ivan
Brimble, Benjamin Sipho Pierrepont
Chabalala, Shidumo Vusi (with
    distinction in the coursework
    component)
Chimenya, Tinashe Patrick (with
    distinction in the dissertation)
Mabovu, Lunga
Ngobeni, Ntombifuthi Aggrineth
Nxumalo, Mhlonipheni Darlington

Swart, Johannes Philippus
Zimba, Sydney Kadikula

DEGREE OF MASTER OF SCIENCE IN PROPERTY STUDIES

Hlophe, Beauty Tholakele
Magagula, Bongani Themba
Meka, Kgothatso
Nomlomo, Chulumanca
Sikhwari, Mashudu Innocent

DEGREE OF MASTER OF TRANSPORT STUDIES

Mathobisa, Seabelo Leonard

DEGREE OF DOCTOR OF PHILOSOPHY

Abeho, Dianah Rose
Thesis Title: *Automated cadastral mapping of customary land using unmanned aerial vehicle imagery in Uganda*

Dianah Rose Abeho completed her BSc in Land Surveying from Makerere University Kampala (MUK), Uganda and her MSc in Geodesy from Addis Ababa University, Ethiopia. She joined the University of Cape Town in 2021 for her PhD studies. Dianah Abeho's research addresses the challenges in cadastral mapping, particularly in regions where land boundaries are not physically marked or are based on local knowledge. Traditional mapping methods are often costly and time-consuming. Dianah developed a semiautomated boundary delineation framework to improve this process using Unmanned aerial vehicle imagery (UAV) and Deep Learning (DL) techniques. This innovative approach allows for more accurate and efficient boundary delineation, even in areas where boundaries are poorly defined or "invisible". The study demonstrates that this method reduces fieldwork time and costs while achieving accuracy comparable to traditional survey techniques. The findings highlight the potential for UAV and DL technologies

to transform cadastral mapping, enhance land management, improve tenure security and support sustainable land governance.

Supervisor: Dr M Shoko (Geomatics)
Co-supervisor: Associate Professor PA Odera (Geomatics)

Charles, Mfon Okokon
Thesis Title: *Wind plant annual energy production maximisation and efficiency improvement with considerations for thrust and turbulence intensity*

Mfon Okokon Charles, holding a BSc and MSc from the University of Calabar, Nigeria, and an MSc in Information and Communications Engineering from the University of Leicester, UK. Mfon Charles's thesis deals with maximising the annual energy production of a multidirectional wind plant. His research aims not only to increase power density, but also to maintain wind plant energy efficiency comparable to conventionally deployed wind plants with 7-rotor diameter spacing, while controlling the resulting increase in turbulence intensities and thrust coefficients. He employs a hexagonal turbine layout to exploit its determinate multi-inter-turbine distance feature, offsetting efficiency losses suffered in tightly-spaced wind directions. He introduces a novel implementation to a well-studied wake model, thereby improving annual energy production by up to 25.1% and energy efficiency by up to 15.9% compared to conventional deployment. These findings impact turbine loads, operational expenditure, land use optimization, aesthetics, environmental impact, and economic viability of hexagonally deployed layouts, compared to optimised and conventional layouts.

Supervisor: Associate Professor DTO Oyedokun (Electrical Engineering)
Co-supervisor: Professor ME Dlodlo (Office of the Vice Chancellor, NUST, Bulawayo, Zimbabwe)

Godi, Nahum Yustus
Thesis Title: *Numerical optimization and theoretical analysis of complex michrochannel heat exchangers*

Nahum Yustus Godi holds a BEng and MEng degree from the Federal University of Technology Yola and Minna in Nigeria. He joined the Faculty of Engineering and Built Environment at UCT in 2016 for his PhD studies. He is currently a lecturer at the Federal University of Technology, Nigeria.

Nahum Yustus Godi's thesis focuses on the numerical optimisation and theoretical analysis of complex heat exchangers for cooling microelectronics and mechanical devices. He uses a commercial software package Ansys Fluent to numerically investigate the thermal performance of different configurations of combined microchannel heat sinks with fins at high-density heat flux. He starts by optimising finless microchannel heat sinks and combined microchannels with fins using water as coolant. He further investigates the thermal efficiency of the combined microchannels with fins by using both water and air as coolants in a parallel and counter flow arrangement. He compares the theoretical prediction with the numerical solution obtained. The outcome of the study shows that the combined microchannels with fins have high thermal conductance and are recommended for cooling microelectronics packages.

Supervisor: Professor BI Collier-Reed (Mechanical Engineering)
Co-supervisor: Associate Professor M Ngoepe (Mechanical Engineering)

Horn, Emma Jane
Thesis Title: *Manufacturing bio-tiles using microbially induced calcium carbonate precipitation*

Emma Horn completed her BSc (Eng) in Chemical Engineering (with honours) at UCT in 2016 and worked in consulting for a year, before commencing a MSc (Chemical Engineering) in 2018 at CPUT and graduated summa cum laude in 2020. She began full-time studies at UCT towards her PhD in 2020.

Emma Horn's thesis focuses on manufacturing bio-tiles using a natural process called microbially induced calcium carbonate precipitation (MICP). Bio-tiles offer an alternative to conventional ceramic tiles which utilise fossil-fuelled high-temperature kilns for production. She investigates three different techniques for producing bio-tiles: submersion, pumping and an automated 3D printing technique. With all three techniques, she was able to produce bio-tiles that meet international strength requirements of conventional ceramic tiles. She discovers that the bacterial activity should be neither too high nor too low and the calcium carbonate precipitation rate constant should be slow for the submersion technique. Supplemental magnesium helps in achieving the strength standards. The pumping technique is highly effective when seeding with calcium carbonate and allows for the production of two classes of bio-tiles. The automated 3D printing technique requires supplemental magnesium and seeding for the produced bio-tiles to meet the strength standards.

Supervisor: Professor DG Randall (Civil Engineering)
Co-supervisor: Dr R Huddy (CeBER, Chemical Engineering & Health Sciences)

Ikeleji, Raymond Ojonugwa
Thesis Title: *Computational design and analysis of a latent heat thermal energy storage system using solar transient temperature model for low to high temperature applications*

Raymond Ikeleji has an HND from Kaduna Polytechnic, Kaduna, Nigeria, and holds a PGD and an MEng from Federal University of Technology, Minna, Nigeria. His PhD thesis emerged from his interest in heat transfer and renewable energy during his postgraduate studies and teaching experiences at Kaduna Polytechnic, Kaduna, since 2000.

Raymond Ikeleji's thesis focuses on the computational design of a latent heat thermal energy storage system for low to high temperature applications using two novel solar transient temperature models for sunrise and sunset. Raymond Ikeleji applies this conceptual framework in the numerical design and second law analysis of a 600 K and 608 K rated thermal energy storage systems with 81.04 % and 82.20 % efficiency, respectively. Both systems can be integrated into concentrated solar power plants to power steam turbines to generate continuous electricity, including off-peak and loadshedding scenarios, and uninterrupted renewable energy demand. This contributes to mitigating the intermittent nature of solar energy and the high thermal resistance of phase change materials in the design of an efficient thermal storage system and accelerates the global transition to low-carbon energy and helps meet the Paris Agreement in support of the affordable clean energy goal.

Supervisor: Professor T Bello-Ochende (Mechanical Engineering)

Ikokou, Guy Blanchard
Thesis title: *Analytical camera pose estimation and inverse modelling of high order radial lens distortion polynomials for close range photogrammetry*

Guy Blanchard Ikokou holds a Bachelor's degree in Cartography from National School of Cadastre and Geographic Sciences, Gabon, a BSc Honours in Geographic Information Systems (GIS) from Stellenbosch University, and a Master's degree in Geomatics from the University of Cape Town.

His PhD research introduces a novel calibration framework for complex imaging scenarios, significantly advancing the accuracy of photogrammetric measurements and 3D modelling. His work expands the methodological toolkit for radial distortion corrections and provides scalable, theoretically grounded solutions to overcome existing computational inefficiencies. Additionally, the development of MATLAB and Python-based implementations makes high-

accuracy analytical camera calibration accessible to researchers, fostering real-world applications across multiple fields. The research has contributed to the global geospatial sciences community through presentations at accredited conferences.

Supervisor: Dr M Shoko (Geomatics)
Co-supervisor: Dr NT Dedei Tagoe (University of Mines and Technology, Ghana)

Jimoh-Taiwo, Qudus Boluwatife
Thesis Title: *Development of a computational model of COVID-19 thrombosis: Understanding the role of flow in COVID-19 thrombosis*

Qudus Jimoh-Taiwo completed his BSc (Eng) and MSc (Eng) in Mechanical Engineering at UCT and began his PhD in 2021. Qudus Jimoh-Taiwo's work focuses on developing a computational COVID-19-related thrombosis model. The developed model is validated with experimental and patient-specific data. He then applies the model to improve understanding of the disease by investigating the role of flow on thrombosis. He compares the clotting outcomes on the microscale to the macroscale and reports the clotting similarities and differences between the different blood vessels. His results prove that the blood flow profile significantly influences the clotting process in these vessels during COVID-19. These findings will be useful in understanding long COVID and the development of treatment protocols for the disease.

Supervisor: Professor M Ngoepe (Mechanical Engineering)
Co-Supervisor: Associate Professor WH Ho (Mechanical Engineering)

Mitchell, Carla Stephanie
Thesis Title: *A new systemic model for the implementation of sustainable space science and technology investment for Sub Saharan African economies: an implementation process derived from a case study of MeerKAT and the square kilometre array projects*

Carla Mitchell completed her BCom qualification at UCT, her Executive MBA through the International Space University, and began study at UCT towards her PhD in 2014. Carla Mitchell's thesis presents a sustainable framework for implementing Space Science and Technology (SST) programmes in African developing nations, utilising econometric analysis and the MeerKAT and SKA projects as case studies. Traditional economic indicators are not necessarily built on the structural and cultural features of the specific economy, and thus for planning of growth in Sub-Saharan Africa (SSA) it is posited that emphasis must also be placed on the socio-economic and innovation environments. As such, labour productivity is proposed as a proxy for socio economic benefit derived from SST investments. This study proposes the Space Science and Technology Investment Framework (SSTIF), which is made up of three phases: the Impact Causality Cycle, the Political Decision Matrix, and the Science Driven Economic Benefit model. These phases collectively aid in decision-making and implementation, providing a roadmap for enhancing sustainability, economic growth, and socio-economic benefits from SST investments in SSA.

Supervisor: Professor F Nicolls (Electrical Engineering)
Co-supervisor: Professor P Martinez (Electrical Engineering); Professor V Zervos (Economics Department, University of Thessaly)

Odeyemi, Chris Adebola
Thesis Title: *Developing a collaboration network framework to facilitate geospatial data access and exchange in the context of National Geospatial Data Infrastructure (NGDI)*

Chris Odeyemi has a HND Cartography (Kaduna Polytechnic), PGD Computer Science (University of Ado-Ekiti), PGD GIS (Federal School of Surveying, Oyo), BSc Geography (Ayo Babalola, Ikeji Arakeji) and MSc Geoinformation Science and Earth Observation (University of Twente, Enschede). He began full-time study toward his PhD at the UCT in 2018. Chris Odeyemi's research develops a Collaboration Network (CN) framework for geospatial datasets access and exchange among geospatial information stakeholders in the context of National Geospatial Data Infrastructure (NGDI). He adopts a mixed-methods research approach. The study combines both qualitative and quantitative methods of analysis by using survey questionnaires and semi-structured interviews, respectively to successfully develop a generic collaborative network framework. The framework recognises the context of the collaboration network and the possible outcomes of a collaboration initiative. The major outcome of the research is a Collaboration Network framework to facilitate geospatial access and exchange. The study substantially proves that research on collaboration networks can support the development and implementation of National Geospatial Data Infrastructures in developing countries. The study contributes knowledge on Public Geospatial Information (GI) organisations, by prescribing a collaboration framework for geospatial data access, exchange and managing geospatial data resources.

Supervisor: Dr M Shoko (Geomatics)
Co-supervisor: Associate Professor JL Smit (Cape Peninsula University of Technology, Geomatics)

Ojijo, Mourice Otieno
Thesis Title: *Machine learning approach to slice admission control in 5G wireless network*

Mourice Ojijo holds a Diploma in Telecommunication Engineering from Mombasa Polytechnic, Kenya, and a BSc and MSc in Electronics from the University of Mysore, India. He joined Electrical Engineering at UCT for his PhD, before which he worked as a lecturer at Kabarak University in Kenya.
Mourice Ojijo's thesis focuses on logical resource management within a sliced 5G multi-domain environment. He examines how inter-domain slice requests from various tenants can be orchestrated by infrastructure providers (InPs) to allocate network resources without compromising quality of service (QoS). Additionally, he explores how resource allocation can be efficiently scheduled by the InPs and fairly distributed within resource-constrained 5G networks. His research further extends to implementing slice admission control (SAC) as a multi-stage process to maintain network resilience. Utilising machine learning, particularly reinforcement learning (RL), he demonstrates that optimal SAC enhances overall network utility. By introducing a novel RL approach known as sequential twin-actor critic (STAC), he illustrates that the probability of accepting slice requests improves even in highly volatile scenarios.

Supervisor: Dr D Ramotsoela
(Electrical Engineering)

Okafor, Chukwuemeka Emmanuel
Thesis Title: *Multi-purpose applications of energy storage systems in a power system network*

Chukwuemeka Emmanuel Okafor holds BEng (1998) and MEng (2006) degrees from the University of Nigeria, Nsukka and University of Benin, Nigeria respectively. He joined the Department of Electrical Engineering at UCT in 2018 for his PhD studies, before which he was a Lecturer at EKSU, Ado-Ekiti, Nigeria.
Chukwuemeka Emmanuel Okafor's thesis focuses on the multi-purpose applications of battery energy storage system in a power system network. First, he develops a novel methodology based on regression

analysis and the application of a Deep Sleep metaheuristic algorithm for the optimal sizing of battery energy storage systems (BESSs) for multiple functions of frequency support, power loss reduction and mitigation of voltage deviations. He continues by proposing algorithms for optimal placement and control of BESS for multiple functions in a power system network. The results show that through the proposed methodologies, BESS was able to provide satisfactory frequency support during a power system contingency, reduce power losses by about 50% and improve voltage profile for all buses. These findings will be useful in the future for the applications of BESSs for multiple functions in a power system network by power utilities and independent power producers.

Supervisor: Professor KA Folly
(Electrical Engineering)

Ssebunnya, Divine Christine Nalukenge
Thesis Title: *The development and application of a simultaneous two-way coupled, discrete element method and smoothed particle hydrodynamic model for spatial scale-up dynamics of laboratory vertical stirred media detritors*

Divine Ssebunnya completed her BSc (Eng) degree in Chemical Engineering at UCT before beginning full-time study towards her PhD in 2019.
Divine Ssebunnya's thesis focuses on modelling the bulk internal dynamics of laboratory vertical stirred media mills. Her thesis uses the discrete element method (DEM) and smoothed particle hydrodynamics (SPH), in a simultaneous two-way coupling, to predict the flow and collision environment of grinding media and slurry in three sizes of laboratory stirred media detritors (SMDs). The assessment of performance prediction capabilities of the model is done for three different impeller tip speeds. The model is applied in scale-up studies of the internal dynamics, in which she develops a methodology to simulate the grinding media as super quadric shapes. The internal scale-up dynamics of the SMDs are assessed through spatial analyses of the flow and energy variables of the media and fluid, and the media collision environment. Within this approach, she assesses the use of single

value quantities, such as dimensionless numbers and intensive properties, as metrics for mill performance.

Supervisor: Professor A Mainza
(Chemical Engineering)
Co-supervisor: Professor S Neethling
(Imperial College London, Earth Science and Engineering)

Surana, Saarthak
Thesis Title: *Chloride penetration in concrete: Evaluation of rapid conductivity methods and development of a service life prediction model for marine conditions*

Saarthak Surana holds a BE degree in Civil Engineering from J.N.V. University and an MS degree from IIT Madras, India. He joined the Department of Civil Engineering at UCT in 2017 for his PhD studies.
Saarthak Surana's thesis focuses on the application of rapid electrical testing methods in predicting the durability of reinforced concrete structures exposed to chloride salts from marine environments. He investigates the relationship between the concrete quality as indicated by electrical tests and the rate of chloride penetration in concrete. He finds that a general relationship independent of the concrete type can be derived when age-related effects on concrete quality are accounted for. He also finds that it is possible to simplify the measurement of the age-related effects by using a simple non-destructive electrical method. Based on these findings, the results from this study, and the data reported in the literature, he develops a model to estimate the corrosion-free life of reinforced structures for selected South African marine environments. The proposed model will be useful in designing and constructing durable concrete structures.

Supervisor: Professor H Beushausen
(Civil Engineering)
Co-supervisor: Emeritus Professor M Alexander (Civil Engineering)

Yongoua Nana, Joel
Thesis Title: *Bridging the urban energy divide: equity-focused transition pathways for sub-Saharan African cities*

Joel Yongoua Nana holds a BEng in Electrical Engineering from the University of Buea in Cameroon, and an MSc in Physics from the University of Fort Hare. While pursuing his PhD at UCT, he also worked in the energy and climate change field across sub-Saharan Africa.

Joel Nana's thesis examines how alternative urban energy transitions in Sub-Saharan Africa could simultaneously address equitable energy access and use across different income groups, while meeting development and sustainability goals. Through detailed analysis of six diverse cities, he provides a comprehensive assessment of energy use and emissions across key economic sectors, with focus on household energy use inequalities in African urban contexts. His research reveals that while current energy policies show promise in reducing inequalities, more ambitious bottom-up policy measures could yield better outcomes. He develops and tests alternative transition pathways that could help cities achieve both their development goals and sustainability objectives. The findings provide practical guidance for municipal authorities seeking to implement more equitable energy transitions, highlighting the importance of context-specific approaches.

Supervisor: Professor H Winkler (Economics)
Co-supervisor: Professor H von Blottnitz (Chemical Engineering)

Zingore, Kumbirai Memory
Thesis Title: *Modeling the invasive range of the peach fruit fly Bactrocera zonata (Saunders) (Diptera:Tephritidae) in Africa under changing climatic conditions: Implications on horticulture*

Kumbirai Zingore holds a BSc in Geology and Geography and an MSc in Geographical Information Systems from the University of Zimbabwe. She joined UCT in 2017 for her PhD studies. Before joining UCT, she worked at the University of Zimbabwe and as GIS consultant for international research organisations.

Kumbirai Zingore's thesis focuses on developing models that complement existing models for predicting the potential range expansion of invasive pest species by different mechanisms under current and future climatic conditions for the year 2050. She determines the establishment of the peach fruit fly *Bactrocera zonata* (Diptera: Tephritidae) using six machine learning and statistical algorithms. She goes on to develop a theoretical mathematical model and a geospatial agent-based model (ABM) to predict the distribution and spread of *B. zonata*. Furthermore, she develops and implements a framework for comparing the spread models. The ABM was found to provide better predictions of *B. zonata's* invasion, capturing its spread through biological capabilities and human-mediated events. The models developed in the study provide decision support system tools for mitigating and controlling *B. zonat*a spread on the continent, hence improving the livelihoods and food security of people.

Supervisor: Professor N Odendaal (Architecture, Planning and Geomatics)
Co-supervisor: Associate Professor S Silal (Statistical Science)

VISION AND MISSION
UNIVERSITY OF CAPE TOWN

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