



GRADUATION CEREMONY

*Faculty of Engineering &
the Built Environment*

SARAH BAARTMAN HALL

10:00 – 14 December 2023

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.

Musical Item.

Welcome by the Master of Ceremonies.

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

The Presiding Officer will congratulate the new graduates and diplomates.

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 and diplomates, 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.

**NAMES OF
GRADUANDS/DIPLOMATES**

**1. FACULTY OF ENGINEERING
AND THE BUILT ENVIRONMENT**

Dean: Professor A Lewis

**DEGREE OF BACHELOR
OF ARCHITECTURAL STUDIES**

Nkosana Mncube
Mashudu Livingstone Mutsila
Mashudu Nekhondela
Khiara Singh

**DEGREE OF BACHELOR
OF SCIENCE IN
CONSTRUCTION STUDIES**

Dan Moleleka Dibetso
Tarirai Mudhilhwa Dzimba
Matimu Osley Khosa
Muhammad Aslam Limalia
Relebohile Motsoikha
Abdul-Basit Parker

**DEGREE OF BACHELOR
OF SCIENCE IN ENGINEERING
IN CHEMICAL ENGINEERING**

Tevin President Holiday
Makokorope Sebedu Maswinyaneng
Zahra Motlekar
Gladness Ntombikayise Mponzwana
Ntandoyenkosi Phiwayena Ndlovukazi
Nomvelo Nonjabulo Ngubane
Mxolisi Siyabonga Nzimande
Tlhologelo Welheminah Polorigni
Layan Salie
Verushka Nikita Snyders
Chad Dante Wessels

**DEGREE OF BACHELOR
OF SCIENCE IN ENGINEERING IN
CIVIL ENGINEERING**

Nkhensani Palesa Biko
Melissa Regina de Waal
Niyaz Japie
Sello Solomon Massa
Msawenkosi Kings Mkhize
Lehlohonolo Mokibitla (with honours)
Kalungisha Ngombe

Tawanda Tadiwanashe Ruswa
Simthembele Avela Tshaka
Tinotenda Clifford Washaya (with honours)

**DEGREE OF BACHELOR
OF SCIENCE IN ENGINEERING IN
ELECTRICAL ENGINEERING**

Nhlanhla Lahlo
Lindokuhle Sillencio Lubisi
Mufaro Mhuru
Martin Mahlatsi Motileng
Akani Abby Junior Tshabalala
Quinton Duncan Verschuuren

**DEGREE OF BACHELOR
OF SCIENCE IN ENGINEERING
IN ELECTRICAL & COMPUTER
ENGINEERING**

Michael Joseph Altschuler
Taine Dillon de Buys
Dylan Hellig
Achmat Kamish
Marvin Chomba Kangangi
Tlotlisang Lephethesang Lekena
Takura Tyrone Kawone (with honours)
Tadiwanashe Tinashu Munesu Mabhudhu
Iviwe Malotana
Siyamcela Yondela Jackson Matwele
Uzile Mkhumbuzi
Toluwanimi Flourish Oluwamakinde
Kudzayi Samakande
Zak Orion Wren
Skye Erin Zive

**DEGREE OF BACHELOR
OF SCIENCE IN ENGINEERING IN
MECHANICAL ENGINEERING**

Zaheera Ally
Tiyamike Paula Chibambo
Albert Vuyani Duda
Nelisa Dyobiso
Nirvanah Vianca Govinden
Katlheho Jerry Mofokeng
Sonwabale Mangaliso Ka-Mawande Mtyi
Yonelisa Ngqebane
Thomas Henry Sands
Mokone Thorsten Shibambu (with honours)
Harvey Vuyani Veleko
Lungelo Ziqubu

**DEGREE OF BACHELOR
OF SCIENCE IN ENGINEERING IN
MECHANICAL & MECHATRONIC
ENGINEERING**

Ndangariro Tizirai Kurivara
Tebello Jackson Lesitha
Muhammed Hoosain Mookadam
Caleb Martin Thetard

**DEGREE OF BACHELOR OF
SCIENCE IN ENGINEERING IN
MECHATRONICS**

Noa Lily Anthony
Luke Dion Baatjes
Jonathan Luke Campbell
Muhammad Aadil Eyasim
Crystal Evelyn Jaftha
Duncan Donald Macpherson
Shivar Maharaj
Jiven Moodley
Veshalin Naidoo
Sivuyile Mhlali Sifuba
Wanga Andrew Sandile Tshikombedze

**DEGREE OF BACHELOR
OF SCIENCE IN GEOMATICS**

Amahle Mkhize

**DEGREE OF BACHELOR OF
SCIENCE IN PROPERTY STUDIES**

Mohamed Ferhad Ahmed
Luke Richard Cammell
Alexia Kirsten Davids
Lewis Anesu Durango
Nathier Galiem
Ross Andrew Hulbert
Marek Oliver Kanigowski
Cynthia Wairimu Macharia
Sinentlaha Simangele Mboxo
Reece James Oosthuizen
Kabangu Phiri
Mhlali Solombela

**POSTGRADUATE DIPLOMA IN
POWER PLANT ENGINEERING**

Makgotso Moremadi Thobejane
Martin Shoopala Utoni

DEGREE OF BACHELOR
OF ARCHITECTURAL
STUDIES HONOURS

Chanderpaul Februarie
Kenneth Mahlangu
Dylan Junior Tejada

DEGREE OF MASTER
OF ARCHITECTURE

Rhulani Rashid Rikhotso

DEGREE OF MASTER OF CITY &
REGIONAL PLANNING

Zayd Gool
Ashleigh Petersen
Georgina Irene Mangisi Sophie Zaloumis
(with distinction)

DEGREE OF MASTER OF
GEOTECHNICAL ENGINEERING

Julian Peter Luyt
Abercon Mbedzi
Ngonidzashe Mutanga
Ndoli Osmond Rusibamayila

DEGREE OF BACHELOR OF CITY
PLANNING HONOURS

Mihkail Shaun Van Rooyen

DEGREE OF MASTER
OF PHILOSOPHY

Mirza Waqas Baig (with distinction)
Renee Buerger
Ann-Marie Ellmann (with distinction in
the coursework component)
Kai Alexander Forster (with distinction)
Pierre-Jeanne Alexander Gerber
Johanna Matlakala Lata
Wilson Kamau Macua
Simphiwe Madlanga
Mack Michael Mokobane
Jonathan Weinberg

DEGREE OF BACHELOR OF
SCIENCE HONOURS IN
CONSTRUCTION MANAGEMENT

Vuyokazi Lerato Mokoena

DEGREE OF MASTER
OF ENGINEERING

Yolanda Dondashe
Pieter Eksteen Du Plessis (with
distinction in the dissertation)
Imeraan Frydie
Jacqueline Siphokazi Gongxeka
Ashfaaq Hoosain (with distinction in the
coursework component)
Tinashe Roxley Kagande
Nokuthula Linda Kutshwa (with
distinction in the dissertation)
Evidence Mandizvidza (with distinction
in the coursework component)
Matthew Leigh Meder
Reitumetse Patrice Monaheng
Naashif Mowzer (with distinction in the
dissertation)
Kaboyamodimo Craig Nare
Muzi Kelvin Nkosi (with distinction in
the dissertation)
Shaheed Obaray
Taariq Parker
Perose Mutombo Ngufor
Pravanya Pillay
Eric Anacleth Rugemalira
Nokwanda Pearl Sibisi
Kapil Singh
Marli Swart (with distinction in the
coursework component)
Graham Van Niekerk (with distinction in
the dissertation)

DEGREE OF MASTER
OF SCIENCE IN ENGINEERING

Miriam Arinaitwe (with distinction)
Daniel Barlin
Mauro Giovanni Borrageiro
Luke Pearce Brown (with distinction in
the dissertation)
Morag Leitrim Brown
Maurine Chepkoech (with distinction)
Deborah Danai Rutendo Chikukwa (with
distinction)
Vidushi Chitranshi (with distinction)
Stephen Mark Cotterrell
Zico Da Silva (with distinction)
Karina Nanette De Kock (with
distinction)
Roberto Agostinho De Oliveira (with
distinction)
Melanie Duvenhage
Nicholas Norman Elias (with distinction)
Toufeeq Fisher
Raeesah Gani (with distinction)
Navya Saira George Mohan
Melissa Gugulethu Gonte
Felix Ashton Guni
James Michael Heydenrych
Matthew Michael Hoare
Tinashe Raphael Jambo
Daniel John Joska
Vimbai Susan Kasonde (with distinction)
Oaitse Percy Ketlogetswe
Evan Justin Kerr (with distinction)
Lebogang Kagiso Kgaladi

DEGREE OF BACHELOR
OF SCIENCE HONOURS IN
GEOGRAPHICAL INFORMATION
SYSTEMS

Louisa Chirwa
Masibulele Triumph Fubesi
Michelle Olwethu Msuthukazi Goba

DEGREE OF BACHELOR
OF SCIENCE HONOURS IN
MATERIALS SCIENCE

Kopano Mosai

DEGREE OF BACHELOR
OF SCIENCE HONOURS IN
PROPERTY STUDIES

Sarah-Jane Deary

DEGREE OF BACHELOR
OF SCIENCE HONOURS IN
QUANTITY SURVEYING

Ayanda Dodi Mnikathi
Mahlatse Motaung
Paul Tshepo Opio-Ikuya
Dean Jordan Wasserman

DEGREE OF MASTER OF
ENGINEERING IN CIVIL
INFRASTRUCTURE MANAGEMENT
& MAINTENANCE

Salmi Ligola Neshila

Saahil Firoz Khan (with distinction)
Tsepiso Lerontina Lepota
Malefetsane David Letsika
Maanda Danson Lilimu
Hlanganani Luthuli
Ike Maunatlala Mafa (with distinction)
Anam Magudu (with distinction)
Surprise Dineko Mahlangu (with distinction)
Hlasoa Alexis Mahlelebe (with distinction in the coursework component)
Christopher Mailer
Malcolm Tendai Mapeta
Richard Donald Alexander Masson
Wilson Masuku
Anabel Ngasi Matalanga
Dennis Tinotenda Matogo
Nyasha Mawungwe
Tichavavamwe Mbizvo
Liam Kent McAlpine
Eddy Miir
Malesela Michael Mogano (with distinction)
Alaa Abdelkareem Awad Mohammed Ali
Ngonidzashe Mombeshora
Motlatsi Monyake (with distinction)
Tiaan Munro (with distinction)
Dayalan Nair (with distinction)
Vafa Naraghi (with distinction)
Siyanda Ncwane
Alexandra Glynne Newlands (with distinction)
Michael Sekiette Ngau (with distinction)
Grace Ngwenya
Kyriacos Eftychiou Nicolaides (with distinction)
Tinashe Ngwenya
Mark Stephen Njoroge
Grant Norrie (with distinction)
Everjoice Tendai Nyaruwata (with distinction)
Alaba James Ojo
Gerald Innocent Otim (with distinction)
Eric Joseph Roberts Payne (with distinction)
Zandile Pertunia Peku
Yatheshthrao Ragoo
Lebohang Ralikalakala
Aaron Daniel Rhodes (with distinction)
Davison Takawira Seenzayi
Jonathan Sibanda
Aashir Siddiqui
Chibambila Simbeye (with distinction in the dissertation)
Senyo Michael Simpson (with distinction)
Harpreet Singh
Daniel George Slater (with distinction in the dissertation)

Anotidaishe Spencer
Karen Kathleen Nalubula Ssekimpi
Athena Rebecca Strauss (with distinction)
David Anthony Sturrock
Kukhokuhle Tsengwa (with distinction)
Thendo Arthur Tshinavhe (with distinction)
Cari Van Coller (with distinction)
Calvin David Van Der Merwe (with distinction)
Pierre Herrmann Van Der Merwe
Sandisile Paul Walaza

DEGREE OF MASTER OF SCIENCE IN PROJECT MANAGEMENT

Sishosonke Muziwakhile Dlamini
Elizabeth Ajoa Nyamebekyere Foli
Mariah Wanjiru Gichuki (with distinction in the dissertation)
Bulelwa Leni
Nkateko Echolls Mkhabele
Kgomotso Mapula Sekgoele
Palesa Singata (with distinction in the dissertation)
Lwazi Zulu

DEGREE OF MASTER OF SCIENCE IN PROPERTY STUDIES

Lloyd Goliath (with distinction in the dissertation)
Godfrey Henderson Kadzuwa
Sharon Tsitsi Marimira
Fulata Zimba

DEGREE OF MASTER OF STRUCTURAL ENGINEERING & MATERIALS

Gideon Tuutaleni Kanyangela

DEGREE OF MASTER OF TRANSPORT STUDIES

Sanele Howard Khawula

DEGREE OF MASTER OF WATER ENGINEERING

Nosisa Happiness Nqayi

DEGREE OF DOCTOR OF PHILOSOPHY

Jessica Leigh Fell
Thesis title: *Evaluating the potential for Blue-Green Infrastructure benefits using the case study of stormwater ponds in Cape Town, South Africa*

Jessica Leigh Fell holds a MSc degree in Environmental and Geographical Science from UCT and joined the Department of Civil Engineering in 2020 for her PhD. Before that, she worked at the Future Water Institute at UCT focusing on urban water and sustainability projects.

Jessica Leigh Fell's thesis presents a Multi-Criteria Analysis methodology to evaluate the potential for existing blue infrastructure to provide multiple benefits as Blue-Green Infrastructure towards a Water Sensitive City. She developed the methodology through the case study of the City of Cape Town, South Africa. This enabled her to illuminate the multifunctional potential of the city's existing stormwater ponds to provide a range of benefits from recreation to aquifer recharge. Her research provides a strategic, flexible and transferable Multi-Criteria Analysis methodology, drawing on Geographic Information System's visual capabilities and incorporating stakeholder input for a participatory approach.

Supervisor: Professor N Armitage (Civil Engineering, Future Water Institute)
Co-supervisor: Dr J Okedi (Civil Engineering, Future Water Institute)

Edwige Feulefack Songong
Thesis Title: *Nonlinear vibration of beams and plates resting on elastic foundations having nonlinear stiffness properties*

Edwige Songong holds a BSc and an MSc degree from the University of Yaoundé in Cameroon. She also completed a taught Master's degree at the African Institute for Mathematical Sciences, Cameroon. She joined the Department of Civil Engineering at UCT in 2018 for her PhD studies. Edwige Songong's thesis

investigates how the vibration behaviour of beams and plates supported on an elastic foundation is affected by the nonlinearity of the foundation stiffness, in which the reaction of the foundation on the beam or plate, as a result of the loading applied on the member, is not directly proportional to the deflection of the member, but varies as the square or the cube of the deflection (or a linear combination of these). Using both analytical formulations and numerical finite-element modelling, she evaluates the effect of foundation nonlinearity on natural frequencies and mode shapes, with the linear foundation taken as the benchmark. Her main finding is that foundation nonlinearity can significantly affect the vibration behaviour of beams and plates on elastic foundations, and should be taken into account unless the coefficients of the nonlinear terms are very small relative to the coefficient of the linear term.

Supervisor: Professor A Zingoni
(Civil Engineering)

Brent Gary Hampton

Thesis Title: An analytic framework to advance understanding of power sector reforms in Sub-Saharan Africa

Brent Hampton completed his BSc (Eng) (Electrical) at the University of the Witwatersrand and his BCom (Hons) and MSc (Eng) (Electrical Engineering) from UCT. He has worked in the power sector in Sub-Saharan Africa for over 30 years, including holding a senior position in the World Bank.

Brent Hampton's thesis examines the theory and outcomes of electric power sector reform during 30 years, focusing on Sub Saharan Africa. A worldwide trend towards competitive markets and privatisation for electricity supply has generally led to disappointing reform outcomes in developing countries. Based on his personal experience and many case studies, he develops an analytic framework of the critical elements of successful sector reform. He tested the validity of the model with further case studies and by interviewing a wide range of stakeholders. The framework provides a basis for systematic analysis

at government, sector, and utility levels of existing operations, as well as being a guide for developing more sustainable future policies. His novel framework has potential applications for understanding the causes of poor performance of infrastructure utilities beyond the electricity sector and contributing broadly to the attainment of the UN's sustainable development goals.

Supervisor: Professor CT Gaunt
(Electrical Engineering)

Thulile Patricia Khoza

Thesis Title: Development of advanced, highly active and durable OER catalyst layers for PEM water electrolyzers

Thulile Patricia Khoza holds a BSc in Chemistry and Microbiology, a BSc (Hons) in Material Science and Engineering, and an MSc in Chemical Engineering, from the University of Cape Town. Her scientific officer role at HySA/Catalysis Centre of Competence led to this PhD. Thulile is currently a research scientist at SINTEF (Norway).

The overall aim of Thulile Patricia Khoza's thesis is to develop catalyst layers for proton exchange membrane water electrolyzers (PEMWE) with reduced precious metal loadings but improved activity and durability. In order to achieve this, the work uniquely combines the development of highly active and durable Ir-Ni nanoframe-based catalysts, fabrication of catalyst layers based on the prepared materials at industrially relevant scale, and in-situ (i.e. realistic operating conditions) testing of the electrodes. This work is the first to show the application of Ir-Ni nanoframe-based electrodes at a relevant scale and under realistic operating conditions. A fundamental understanding of synthesising Ir-Ni bimetallic nanostructures was established. Further, the influence of post-treatment on the nanostructure was studied. The result is a study that makes important contributions towards the realisation of cost-effective PEMWE systems, an essential prerequisite on the route to a carbon-neutral future.

Supervisors: A/Professor P Levecque (Chemical Engineering); Dr D Susac (Chemical Engineering)

Co-supervisor: Adjunct A/Professor A Oyarce-Barnett (Norwegian University of Science and Technology, NTNU)

Sinqobile Vuyisile Lusanda Mahlaba

Thesis title: The aerobic, water-assisted selective oxidation of methane over platinum-based catalysts

Sinqobile Mahlaba obtained her BSc, BSc(Hons) and MSc (Chemistry) at the University of KwaZulu-Natal, and started her PhD studies at UCT in 2019.

Sinqobile Mahlaba's thesis reports for the first time on the aerobic, selective oxidation of methane, one of the holy grails in chemistry, over platinum-based catalysts in the presence of water. Sinqobile managed to develop a highly active and highly selective catalytic process, with a conversion of ca. 3.5% and an unprecedented selectivity toward the formation of formaldehyde of 99%. She elaborated on the unique reaction mechanism, stressing the importance of the catalyst support in obtaining a selective catalyst. The promising results obtained so far may result in the first industrial process converting natural gas directly into valuable products. Some of the results have been published in a prestigious journal and have contributed to the filing of a patent.

Supervisor: Professor E van Steen
(Chemical Engineering)

Co-Supervisor: Dr A Govender (Sasol)

Rešoketšwe Martha Manenzhe

Thesis Title: A Stepwise study on the characterisation and processing of South African platinum group tailings

Rešoketšwe Manenzhe holds a BSc and MSc in Chemical Engineering from UCT. She joined the Centre for Minerals Research for her MSc, and in 2019, commenced her PhD. She has worked in the cement industry, and at the UCT Department of Chemical Engineering as a junior lecturer.

Rešoketšwe Manenzhe's thesis focuses on the feasibility of

processing South African platinum group mineral (PGM) tailings for the recovery of residual copper. She starts by investigating the use of easily applicable laboratory techniques in determining the weathered state of copper species present in the waste materials. She extends the research into using common chemical reagents from the minerals beneficiation industry, to investigate the efficiency of extracting copper from the waste materials. Further, she investigates whether mechanical methods can be used to mitigate the weathered state of the wastes, and whether this mitigation can improve or optimise copper extraction. As a secondary objective, the thesis assesses the feasibility of extracting nickel from the same waste materials.

Supervisor: A/Professor K Corin
(Chemical Engineering)
Co-supervisor: Dr M Tadie
(Chemical Engineering)

Kenny Mudenda
Thesis Title: Lateral-torsional buckling behaviour of monosymmetric steel sections formed with flange upstands

Kenny Mudenda completed a BEng degree in Civil Engineering at the University of Zambia. He then completed an MSc degree at the University of Cape Town in 2008. He joined the Department of Civil Engineering in 2016 as a senior lecturer, at the same time commencing studies for a PhD.

Kenny Mudenda's work focuses on the beneficial use of monosymmetry in steel members. The study reveals unique properties that are observed with a particular type of monosymmetric section obtained by altering commonly available doubly symmetric sections using flange upstands. For this type of section, the flange upstand height needs to be restricted to a specific desirable region of size in order to obtain the greatest benefit. In this region, significant strength gain is obtained from monosymmetry. The point where the benefit vanishes is identified using a unique property of these cross-sections. The study considers both elastic and elastic-plastic behaviour. Practical applications to structural engineering are

demonstrated using examples.

Supervisor: Professor A Zingoni
(Civil Engineering)

Adolph Ntaja Mwale
Thesis Title: Developing a ball mill model that incorporates grate and overflow discharge configurations

Adolph Mwale completed his BMinSc in 2009 at the University of Zambia and joined UCT in 2013 for his MSc studies in Chemical Engineering. He commenced PhD studies in 2016.

Adolph Mwale's research involves performing experiments and using the data generated to develop a mathematical model for assessing the performance of ball mills in the mining industry. The developed model captures the influence of the discharge mechanism, which is one of the key design parameters, and other key operating variables affecting mill performance. The other novel feature of the model is the explicit incorporation of the energy used in size reduction. The model will contribute to designing ball mills to meet plant targets in terms of fineness of grind and capacity, which are key plant performance criteria. This model can also be applied for optimisation studies to improve productivity of existing plants. The model allows testing the impact of changing the discharge mechanism, which will reduce costs of assessing engineering solutions and lead to improved performance.

Supervisor: Professor A Mainza
(Chemical Engineering)

Chukwuma John Okolie
Thesis Title: Enhancement of digital elevation models using tree-based ensemble machine learning algorithms

Chukwuma Okolie holds a BSc degree in Surveying and Geoinformatics and an MSc degree with distinction in Surveying and Geoinformatics from the University of Lagos, Nigeria. In 2017, he started his lecturing career at that University, but interrupted it in 2020 to commence a PhD at UCT.

Chukwuma Okolie proposes an explainable tree-based ensemble machine learning framework for the enhancement of global digital elevation models. The backbone of the framework is a gradient boosted decision tree-based feature-level fusion of environmental parameters that incorporates Bayesian optimisation for digital elevation model error prediction and correction. Training data for the algorithms are representative of landscapes in Cape Town including urban areas, agricultural fields and mountainous landscapes. The proposed enhancement scheme led to competitive improvements in digital elevation model accuracy, with as much as an eighty percent reduction in the elevation bias. His findings provide insights on the cause-and-effect relationship between environmental parameters that are known influencers of digital elevation model error. Chukwuma shows the applicability of the enhancement scheme for the revision of topographic maps by national mapping agencies in data-scarce regions of Africa and the global South, where it has potential as a substitute for costly airborne topographic surveys.

Supervisor: (2020-2022): A/Professor J Smit (Geomatics)
Supervisor (Admin): Professor J Whittal (Geomatics)
Co-supervisor: Dr A Adeleke (University of Pretoria, Geography, Geoinformatics and Meteorology)

Arnold Pretorius
Thesis Title: Contributions to quantitative feedback theory design and preliminary application to a variable-pitch quadcopter

Arnold Pretorius completed his BSc (Eng) (with honours) at UCT and began full-time study towards his PhD in 2016.

Arnold Pretorius's thesis contributes to quantitative feedback theory control design bound generation techniques, with particular focus on multivariable systems. His work focuses on using mathematical and geometric insights to formulate bound generation techniques that can capture a larger subset of the inherent feedback control solution space, relative to traditional

methods, allowing for improved feedback control solutions. The thesis also details the mathematical and mechanical modelling and design, state estimation, and preliminary control design of a variable-pitch quadcopter. Experimental methods are used to verify the quadcopter dynamics, and low-level feedback control is implemented on the platform. A low-cost vision-based motion capture system is also developed as part of the thesis, which is used to localise the quadcopter during operation.

Supervisor: Professor ES Boje
(Electrical Engineering)

Vinay Ramaswami Shekhar
Thesis Title: Response of composite and steel v-structures to localised air blast loading - numerical and experimental

Vinay Shekhar completed studies towards his BSc (Eng) in Electro-Mechanical engineering in 2012 and his MSc in Mechanical engineering in 2015. He began his PhD research in 2016 and worked part-time at UCT as a lecturer in the mechanical engineering department.

Vinay Shekhar's thesis investigated the blast performance of V-structures made from armoured steel and glass-fibre reinforced polymer (GFRP). The primary goal was to determine if GFRPs could be used instead of steel when manufacturing V-hulls for mine resistant ambush protected (MRAP) vehicles. Additionally, the transient behaviour of these V-structures under localised blast loads was studied. Using both blast experiments performed at the BISRU centre and numerical simulations, V-structures with different configurations were investigated and optimal designs were obtained.

Supervisor: A/Professor CJ von Klemperer (Mechanical Engineering)
Co-supervisor: Professor GS Langdon (Mechanical Engineering)

Lindani Prince Shelembe
Thesis Title: Development of an online broadband impedance spectroscopy extraction system of PV modules through switch-mode converters

Lindani Prince Shelembe completed his BSc and MSc qualifications at UCT and began full-time study towards his PhD in 2020.

Lindani Prince Shelembe's thesis focuses on online conditioning monitoring of solar photovoltaic modules. He investigates several fault conditions using broadband impedance spectroscopy (BIS) through a switch-mode converter (SMC). With his research, he aims to reduce power losses, and costs of maintenance and module replacement. He first investigates fault conditions on solar modules. He then investigates, and designs for, the integration of BIS on SMC technologies, by considering the bandwidth of a solar module, the induction of BIS excitation voltages, multivariable point control algorithms, and direct inductor current ripple excitation. He obtains results which show that it is feasible to monitor the impedance of a solar module online. These findings will be useful in improving condition monitoring of solar modules on solar plants.

Supervisor: Professor PS Barendse
(Electrical Engineering)

Helene-Marie Stander
Thesis Title: Early-stage design and development of mine waste valorisation technologies with expert input: a case study of South African sulfide-enriched coal waste

Helene-Marie Stander holds a BEng in Chemical Engineering from the University of Pretoria and an MPhil in Business Ethics with distinction from the same institution for which she was awarded academic honorary colours.

Helene-Marie Stander's doctoral work contributes to improving mines' negative environmental and social footprints. Mine waste represents a waste of materials and is potentially harmful to surrounding communities and the environment. Beneficially using

mine waste, called valorisation, has the potential to reduce both wastage and harm. Helene-Marie's study sought to improve the rate and efficiency with which university- and research institution-developed mine waste valorisation technologies are commercialised by developing a structured approach to the early stages of design and development. This approach incorporates technology transfer considerations early in the process through expert interviews, overcomes data deficiency by using expert input in evaluation, and suggests creating tailored development roadmaps based on the results of prefeasibility studies. The approach was further demonstrated and tested on the case study of sulfide-enriched fine coal waste, which is acid generating and therefore poses long-term environmental risks if disposed of to landfill.

Supervisor: A/Professor J L Broadhurst (Minerals to Metals Research Initiative, Department of Chemical Engineering)
Co-Supervisor: Professor STL Harrison (Centre for Bioprocess Engineering Research, Department of Chemical Engineering)

Craig Tinashe Tanyanyiwa
Thesis Title: The viability of transforming stormwater detention ponds into infiltration ponds on the Cape Flats, South Africa

Craig Tinashe Tanyanyiwa completed his BEng in Civil and Water Engineering (Hons) in 2017 from the National University of Science and Technology, Zimbabwe. He moved to the University of Cape Town, obtaining an MSc (Eng) in Civil Engineering in 2019, before continuing to PhD studies in 2020.

Craig Tinashe's thesis explores the viability of retrofitting stormwater detention ponds in Cape Town for managed aquifer recharge at a neighbourhood scale. His pilot field-scale study highlighted the need for extensive collaboration between officials and communities to manage conflicting priorities and interests. Departing from conventional engineering, this retrofitting approach requires significant time investment by the professional

team. Using a computational hydraulic model, Tinashe predicted a potential managed aquifer recharge increase above natural recharge of up to 290% under various scenarios. Laboratory tests demonstrated the ability of the retrofitted ponds to treat poor-quality stormwater. An economic assessment of the viability of the managed aquifer recharge and subsequent recovery in a retrofitted pond showed that it is economically more attractive than seawater desalination. These findings informed the development of a practical 'middle-out' approach for retrofitting detention ponds for managed aquifer recharge in Cape Town. [142 words]

Supervisor: Professor NP Armitage
(Civil Engineering)
Co-supervisor: Dr. J Okedi
(Civil Engineering)

VISION AND MISSION

UNIVERSITY OF CAPE TOWN

Vision

An inclusive and engaged research-intensive African university that inspires creativity through outstanding achievements in learning, discovery and citizenship; enhancing the lives of its students and staff, advancing a more equitable and sustainable social order and influencing the global higher education landscape.

Mission

UCT is committed to engaging with the key issues of our natural and social worlds through outstanding teaching, research and scholarship. We seek to advance the status and distinctiveness of scholarship in Africa through building strategic partnerships across the continent, the global south and the rest of the world.

UCT provides a vibrant and supportive intellectual environment that attracts and connects people from all over the world.

We aim to produce graduates and future leaders who are influential locally and globally. Our qualifications are locally applicable and internationally acclaimed, underpinned by values of engaged citizenship and social justice. Our scholarship and research have a positive impact on our society and our environment.

We will actively advance the pace of transformation within our University and beyond, nurturing an inclusive institutional culture which embraces diversity.

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Chancellor

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