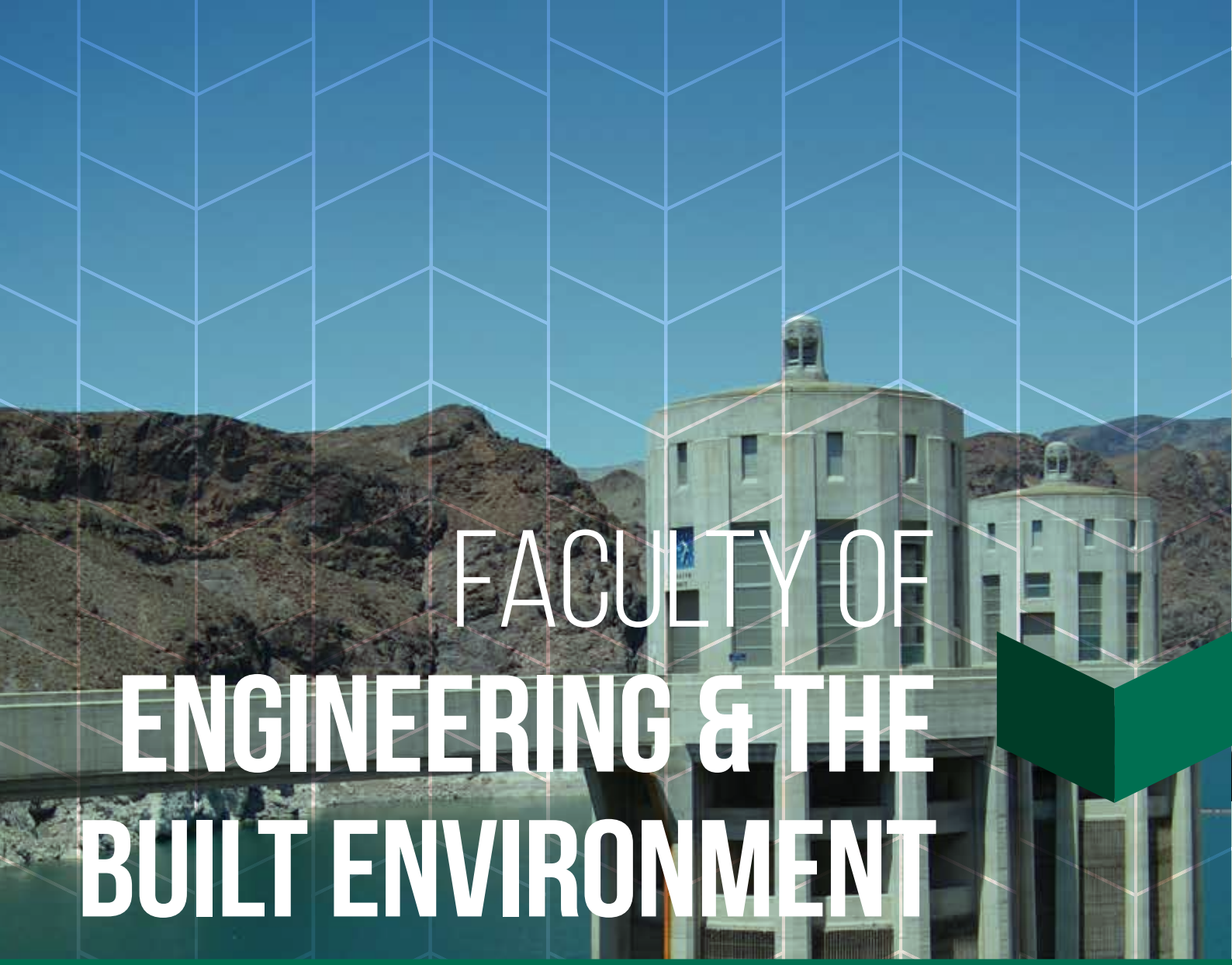


FACULTY OF ENGINEERING & THE BUILT ENVIRONMENT

The Faculty of Engineering & the Built Environment has emerged from a five-year strategic planning cycle and significant strides have been made towards our goal of establishing it as the faculty of choice for national and international staff and students. Investment in new buildings and the refurbishment of laboratories have improved the research space and infrastructure.

DEAN'S REPORT
PROFESSOR FRANCIS PETERSEN

HAVING A STRONG AND INTERNATIONALLY COMPETITIVE RESEARCH AND INNOVATION AGENDA WILL ALWAYS BE AT THE HEART OF STRATEGIC PLANNING FOR THE FACULTY.

51
NRF-RATED RESEARCHERS

R135.42M
VALUE OF **RESEARCH CONTRACTS**

1198
REGISTERED **POSTGRADUATES**

Research in the Faculty of Engineering & the Built Environment continues to go from strength to strength. In the past year, a number of sophisticated analytical instruments have been purchased to assist various research groups in their work. The Department of Chemical Engineering received a new R14 million FEI QEMSCAN (quantitative evaluation of minerals by scanning electron microscopy) 650F as well as a high-resolution scanning electron microscope (see p156).

The new geotechnical laboratory in the Department of Civil Engineering has recently gone from a manual laboratory to a fully automated one, thanks to a grant from the Department of Higher Education and Training and the University Equipment Committee. The Department of Electrical Engineering has purchased a R3.5 million 10 MHz to 67 GHz Agilent PNA-X N5247A network analyser, which is an instrument used to measure and characterise electronic devices, antennas and systems, such as components and systems relating to radar, radio astronomy and telecommunications.

The high quality of research in the faculty is reflected in an increase in the number of peer-reviewed publications in international journals, and the international recognition that members of staff enjoy in their areas of research. A number of staff received international awards for their research, have been elected onto committees of local professional bodies, and serve on the editorial and advisory boards of various international journals and conferences. Clinton Hindes and Liana Müller

(School of Architecture, Planning and Geomatics) received an Award of Excellence in the category "Publications and Research" from the Institute for Landscape Architecture of South Africa for the book pair *South African Landscape Architecture: A compendium* and *A reader.* Dr Denis Kalumba (Department of Civil Engineering) was appointed to the South African Bureau of Standards national working committee to draft the new South African Geotechnical Design Standard. The best presentation award at the World Gold Conference in Brisbane went to Dr Megan Becker (Minerals to Metals Initiative, Department of Chemical Engineering). Associate Professor Neil Armitage (Department of Civil Engineering) received an award from the Water Research Commission for "Human Capital Development in the Water and Science Sectors".

Interdisciplinary thinking and activity have become firmly embedded in the objectives of the Centre for Research in Computational and Applied Mechanics (CERECAM), which has grown into a research centre comprising 13 full-time academic staff members from six departments and three faculties. In 2013, CERECAM had 21 doctoral and 14 master's students, who were drawn from all the member departments.

The DST/NRF South African Research Chairs Initiative (SARChI) is a flagship initiative of government designed to attract and retain excellence in research and innovation at South African universities. The faculty is proud that its total number of DST/NRF SARChI chairs increased to seven when Professor Arnaud Malan took up his chair in 2014. Four additional research chairs in the faculty are supported by industry.

The DST/NRF Centre of Excellence in Catalysis (c*change) has undergone its second five-year review and the DST/NRF has confirmed an additional five years of funding. A total of 20 projects were funded during the course of 2013, of which 13 were multi-institutional and/or interdisciplinary projects. The centre has been awarded a DST/NRF SARChI Chair, which is expected to boost its scientific output.

National Research Foundation (NRF) ratings in the faculty have grown significantly over the past years, with 51 rated researchers at the end of 2013. It is exciting to see such a high number of young academics who have received ratings for their research and that the participation in the Emerging Researcher Programme continues to grow: a total of 79 researchers from the faculty have participated in the programme to date. The number of research contracts has increased significantly from 295 in 2012 to 395 in 2013. There has been a drive to grow our research and innovation output and with this in mind, a number of new master's programmes have been introduced into the faculty, which will have spin-offs in the form of research contracts and income. A new transdisciplinary and inter-institutional Master of Philosophy specialising in Sustainable Mineral Resource Development was developed as part of the Education for Sustainable Development in Africa project convened by the United Nations University for Sustainability and Peace. It is based in the Department of Chemical Engineering, in partnership with the University of Zambia and the United Nations University in Japan. A multidisciplinary research-based MPhil programme in space studies is recruiting students with strong backgrounds in engineering, science, law and commerce. It is based in the Department of Electrical Engineering and exposes participants to all the key aspects of space science and technology. The MEng programme specialising in nuclear power provides an interdisciplinary postgraduate qualification in the key aspects of nuclear power for societal benefit: it encompasses the scientific, engineering and applications aspects of nuclear power, including the policy-operating, safety and regulatory aspects. The Department of Civil Engineering introduced an MEng and MSc Eng in Civil Infrastructure Management and Maintenance as well as an MSc in Geotechnical Engineering.

THERE HAS BEEN A DRIVE TO GROW OUR RESEARCH AND INNOVATION OUTPUT.

The Department of Electrical Engineering hosted a workshop on high-performance signal processing, funded by the South African MeerKAT project, which allowed engineers and scientists to share thoughts on some of the technology underpinning high-performance computing.

The HySA/Catalysis Competence Centre co-hosted a workshop with Germany's Centre for Fuel Cell Technology. The workshop was on "Proton Exchange Membrane Fuel Cell Systems in South Africa: Supply chain opportunities and platinum-group metals beneficiation". Representatives from industry, government and academia from both countries met to see how they could chart collaborations in the field of hydrogen and fuel cell technology.

With an eye to future collaboration, the Flotation Research Group in the Department of Chemical Engineering hosted a joint student Flotation Day with the University of Queensland (UQ), Australia.

ROYAL SOCIETY HONOUR FOR CIVIL ENGINEERING PROFESSOR

Alphonse Zingoni, Professor of Structural Engineering and Mechanics in the Department of Civil Engineering, was invited by the Royal Society of the United Kingdom in February 2013 to present his work on symmetry and applications of group theory in structural mechanics at one of the themed meetings of the Royal Society.

The only civil engineer among a distinguished group of mathematicians, physicists, chemists and engineers, and the only speaker from Africa, Zingoni explained how the mathematical concepts of group theory, exploited for many years by physicists and chemists to study problems in crystallography, quantum mechanics and molecular symmetry, could also be successfully applied in engineering.

According to Zingoni, not only can group-theoretic formulations vastly reduce computational effort (an important consideration in large-scale engineering problems), but they can also allow researchers to gain valuable insights into complex phenomena in engineering mechanics such as bifurcation, stability, vibration and non-linear dynamics. Such insights greatly enhance the capacity to predict unfavourable or catastrophic behaviour in engineering systems, making it possible to design these systems more safely and more effectively.

The written version of Zingoni's lecture has recently been published as a research paper in the prestigious *Philosophical Transactions* of the Royal Society, which was founded in 1662, and is the oldest scientific journal in the world.

In 2013, there were 1 198 postgraduate students registered in the faculty. Of these, 599 students received awards to the value of R33 744 581, with a large percentage of the funding coming from donations and external funders. There are 23 postdoctoral research fellows in the faculty, with 11 of them in their first year of research.

Postgraduate students were rewarded for their excellent work. Phillippa Hedley, a 2012 Master of Landscape Architecture graduate, received Corobrik's Most Innovative Final Year Landscape Architecture Project Award for her thesis on disused landscapes and the potential of damaged sites for redevelopment. Electrical Engineering PhD student Chris de Beer received a best paper award at the international conference sponsored by the Industrial Technology Industrial Electronics Society. Janine Loubser, a 2012 City and Regional Planning master's graduate, received the Royal Town Planning Institute's Education Award 2013 for excellence in spatial planning research – student entry. Mehdi Safari, a PhD student in the Centre for Minerals Processing, received first prize for the best student presentation and poster at MinProc 2013, the "Southern African Mineral Beneficiation and Metallurgy Conference". Doctoral student Petro Ernest (Communications Research Group) won one of three best paper awards at the 16th "Southern Africa Telecommunication Networks and Applications Conference". Drewan Sanders, a master's student in the Aeronautical Research Group, received the best paper award at the "International Aerospace Conference of South Africa". Another master's student, Mfundo Vezi (Department of Civil Engineering), attended the "South African National Committee on Large Dams Conference" where he was awarded a prize for the best-prepared and presented paper.

The Initiative for Public Good, co-ordinated by Emeritus Professor Duncan Fraser, continues to look at the development of new research projects that have wider socio-economic benefits. Bringing our research and training programmes in line with the developmental needs of society and industry guarantees that our work will remain relevant and attractive to funders. To this end, much has been achieved, and we will, through our inter- and transdisciplinary work, build on the excellence, visibility and impact of our research and innovation. Having a strong and internationally competitive research and innovation agenda will always be at the heart of strategic planning for the faculty. Part of our strategy over the next five years is to enable the faculty to grow, to link with other institutions, and to create frameworks at various academic levels. Recognising opportunities academically and within industry will stand us in good stead.

PRIZE WINNER

This photograph (left) of Edward Peters, an MSc Chemical Engineering student in the Crystallisation and Precipitation Research Unit, won first prize in the International Year of Water Co-operation category at the South African Science Lens Competition, which was hosted by the South African Agency for Science and Technology Advancement. It was submitted by Cullinan Nicholas of the Diocesan College.

XRD CELL OPENING UP NEW VISTAS FOR CATALYSIS RESEARCH

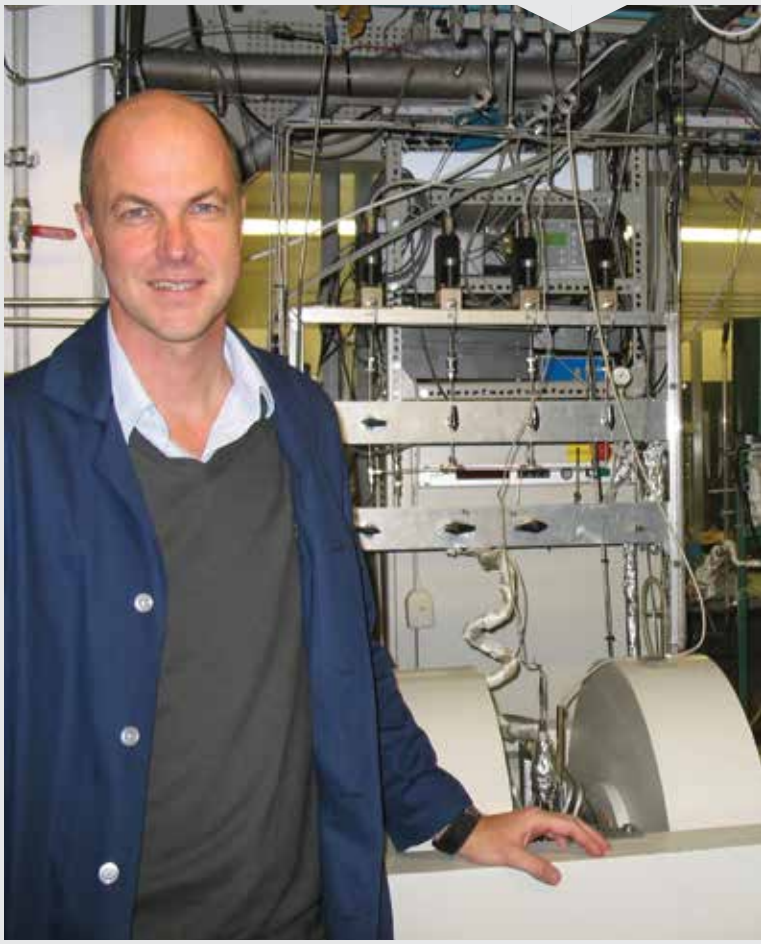
The Department of Science and Technology Catalysis Competence Centre (HySA/Catalysis), co-hosted by the Department of Chemical Engineering at UCT and Mintek, continues to make a research impact with its in situ reaction cell for a commercial X-ray diffractometer (XRD).

In 2013, Professor Michael Claeys, the inventor of the XRD cell, together with co-authors Nico Fischer, Brett Clapham, Theresa Feltes and Eric van Steen, published a paper on the use of the device in the respected *Angewandte Chemie International Edition* – one of the prime chemistry journals in the world with an impact factor of 13.7. The paper was also chosen by the editors as a "hot paper" for its importance in a rapidly evolving field, and artwork depicting the cell's capabilities was included on the journal's back cover.

The in situ XRD cell is proving to be a cutting-edge research tool and can be retrofitted to existing X-ray diffractometers or synchrotrons to enable materials such as catalysts to be studied at elevated temperatures and pressures in changeable gaseous or liquid environments. The construction and design overcome a number of shortcomings that restrict the use of current commercial systems and are opening up new areas of research.

Advantages over commercially available in situ cells include minimised dead volume and the possibility of co-feeding gases such as water vapour.

An automated control system for the XRD cell has been developed, whereby the XRD cell can be controlled remotely using a tablet. This control system is particularly useful for synchrotron applications where the instrument itself cannot be easily accessed during operation. A marketable, industrially designed control box has been fabricated, with a holding place for the tablet. A transportation case for the XRD cell, control box and ancillary items has been manufactured.



Professor Michael Claeys.

Collaborative work is being conducted with local industry using international synchrotron facilities. Two units have been sold internationally, in Europe and Asia, and interest has been expressed by other foreign institutions, including a global diffractometer supplier.

HIGHEST HONOUR IN THE LAND FOR UCT WATER EXPERT

President Jacob Zuma has bestowed the Order of Mapungubwe on UCT wastewater treatment expert Professor George Ekama of the Department of Civil Engineering. The order was conferred on Freedom Day, 27 April 2013, "for research that has provided innovative solutions to enhancing and improving wastewater treatment and helped South Africa find answers to its water shortage problems". Professor Ekama was among several South Africans, including the late Dr Neville Alexander, to be awarded this, the highest recognition in the land.

Professor Ekama is a civil engineer who lives by a simple research credo: "Locally inspired, globally relevant." He has held a National Research Foundation (NRF) A-rating since 2006, which recognises him as a world leader in his field.

After qualifying from UCT in civil engineering, he started work on a construction site, but his interest in wastewater treatment was sparked when he met former UCT Professor Gerrit van Rooyen Marais, an expert in the field, who later became his PhD supervisor. He has remained at the forefront of developments in wastewater treatment ever since, primarily through a strong research group.

He describes his area of research as "fascinating" and says if you are looking for a biological process that needs to take place before treating water, don't give up: "There are bacteria out there that can do amazing things. You are bound to find one."

Widely published, with more than 150 papers on wastewater treatment in top international journals, Professor Ekama is also highly cited. He is one of only seven South Africans to be listed on www.ISIHighlyCited.com, an international website of the most cited academics globally. He is a senior fellow of the Water Institute of South Africa (WISA), and a fellow of the Royal Society of South Africa, of UCT and of the South African Academy of Engineers.

From left: Professor Danie Visser, Dr Rob Schouwstra (Anglo American Technical Solutions), Dr Romilla Maharaj (NRF), Dr Megan Becker, Professor Dave Deglon and Emeritus Professor Cyril O'Connor.

RESEARCH BOOSTER

Research in the Centre for Minerals Research (CMR) was given a shot in the arm in late 2013 with the successful installation of a new R14 million FEI QEMSCAN 650F for automated mineralogy. Funded by the National Research Foundation (NRF) National Equipment Programme and the Centre for Minerals Research, the new instrument was delivered and installed in a custom-built facility for high-end electron microscopes and associated equipment, housed in the New Engineering Building on Upper Campus. It replaces the very successful 14-year-old LEO QEMSCAN (donated to the CMR by Anglo American Platinum), which helped establish the mineralogical analyses capabilities of the CMR. The new QEMSCAN will be run as both a university and a regional facility (with the University of the Western Cape, the Cape Peninsula University of Technology and the University of Stellenbosch) for the acquisition of high-quality mineralogical data that will be used for world-class research across a broad range of disciplines.

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DOCTORAL GRADUATIONS

E.O. AKROFI (GEOMATICS)
Assessing customary land administration systems for peri-urban land in Ghana
Supervised by Associate Professor J. Whittal

H. APPA (CHEMICAL ENGINEERING)
Numerical modelling of hydrodynamics, gas dispersion and mass transfer in an autoclave
Supervised by Professor D. Deglon and Professor C. Meyer

I.N. BANDA (CONSTRUCTION ECONOMICS AND MANAGEMENT)
Institutional mechanisms for water supply to informal settlements in Zambia: a grounded theory approach
Supervised by Associate Professor K. Michell and Professor K.S. Cattell

L. BBOSA (CHEMICAL ENGINEERING)
Probability based models for the power draw and energy spectra of a tumbling mill
Supervised by Dr A. Mainza and Dr I. Govender

K.J. CARDEN (CIVIL ENGINEERING)
A measure of sustainability in the context of urban water management in South Africa
Supervised by Associate Professor N. Armitage

W. COETZEE (CHEMICAL ENGINEERING)
Development of a computationally efficient bubble column simulation approach by way of statistical bubble micro-flow modelling
Supervised by Dr R. Rawatlal and Dr R. Coetzer

J. ENGELBRECHT (ELECTRICAL ENGINEERING)
Parameters affecting interferometric coherence and implications for long-term operational monitoring of mining-induced surface deformation
Supervised by Professor M. Inggs

R. JOBANPUTRA (CIVIL ENGINEERING)
An investigation into the reduction of road safety risk in Cape Town through the use of microscopic simulation modelling
Supervised by Associate Professor M. Vanderschuren

D.V.V. KALLON (CHEMICAL ENGINEERING)
Circulation rate modelling of tumbling mill charge using Positron Emission Particle Tracking (PEPT)
Supervised by Dr I. Govender and Associate Professor A.N. Mainza

D. KOBEL (CIVIL ENGINEERING)
Quantifying the value of non-user benefits of improving water and sanitation in informal settlements
Supervised by Associate Professor R. Del Mistro

E. MAZIMPAKA (MECHANICAL ENGINEERING)
Woodfuel in Rwanda: impact on energy, poverty and the environment
Supervised by Dr G. Prasad

N. MOODLEY (ELECTRICAL ENGINEERING)
Power transformer health assessment derived from low energy and dissolved parameters
Supervised by Professor T. Gaunt

N. MOORUTH (CHEMICAL ENGINEERING)
An investigation towards passive treatment solutions for the oxidation of sulphide and subsequent removal of sulphur from acid mine water
Supervised by Dr R. Van Hille

R. NADJIASNGAR (ELECTRICAL ENGINEERING)
On improving the performance of Gauss-Newton filter
Supervised by Professor M. Inggs

B.N. NDLOVU (CHEMICAL ENGINEERING)
The effect of phyllosilicate mineralogy and surface charge on the rheology of mineral slurries
Supervised by Professor D. Deglon, Dr M. Becker and Dr E. Forbes

O.A. OLAOFE (CHEMICAL ENGINEERING)
A bioprocess approach for enhanced biocatalytic activity and efficiency of whole cell escherichia coli expressing alkane hydroxylase CYP153A6 for terminal hydroxylation of n-octane
Supervised by Professor S. Harrison and Professor M. Smit

B.V. SOUBACHOV (ELECTRICAL ENGINEERING)
Pilot patterns and power loading in NC-OFDM cognitive radios
Supervised by Mr N. Ventura

PATENTS

Filed applications

Brijlal, Y., John, L.R., Sivarasu, S. Hand Exoskeleton. PCT Patent Application PCT PCT/IB2013/059809.

Gaunt, C.T., Malengret, M. Optimal Currents for Power Injection or Extraction in a Power Network. Provisional Patent Application Britain 1322487.8.

Ginsberg, S.I., Parsons, A.T., Vicatos, G. An Endoprosthesis. National Phase Patent Application United States 14/127,933.

Hill, J., Hoffmann, J.J., Kloot, B.C, Molteno, M., Shelley, M. Hydraulic Pruning Shears. Provisional Patent Application Britain 1319686.0.

Hussain, N., Levecque, P.B.J, Tanaka, S. A Clamp Assembly for a Fuel Cell Stack and a Method of Assembling a Fuel Cell Stack. Provisional Patent Application Britain 1320838.4.

Inggs, M.R., Mishra, A.K., Wilson-Langman, A. An Integrated Commensal Radar System. Provisional Patent Application South Africa 2013/01224.

Mishra, A.K., Montsi, T.S. Imaging an Internal Volume of a Subject Body. Provisional Patent Application Britain 1322092.6.

Vicatos, G. Rotating Hinge Knee Prosthesis. PCT Patent Application PCT PCT/IB2013/051728.

Granted applications

Bradshaw, D.J., Newell, A.J.H. Sulfidisation Process and Apparatus for Enhanced Recovery of Oxidised and Surface Oxidised Base and Precious Metal Minerals. National Phase Patent Application ARIPO AP/P/2009/004867.

Bradshaw, D.J., Newell, A.J.H. Sulfidisation Process and Apparatus for Enhanced Recovery of Oxidised and Surface Oxidised Base and Precious Metal Minerals. National Phase Patent Application Australia 2007320759.

Claeys, M.C.M., Rausch, A., Rößner, F., van Steen, E.W.J. A Process for the Production of Hydrocarbons Including Olefins from Synthesis Gas. National Phase Patent Application United States 12/937,694.

Claeys, M.C.M., Rößner, F., Sango, T., van Steen, E.W.J. A Process for the Production of Nitrogen or Phosphorous Containing Compounds from Synthesis Gas. National Phase Patent Application United States 12/988,052.

Etienne-Cummings, R.R., Folowosele, F.O., Tapson, J.C., Tenore, F.V.G., Vismer, M.P. Neuromorphic Cross-correlation Engine. National Phase Patent Application United States 12/467,759.

Golovins, E. A Method for Improving Channel Estimation Performance in dynamic spectrum access multicarrier systems. National Phase Patent Application South Africa 2012/03925

Holder, D., McEwan, A., Tapson, J.C., van Schaik, A. System and Method for Conducting Multiplexed Electrical Impedence Tomography. National Phase Patent Application South Africa 2010/04425.

Holder, D., McEwan, A., Tapson, J.C., van Schaik, A. System and Method for Conducting Multiplexed Electrical Impedence Tomography. National Phase Patent Application United States 12/477,734.

Lusilao-Zodi, G-A., Morrison, N. A System and Method for Estimating Round-Trip Time in Telecommunication Networks. National Phase Patent Application South Africa 2012/05903.

SCHOOL OF ARCHITECTURE, PLANNING AND GEOMATICS

(Including the African Centre for Cities)

Director: Associate Professor Alta Steenkamp

School Profile

Within the School of Architecture, Planning and Geomatics, research work includes conventional research and applied research as well as creative work. This takes place within the actively teaching divisions within the School, as well as within dedicated research units. In the Architecture and Planning programmes these research endeavours include areas of enquiry such as urban design, architectural design, architectural education, digital technology, contemporary architectural theory and practice, planning theory, urban conservation, urban transport policy and urban informality.

The ethos of this School is also strongly influenced by our context: the physical context, the city, and the broader social/cultural/economic context of the region and the country. We are committed to engage with these contexts in both a meaningful and critical way, not as abstract sites for investigation but rather as peopled places to which we can respond.

The Geomatics Division within the School undertakes research in a variety of areas. These include documentation, modelling and visualization of African heritage sites, close-range photogrammetry, laser scanning of architectural structures and remote sensing of the environment; issues relating to land surveying, ownership, registration and tenure; modeling of the shape of the Earth (geoid) using gravity and satellite data, applications of GPS and modeling of datum transformations in Africa; applications of remote sensing and geographic information systems (GIS) to urban, agricultural and environmental monitoring. Spatial data infrastructure (SDI) development for integrated development planning (IDP) in sub-Saharan African cities.

Research Units and Groups

African Centre for Cities

Known colloquially by the acronym 'ACC', the Centre has established an impressive international profile and reputation as a dynamic home for analysis of urban problems and policies. Its interdisciplinary brand gives the ACC huge potential to facilitate urban conversations and inquiry throughout UCT.

'CityLabs', a new model of engaged and applied research, were created to address pressing concerns in Cape Town, including flooding, urban health, densification, ecology, and climate change. New Labs on violence, culture and human settlements have been launched. The ACC partners with international research units studying food security, and women's informal employment. Honours for ACC include its (renewed) status as a UCT 'Signature Theme' and a Rockefeller Innovation Award.

School Statistics

Permanent and Long-term Contract Staff

Professors	5
Associate Professors	6
Senior Lecturers	10
Lecturers	9
Technical Support Staff	9
Administrative Staff	12
Total	**51**

Students

Doctoral	16
Master's	104
Honours	53
Undergraduates	324
Total	**497**

Research Fields and Staff

DR MAHMOUD ABDEL-GELIL
Senior Lecturer: Geomatics. Gravity data analysis, GPS, Geodesy and geophysics.

FRANCIS CARTER
Senior Lecturer: Architecture. Curriculum theory in relation to undergraduate built environment design programmes; theories of making, with reference to contemporary South African architecture; programming for new knowledge space.

ASSOCIATE PROFESSOR NICHOLAS COETZER
Architecture. Architectural design; contemporary architectural history and theory; digital technology.

ALBERTRUM CROWDER
Lecturer: Architecture. Specializes in the area of cultural heritage conservation. His research focuses on the inherent values that people associate with their environment and the possibility for this to help promote sustainable cultural heritage conservation and development.

KEVIN FELLINGHAM
Senior Lecturer: Architecture. Interdisciplinary research, practice and design.

DR MATTEO FRASCHINI
Senior Lecturer: BAS Programme

DR RAMESH GOVIND
Senior Lecturer: Geomatics Programme

CLINTON HINDES
Senior lecturer: Landscape Architecture. History and theory of landscape architectural design and its application to teaching and practice. Documenting the history of South African landscape architecture.

SIMON HULL
Lecturer: Geomatics. Digital photogrammetry for heritage documentation, fields of land tenure reform, disaster management using remote sensing and GIS, heritage documentation, and improving education.

FADLY ISAACS
Lecturer: Architecture. (Measuring) urban settlement quality, integrating strategic urban infrastructure investment.

TANIA KATZSCHNER
Lecturer: Planning. Education for sustainable development, sustainable urban systems, creating and nurturing educational systems that serves human needs while also protecting our resources for future generations, trans-disciplinarity and systems thinking.

MS TARNA KLITZNER
Part time Lecturer – MLA Proramme

SIMONE LE GRANGE
Lecturer: Architecture. Architectural design, Academic Development Lecturer.

MIKE LOUW
Lecturer: Architecture. Sustainable architecture and urbanism, architectural history and materiality.

PROFESSOR IAIN LOW
Architecture. Space and transformation; critical thinking / practice and the 're-writing' of architectural type; post apartheid South African condition: urbanism, the 'new' public realm, contemporary dwelling and architectural pedagogy.

PROFESSOR JO NOERO
Architecture.

DR NANCY ODENDAAL
Senior Lecturer: Planning. Relationship between Information and Communication Technology and urban transformation, metropolitan planning, planning theory and infrastructural transitions in cities of the Global South. Commissioned research on planning and transformation, land use management and planning standards.

STELLA PAPANICOLAOU
Lecturer: Design, the tension between meaning and the production of space in architectural practice and education; developing tools for critical thinking to enhance the creative process in architectural education.

PROFESSOR EDGAR PIETERSE
Director: African Centre for Cities, and holder of a DST/NRF SARChI Research Chair. Promoting new approaches to urban development in South Africa and Africa, in collaboration with partners from the global South.

PROFESSOR GORDON PIRIE
Deputy Director: African Centre for Cities. Geographer, principal research field of transportation and travel.

MR JULIAN RAXWORTHY
Senior Lecturer – MLA Programme

DR TOM SANYA
Senior Lecturer: Architecture. Sustainable Habitat Innovations (SusHI), systems theory in sustainable architecture evaluation with particular focus on Africa. Sustainability evaluation tool (emerging from PhD). Design and making Epistemology – in Search of an Afro-centric perspective via the African Informal Settlement.

MS MELINDA SILVERMAN
Senior Lecturer – MArch Programme

DR GEORGE SITHOLE
Senior Lecturer: Laser altimetry, photogrammetry, 3D object reconstruction.

ASSOCIATE PROFESSOR JULIAN SMIT
Geomatics. Application of remote sensing, photogrammetry and geographic information systems for land and environmental management.

ASSOCIATE PROFESSOR ALTA STEENKAMP
Director: School of Architecture, Planning & Geomatics. History and theory of Southern African architecture and its relation to the global environment.

ADJUNCT ASSOC PROF STEPHEN TOWNSEND
Convenor – M Phil in Conservation of the Built Environment

PROFESSOR VANESSA WATSON
Planning. Planning theory; governance; housing; urbanization; large city planning.

ASSOCIATE PROFESSOR JENNY WHITTAL
Geomatics. Land tenure and cadastral systems, specialising in land for the urban poor and fiscal cadastral systems and reform.

DR TANJA WINKLER
Senior Lecturer: Planning. Current research interests include critically assessing "the voice of the poor" in urban governance and public decision making processes. Ongoing research on civil society, poverty, and inner city regeneration.

Research Associates

EMERITUS PROFESSOR JULIAN COOKE
Contemporary South African architecture.

EMERITUS PROFESSOR DAVID DEWAR
Former Deputy Dean of the Faculty of Engineering and the Built Environment; BP Chair of Planning; urban structure and form; place making; informal housing; housing policy; informal economic development; public space; regional planning and development.

EMERITUS PROFESSOR LUCIEN LE GRANGE
Urban Conservation Policy; Urban Design; Mission Settlements in South Africa; Documenting modern architecture in Cape Town. Contemporary Architecture – Theory and Practice.

EMERITUS PROFESSOR FABIO TODESCHINI
Architect, city planner, urban designer, heritage practitioner.

EMERITUS PROFESSOR HEINZ RÜTHER
Digital close range and aerial photogrammetry; precise engineering surveying; geographic information systems; visualisation and 3D modeling.

EMERITUS ASSOCIATE PROFESSOR CHARLES MERRY
Earth's gravity field; global positioning system; co-ordinate transformations.

MR BARRIE GASSON
Ecologically sustainable cities; regional planning and development.

Contact Details

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SA (21) 650-2383
Planning: Tel: SA (21) 650-2359 and Fax:
SA (21) 689-9466
Geomatics: Tel: SA (21) 650-3577 and Fax:
SA (21) 650-3572
Webpage: http://www.apg.uct.ac.za

Research Output

Authored books

Coetzer, N.R. 2013. Building Apartheid on Architecture and Order in Imperial Cape Town. 242pp. England: Ashgate Publishing. ISBN 9781409446040.

Edited books

Pieterse, E.A. and Simone, A. (eds) 2013. Rogue Urbanism-Emergent African Cities. 489pp. Auckland Park: Jacana Media (Pty) Ltd. ISBN 9781431406234.

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Battersby, J. 2013. Urban agriculture and race in South Africa. In R. Slocum and A. Saldanha (eds), Geographies of Race and Food: Fields, Bodies, Markets, pp. 117-135. England: Ashgate Publishing. ISBN 9781409469254.

Cartwright, A. 2012. Can mega events deliver sustainability? The case of the 2012 FIFA World Cup in South Africa. In W. Maennig and A. Zimbalist (eds), International Handbook on the Economics of Mega Sporting Events, 13pp. United Kingdom: Edward Elgar Publishing. ISBN 9780857930262.

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Pieterse, E.A. 2013. Development, planning and sustainability. The Ashgate Research Companion to Planning and Culture, pp. 239-255. United Kingdom: Ashgate Publishing. ISBN 9781409422242.

Pieterse, E.A. and van Donk, M. 2013. Local government and poverty reduction. In U. Pillay, G. Hagg and F. Nyamnjoh (eds), State of the Nation: South Africa 2012-2013, pp. 98-123. South Africa: HSRC Press. ISBN 9780796924223.

Sibolla, B. and Smit, J.L. 2013. A GIS based approach to embedded fire modelling: a South African case study. Earth Observation of Global Changes (EOGC), pp. 235-254. New York: Springer Berlin Heidelberg. ISBN 9783642327148.

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Articles in peer-reviewed journals

Akrofi, E.O. and Whittal, J.F. 2013. Compulsory acquisition and urban land delivery in customary areas in Ghana. South African Journal of Geomatics, 2(4): 280-295.

Anderson, P.M.L., Brown-Luthango, M.M., Cartwright, A., Farouk, I. and Smit, W. 2013. Brokering communities of knowledge and practice: reflections on the African centre for Cities' CityLab programme. Cities, 32: 1-10.

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Shoko, M. and Smit, J.L. 2013. Use of agent based modelling to investigate the dynamics of slum growth. South African Journal of Geomatics, 2(1): 54-67.

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Winkler, T.A. 2013. At the coalface: community-university engagements and planning education. Journal of Planning Education and Research, 33(2): 215-227.

Winkler, T.A. 2013. Why won't downtown Johannesburg 'regenerate'? Reassessing Hillbrow as a case example. Urban Forum, 24(3): 309-324.

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Isaacs, F. 2013. Socio-spatial dialectics within Langa, the first black township in Cape Town, 1923-1960. In Y.O. Kim, H.T. Park and K.W. Seo (eds), Proceeding of 9th International Space Syntax Symposium (SSS9), 2013, Seoul. Republic of Korea: Sejong University Press. ISBN 9788986177213.

Creative Works

Artistic works

Farouk, I. 2013. Smaaklik: Permanent public artwork, produced for the City of Ghent and Africalia, located at Jenaplan De Kleurdoos.

Low, I. 2013. Digest of SA Architecture.

Noero, M.F.J. 2013. Design exhibition work published in catalogue - Energetic Architecture. Commissioned by Published by Maxxi.

Noero, M.F.J. 2013. Invited to give lecture at CAA world congress in Bangladesh - unable to deliver lecture because of political unrest in Bangladesh at the time. April 2013.

Noero, M.F.J. 2013. Keynote lecture at Biennial Congress of Sri Lanka Institute of Architects. March 2013.

Noero, M.F.J. 2013. Lecture - Alghero School of Architecture, Sardinia, Italy. March 2013.

Noero, M.F.J. 2013. Public lecture - Limits of Architecture at Museum of Architecture, Munich. September 2013.

Noero, M.F.J. 2013. Received award of merit for 2013 from the Cape Institute for Architecture for Extensions to St Cyprians School in Oranjezicht, Cape Town.

Noero, M.F.J. 2013. Work published in catalogue - Africtecture - published by the Museum of Architecture, Munich.

Exhibitions

Noero, M.F.J. 2013. Exhibition of work - Alghero School of Architecture. Sardinia, Italy 01/03/2013 to 01/06/2013.
Noero, M.F.J. 2013. Productive republic for the exhibitions. Maxxi National Museum of contemporary Art and Architecture in Rome 01/03/2013 to 01/11/2013.
Noero, M.F.J. 2013. Work exhibited entitled 'Afritecture'. Museum of Architecture in Munich, Germany 01/09/2013 to 01/01/2014.

DEPARTMENT OF CHEMICAL ENGINEERING

(Including the Centre for Bioprocess Engineering Research (CeBER), the Centre for Catalysis Research, c*change – DST-NRF Centre of Excellence in Catalysis, *HySA/catalysis* – National Hydrogen Catalysis Competence Centre, the Centre for Minerals Research, the Centre for Research in Engineering Education and the Crystallization and Precipitation Research Unit)

Head of Department: Professor Alison E Lewis

Departmental Profile

The vision of The Department of Chemical Engineering is to be "A Beacon in Education and Research", which we aim to fulfil through our combined undergraduate and postgraduate programmes. The undergraduate programme is accredited by the Engineering Council of South Africa, whilst the undergraduate and postgraduate programmes both have national and international recognition for their high quality graduates.

Our postgraduate programme is the largest academic research activity in Chemical Engineering in Africa and is based on a strong link between fundamental research and its application to the solution of industrial and applied problems.

The research programme is focussed around five University-accredited research groupings in Bioprocessing, Catalysis, Crystallization & Precipitation, Engineering Education and Minerals Processing. The department also has strong research interests in Environmental Process Engineering and Process Modelling. The Chemical Engineering Department also hosts the DST-NRF Centre of Excellence in Catalysis, the DST Hydrogen Catalysis Centre of Competence, the South African Minerals to Metals Research Institute (SAMRI), four DST/NRF SARChI chairs: Minerals Beneficiation, Bioprocess Engineering, Nano-Materials for Catalysis and Reaction Engineering, as well as the Anglo American Platinum Chair in Minerals Processing.

Departmental Statistics

Professors	10
Associate Professors	3
Senior Lecturers	5
Lecturers (contract)	1
Assistant Lecturers (contract)	11
Research Staff (permanent)	14
Research Staff (contract)	3
Senior Research Scholar	1
Technical & Scientific Staff (permanent & Long-term Contract)	28
Technical & Support Staff (contract)	10
Administrative and Clerical Staff (permanent)	19
Administrative and Clerical Staff (contract)	10
Total	**115**

Honorary Staff

Honorary Professor	1
Honorary Adjunct Professors	2
Total	**3**

Students

Doctoral	57
Master's	80
BSc(Eng) including Aspect	521
Total	**658**

Research Fields and Staff

Academic staff and research fields

DR LAWRENCE BBOSA
Centre for Minerals Research - Comminution, DEM modelling

MR PAUL BEPSWA
Centre for Minerals Research - Metal Accounting, Comminution

DR MEGAN BECKER
Centre for Minerals Research - Process Mineralogy

MR WALTER BÖHRINGER
Centre for Catalysis Research - Acid catalysis

DR JENNIFER BROADHURST
Minerals to Metals Signature Theme - Environmental sustainability of mineral beneficiation processes

DR ROALD BROSIUS
Centre for Catalysis Research - Diesel selective and gasoline/kerosene selective catalytic synthetic fuel processes; noble metal promoted zeolite catalysts for Fischer-Tropsch compatible hydrocracking catalysts; hierarchically and/or nano-structured zeolite catalysts for combined FT synthesis and fuels upgrading in micro-channel and continuously stirred tank reactors

PROFESSOR JENNI CASE
Centre for Research in Engineering Education - Student experience of learning in science and engineering

PROFESSOR MICHAEL CLAEYS
Centre for Catalysis Research - Director DST/NRF Centre of Excellence in Catalysis (c*change), Fischer-Tropsch synthesis, in-situ catalyst characterization, nano-materials

DR OLAF CONRAD
Centre for Catalysis Research - Director HySA/Catalysis

DR KIRSTEN CORIN
Centre for Minerals Research - Flotation Chemistry

PROFESSOR DAVID DEGLON
Centre for Minerals Research - Flotation Cells, CFD Modelling, Metal Accounting

PROFESSOR MARK DRY
Centre for Catalysis Research – Fischer-Tropsch (FT) catalytic processes, production of synthesis gas

DR CARYN FENNER
Centre for Bioprocess Engineering Research - Production of fine chemicals and commodity bioproducts, product optimisation and induction; production of affordable, modern biopharmaceuticals and chemicals; production of industrial, development and optimisation of bio-analytical procedures

PROFESSOR JACK FLETCHER
Director of the Centre for Catalysis Research – Contract Director National Hydrogen Catalysis Competence Centre (HySA/Catalysis) - catalysis by noble metals, zeolite catalysed conversion of phenol and derivatives, wax hydrocracking, shape selectivity in zeolites and molecular sieves, hydrogen processors and fuel cells

PROFESSOR JEAN-PAUL FRANZIDIS
SA Research Chair in Minerals Beneficiation, Director of Minerals to Metals Signature Theme - Integrating and expanding capacity in minerals beneficiation research

DR INDRESAN GOVENDER
Centre for Minerals Research - Comminution, DEM Modelling, PEPT

MR MARTIN HARRIS
Centre for Minerals Research - Flotation Circuit Modelling

PROFESSOR SUE HARRISON
SA Research Chair in Bioprocess Engineering, Director of the Centre for Bioprocess Engineering Research - Interaction of micro-organisms with the environment; microbial community dynamics in planktonic and sessile environments; biokinetics and metabolic modelling of biomass and bioproducts. The above is applied to the fields of: alkane biotechnology, biomanufacture of pigments, enzymes and nutraceuticals, yeast handling, mineral bioleaching through heap and tank processes, Acid Rock Drainage (ARD) prevention, ARD remediation through sulphate reduction, wastewater bioprocessing, algal bioprocesses for bioenergy and fine chemicals, Bioprocess design and evaluation for sustainable process engineering

MR HILTON HEYDENRYCH
Crystallization & Precipitation Research Unit - Development of a systematic approach for the treatment of effluent water streams using multi-criteria evaluations and comparisons of simulated processes to develop new heuristic principles for the design of water treatment processes. Chemical engineering education curriculum design and the analysis of throughput issues

MR NABEEL HUSSAIN
Centre for Catalysis Research - Design and development of catalytic components and devices for low temperature fuel cells

DR ADENIYI ISAFIADE
Environmental and Process Systems Engineering - Process design and optimization

DR MADELYN JOHNSTONE-ROBERTSON
Centre for Bioprocess Engineering Research - Enzyme production, wastewater biorefineries, biopolymer production, integrated bioprocess development

DR PIETER LEVECQUE
Centre for Catalysis Research - Electrocatalysts for fuel cells and high throughput catalyst preparation

PROFESSOR ALISON LEWIS
Director of the Crystallization & Precipitation Research Unit - Industrial precipitation and crystallization, product and particle analysis; process control for optimised product quality; crystallization process development; aqueous chemistry modelling of speciation, thermodynamic equilibria, hydrodynamic and population balance modelling of precipitation systems; water treatment through crystallization, eutectic freeze crystallization

MR NIELS LÜCHTERS
Centre for Catalysis Research - High throughput experimentation, parallel preparation of heterogeneous catalysts, high throughput methodology for fuel processing research

DR AUBREY MAINZA
Centre for Minerals Research - Comminution, Classification, CFD/DEM Modelling, PEPT

DR BELINDA MCFADZEAN
Centre for Minerals Research - Flotation Chemistry

DR ANDREW MCBRIDE
Centre for Minerals Research - Comminution, CFD/DEM Modelling

PROFESSOR KLAUS MÖLLER
Process Modelling and Optimisation Group - Multiphase reactor modelling, separator modelling, integrated reaction – separation systems modelling, parameter estimation, modular process and flowsheet feasibility and optimisation. Centre for Catalysis Research – wax hydrocracking modelling, FT process modelling

PROFESSOR CYRIL O'CONNOR
Centre for Minerals Research - Flotation Chemistry

ASSOCIATE PROFESSOR JOCHEN PETERSEN
Centre for Bioprocess Engineering Research - Hydrometallurgy, especially heap (bio) leaching of low grade minerals, heap reactor characterisation and modelling, bio-leaching processes

ASSOCIATE PROFESSOR RANDHIR RAWATLAL
Reactor Engineering with focus on modelling and simulation, mass transfer modelling in the activation of alkanes, multiphase flow, population balances and applications of segregation and compartment models in flow reactors for minerals bio-leaching and polymerization

DR MARCOS RODRIGUEZ PASCUAL
Crystallization and Precipitation Research Unit - Design and implementation of reactors for crystallization and precipitation processes applying thermo - fluid dynamics and non-intrusive optical techniques

MRS JEANNETTE SWEET
Centre for Minerals Research - Comminution, Flotation, Technology Transfer

DR SIEW TAI
Centre for Bioprocess Engineering Research - High-value bioproducts, vaccines and biopharmaceuticals; bioreactor design, cell culture in bioreactors; beer and wine fermentation; metabolic engineering, systems biology

PROFESSOR ERIC VAN STEEN
Centre for Catalysis Research/DST-NRF Centre of Excellence in Catalysis c*change - Fischer-Tropsch synthesis, nano-materials, molecular modelling of heterogeneous catalytic systems, reaction kinetics

MR ANDRIES VAN DER WESTHUIZEN
Centre for Minerals Research - Classification

DR ROB VAN HILLE
Centre for Bioprocess Engineering Research - Mineral biotechnology, algal biotechnology, microbial ecology, carbon cycling, sulphide chemistry and bioremediation, acid mine drainage retention treatment, anaerobic digestion, bioenergy

PROFESSOR HARRO VON BLOTTNITZ
Environmental and Process Systems Engineering - Industrial ecology especially Life Cycle Assessment, waste management and bioenergy, for sustainable development

DR MARK WILLIAMSON
Process Modelling and Optimisation - Development and characterisation of novel sensors for use in combustion processes, computational fluid dynamic modelling of combustion systems and optimisation of heat transfer in ovens, furnaces and driers

MRS JENNIFER WIESE
Centre for Minerals Research - Flotation Chemistry

Honorary staff and associates

HONORARY PROFESSOR DEE BRADSHAW
Centre for Minerals Research - Flotation Chemistry

HONORARY PROFESSOR JIM PETRIE
Environmental and Process Systems Engineering - Decision support systems, sustainable energy systems, industrial ecology

HONORARY ADJUNCT PROFESSOR DAVID WILLIAM WRIGHT
Chemical Engineering Design and Engineering Education

Postdoctoral Fellows

DR ABOYADE AKINWALE
Environmental and Process Systems Engineering - LCA of syngas from co-gasification

DR MARIJKE FAGAN
Centre for Bioprocess Engineering Research - Heap bioleaching studies using non-invasive techniques

DR YOUSEF GHORBANI
Minerals to Metals - Heap leaching technology

DR MELINDA GRIFFITHS
Centre for Bioprocess Engineering Research - Process improvements and economics of large-scale production of Spirulina and other micro-algae

DR ROBERT HENKEL
Centre for Catalysis Research - Two-dimensional gas chromatography GCxGC-TOF, Magnometer

DR ROB HUDDY
Centre for Bioprocess Engineering Research - Investigating the behaviour and ecology of mixed microbial communities in dynamic bioprocess environments

DR RENE LARYEA-GOLDSMITH
Centre for Catalysis Research - Thermal conversion of biomass

DR THANOS KOTSIOPOULOS
Centre for Bioprocess Engineering Research - Liquid-Mineral Contacting for the Optimisation of Heap Leaching and Prevention of Acid Rock Drainage

DR TOBI LOUW
Centre for Bioprocess Engineering Research - Multi-scale mathematical modeling of algae raceway ponds for optimal mass transfer and energy usage

DR PETER MALATJI
Centre for Catalysis Research - Development of bimetallic precious metal catalysts for steam reforming of methane

DR RUSHANAH MOHAMED
Centre for Catalysis Research - Membrane electrode assembly development for PEM fuel cell application

DR QILING NAIDOO
Centre for Catalysis Research - Synthesis core-shell platinum group metal electrocatalysts by different approaches

DR SUZANA SAVVI
Centre for Bioprocess Engineering Research - Redox Biotransformation of n-Octane by Recombinant E. coli

DR MAMOHALE MOHAJANE
Centre for Minerals Research - Collector mineral interactions within flotation

DR DARAMY KALLON
Centre for Minerals Research - Comminution Research

DR MAXILLIAN RICHTER
Centre for Minerals Research - DEM/PEPT

International Visitors

Centre for Minerals Research

PROFESSOR MICHAEL NICOL, SCHOOL OF ENGINEERING AND INFORMATION TECHNOLOGY, MURDOCH UNIVERSITY, WESTERN AUSTRALIA
PROFESSOR STEPHEN SIMUKANGA, VICE CHANCELLOR, UNIVERSITY OF ZAMBIA, ZAMBIA
PROFESSOR LAURINDO DE SALLES LEAL FILHO, UNIVERSITY OF SAO PAULO, BRAZIL
PROFESSOR SANDOVAL CARNEIRO JUNIOR, VALE INSTITUTE OF TECHNOLOGY, BRAZIL
PROFESSOR ERIC FORSSBERG, LULEA UNIVERSITY, SWEDEN
MISS SENNI UUSI-HALLILA, CONTROL ENGINEERING LABORATORY, FACULTY OF TECHNOLOGY, UNIVERSITY OF OULU, FINLAND
MR DARIUS LELLINSKI, FLSHMIDT, UNITED STATES
DR JEWETTE MASINJA, UNIVERSITY OF ZAMBIA

Centre for Catalysis Research

PROFESSOR NI MINGJIANG, DEPARTMENT OF ENERGY ENGINEERING, ZHENJIANG UNIVERSITY JAPAN
PROFESSOR XUGUANG JIANG, DEPARTMENT OF ENERGY ENGINEERING, ZHENJIANG UNIVERSITY JAPAN
MR JOHANN SCHNEIDER-AMMANN, SWISS FEDERAL INSTITUTE OF TECHNOLOGY, SWITZERLAND
PROFESSOR GRAHAM HUTCHINGS, SCHOOL OF CHEMISTRY, CARDIFF UNIVERSITY, UNITED KINGDOM
PROFESSOR HANS NIEMANTSVERDRIET, EINDHOVEN UNIVERSITY OF TECHNOLOGY, NETHERLANDS
MICHAEL EIKERLING, SIMON FRASER UNIVERSITY, CANADA
THOMAS SCHMIDT, PAUL SCHERRER INSTITUTE, SWITZERLAND
GUENTHER SCHERER, PAUL SCHERRER INSTITUTE, SWITZERLAND

Centre for Bioprocess Engineering Research

PROFESSOR JILL BANFIELD, UNIVERSITY OF CALIFORNIA, BERKELEY, UNITED STATES
PROFESSOR JAN CILLIERS, IMPERIAL COLLEGE LONDON, UNITED KINGDOM
PROFESSOR KEVIN GALVIN, UNIVERSITY OF NEWCASTLE, AUSTRALIA
PROFESSOR CHRIS HOWE, UNIVERSITY OF CAMBRIDGE, UNITED KINGDOM
DR STEPHEN NEETHLING, IMPERIAL COLLEGE LONDON, UNITED KINGDOM
PROFESSOR LYNNE MACASKIE, UNIVERSITY OF BIRMINGHAM, UNITED KINGDOM
DR ANGELA MURRAY, UNIVERSITY OF BIRMINGHAM, UNITED KINGDOM
PROFESSOR LILIAN VELASQUEZ, UNIVERSIDAD CATÓLICA DEL NORTE, CHILE
PROFESSOR JOHN VILLADSEN, TECHNICAL UNIVERSITY OF DENMARK
PROFESSOR HENK VILJOEN, UNIVERSITY OF NEBRASKA, UNITED STATES

Crystallization and Precipitation Research Unit

PROFESSOR PATRICE NORTIER, GRENOBLE INP, PAGORA, SAINT MARTIN D'HERES, FRANCE
ROB VANDERMEIJ AND BART DE GRAAF, EFC SEPARATIONS, THE NETHERLANDS

Minerals to Metals Initiative (MtM)

A.PROFESSOR PHILLIP KIRSCH, MINERALS INDUSTRY SAFETY AND HEALTH CENTRE, SUSTAINABLE MINERALS INSTITUTE UNIVERSITY OF QUEENSLAND, AUSTRALIA
PROFESSOR TAKASHI MINO, GRADUATE SCHOOL OF SUSTAINABILITY SCIENCE, UNIVERSITY OF TOKYO, JAPAN
PROFESSOR MASAFUMI NAGAO, GRADUATE SCHOOL OF SUSTAINABILITY SCIENCE, UNIVERSITY OF TOKYO, JAPAN
PROFESSOR MIKE NICOL, SCHOOL OF ENGINEERING AND INFORMATION TECHNOLOGY, MURDOCH UNIVERSITY, WESTERN AUSTRALIA
PROFESSOR MARGIE SCOTT, WH BRYAN MINING AND GEOLOGY RESEARCH CENTRE, SUSTAINABLE MINERALS INSTITUTE, UNIVERSITY OF QUEENSLAND, AUSTRALIA

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Research Output

Authored books

Case, J.M. 2013. Researching Student Learning in Higher Education. A social realist approach. 153pp. Oxfordshire, UK: Routledge Taylor & Francis. ISBN 9780414662345.

Chapters in books

Griffiths, M. 2013. Microalgal cultivation reactor systems. In F. Bux (ed), Biotechnological applications of microalgae. Biodiesel and value-added products, pp. 51-75. Boca Raton, Florida: CRC Press, Taylor & Francis Group. ISBN 9781466515291.

Harrison, S.T.L., Richardson, C. and Griffiths, M. 2013. Analysis of microalgal biorefineries for bioenergy from an environmental and economic perspective focus on algal biodiesel. In F. Bux (ed), Biotechnological applications of microalgae. Biodiesel and value-added products, pp. 113-136. Boca Raton, Florida: CRC Press, Taylor & Francis Group. ISBN 9781466515291.

Articles in peer-reviewed journals

Africa, C., van Hille, R.P. and Harrison, S.T.L. 2013. Attachment of acidithiobacillus ferrooxidans and leptospirillum ferriphilum cultured under varying conditions to pyrite, chalcopyrite, low-grade ore and quartz in a packed column reactor. Applied Microbiology and Biotechnology, 97: 1317-1324.

Africa, C., van Hille, R.P., Sand, W. and Harrison, S.T.L. 2013. Investigation and in situ visualisation of interfacial interactions of thermophilic microorganisms with metal-sulphides in a simulated heap environment. Minerals Engineering, 48: 100-107.

Appa, H., Deglon, D.A. and Meyer, C.J. 2013. Numerical modelling of hydrodynamics and gas dispersion in an autoclave. Hydrometallurgy, 131-132: 67-75.

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DEPARTMENT OF CIVIL ENGINEERING

Head of Department: Associate Professor Neil Armitage

Departmental Profile

The Department of Civil Engineering currently has an establishment of 16 permanent full-time academic positions and 2 Research Officers, supported by a dedicated complement of 13 technical and administrative staff. It offers a four-year BSc (Civil Engineering) degree programme and several taught postgraduate programmes, as well as supervised research studies leading to Master's and Doctoral degrees. The current enrolment is about 424 undergraduate students and 226 postgraduates – giving a total of 650 students.

Postgraduate teaching and research is conducted within the framework of well-established research groups in the areas of Structural Engineering and Mechanics, Geotechnical Engineering, Concrete Materials and Technology, Hydraulic Engineering, Water Quality Engineering, Urban Water Management, Urban Engineering and Management, Transport Studies and GIS. Members of staff also interact with research groups in other departments, such as the Centre for Research in Computational and Applied Mechanics (CERECAM) and the Africa Centre for Cities (ACC). The Department has fruitful collaborative links with several local and overseas universities, and with local industry. Much of the work done by members of staff finds application in industry.

The high quality of the research undertaken by the Department is evidenced by the considerable number of peer-reviewed publications in ISI-accredited international journals produced by members of staff annually, and the international recognition that members of staff enjoy in their areas of research. Members actively participate on the committees of local professional bodies, provide expert advice to industry, and serve on the editorial and advisory boards of various international journals and conferences.

Departmental Statistics

Permanent and Long-Term Contract Staff

Professors	4
Associate Professors	8
Senior Lecturers	3
Lecturers	1
Research Officers	2
Technical Support Staff	6
Administrative Support Staff	7
Total	**31**

Emeritus and Honorary Staff

Emeritus Associate Professors	5
Honorary Research Associates	3
Total	**8**

Students

Doctoral	25
Master's and Diplomas	201
Undergraduate	424
Total	**650**

Research Fields and Staff

Permanent and Long-Term Contract Staff

PROFESSOR MARK ALEXANDER
Concrete durability and deterioration; concrete materials; concrete service life; sustainability of concrete construction; applications to structural design and construction.

ASSOCIATE PROFESSOR NEIL ARMITAGE
Urban water management including: Water Sensitive Urban Design (WSUD), Sustainable Drainage Systems (SuDS) and the provision of water services to informal settlements.

ASSOCIATE PROFESSOR ROGER BEHRENS
Activity-based travel analysis; local movement network configuration and management; non-motorised transportation; policy analysis in the fields of urban passenger transport; land use-transport interaction.

ASSOCIATE PROFESSOR HANS BEUSHAUSEN
Concrete materials; structural engineering; repair of concrete structures.

DR KIRSTY CARDEN
Urban water management; sustainability assessment; integrated approaches geared towards sustainable urban development and water sensitive cities.

MS FARIIDAH CHEBET
Geotechnical engineering

PROFESSOR GEORGE EKAMA
Chemical and biological wastewater treatment; physical and biological process modelling.

DR DENIS KALUMBA
Geotechnical engineering: Ground Improvement, Waste Minimisation, Foundations/Soils Interaction, Electrokinetics, Geosynthetics, and Soil Remediation

PROFESSOR PILATE MOYO
Structural analysis and Design, Structural dynamics and vibration analysis-, Structural integrity assessment, Structural health monitoring and vibration testing.

ASSOCIATE PROFESSOR ULRIKE RIVETT
iCOMMS: Information for Community Oriented Municipal Services. Role of ICTs in water service delivery and management.

MR HERRIE SCHALEKAMP
Road-based public transport policy and regulation; institutional and operational reform processes in passenger transport systems; qualitative methods of investigation in the transport arena

DR SEBASTIAN SKATULLA
Multiscale Methods; Biomechanics; Electromechanics; Meshfree Methods; High-Performance Computing.

ASSOCIATE PROFESSOR MARIANNE VANDERSCHUREN
Assessment of urban transport systems; urban transport decision-making; transport policy.

ASSOCIATE PROFESSOR MARK VAN RYNEVELD
Urban Engineering; infrastructure planning and settlement planning; sanitation; capacity building/ engineering education

ASSOCIATE PROFESSOR KOBUS VAN ZYL
Hydraulics; urban water management; water demand analysis; distribution networks.

MS NICKY WOLMARANS
Academic development; teaching and learning; mechanics of solids.

PROFESSOR ALPHOSE ZINGONI
Shell structures; space structures; structural mechanics; applications of group theory; finite element modelling; vibration and structural dynamics; structural analysis and design.

ASSOCIATE PROFESSOR MARK ZUIDGEEST
Pedestrian activity on highways; transport network design; location-allocation modelling; land-use transport interaction models; transport-related social exclusion; climate change and transport; walkability assessment

Honorary Research Associates

MS LISA KANE
Transportation engineering and planning.

PROFESSOR MANU SANTHANAM
Concrete materials and technology; concrete diagnosis, service life design

MR VERNON COLLIS
Integrated structural design; sustainability solutions; concrete repair and rehabilitation

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Research Output

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Vanderschuren, M.J.W.A. and de Vries, D. 2013. Advanced public transportation information provision: what are the effects on improved customer satisfaction? Proceedings of the 16th International IEEE Annual Conference on Intelligent Transportation Systems (ITSC 2013), 6-9 October 2013, The Hague, Netherlands. Netherlands: IEEE. ISBN 978147992914613.

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Warren-Codrington, C. and Kalumba, D. 2013. Using the shear strength reduction method to assess the stability of retaining structures adjacent to excavations for the University of Cape Town's new engineering building. In A. Zingoni (ed), Proceedings of Research and Applications in Structural Engineering, Mechanics and Computation. Proceedings of the Fifth International Conference on Structural Engineering, Mechanics and Computation (SEMC 2013), 2-4 September 2013, Cape Town, South Africa. The Netherlands: CRC Press/ Balkema. ISBN 9781138000612.

Wolmarans, N. 2013. Engineering design, why is it so difficult to teach and to learn? In B. Collier-Reed (ed), Proceedings of the Second Biennial Conference of the South African Society for Engineering Education (SASEE), 11-12 June 2013, Cape Town, South Africa. Cape Town: the South African Society for Engineering Education (SASEE). ISBN 9780620571234.

DEPARTMENT OF CONSTRUCTION ECONOMICS AND MANAGEMENT

Head of Department: Professor Keith Cattell

Departmental Profile

Research and allied scholarly work in the Department falls under two broad themes of property and construction. Five research groups examine issues related to infrastructure delivery, construction industry development, wellness in construction, emerging property markets, and facilities management. A number of cross cutting themes provide diversity and smaller research interest groups; these themes include sustainability, project management, human development, property markets and property valuations, procurement, entrepreneurship, and teaching and learning.

Strong research links exist with academic institutions in the United Kingdom, Australia, United States of America, Canada, Hong Kong, Central and East Africa, as well as with institutions within South Africa.

During 2013, papers were presented at key international conferences in Cape Town, New Delhi, Ghana, Reading and Brisbane. In addition, a number of papers were published in peer-reviewed local and international journals, frequently with international co-authorship, underlining the Department's international profile and collaborative research philosophy.

Nationally, the Department continues its engagement with local and international organisations. These include:

- The Association of South African Quantity Surveyors on the Standard System and Chapter Committees,
- The South African Council for the Quantity Surveying Profession as Council Members and on the Education Standards and Research Sub-Committee,
- The Royal Institution of Chartered Surveyors on the World Regional Board, and the Education Standards Board,
- The South African Facilities Management Association,
- The South African Property Owners Association,
- The Construction Industry Development Board, and
- The African Real Estate Society.

Research endeavours by individual staff have been good in terms of higher degree graduates, attracting research funding, and research outputs. The staff received research funding from a variety of sources in 2013, namely: the University Research Committee (URC), the National Research Foundation (NRF), and the Construction Industry Development Board (CIDB). In addition, the department boasts a "B2" NRF-rated researcher.

Departmental Statistics

Permanent and Long-term Contract Staff

Professors	2
Associate Professors	2
Senior Lecturers	8
Lecturer	-
Administrative and Clerical Staff	5
Departmental Assistant	1
TOTAL	**18**

Students

Doctoral	5
Masters	96
Postgraduate Diploma	20
Honours	74
Undergraduate	385
TOTAL	**580**

Research Fields and Staff

Permanent Staff

PROFESSOR KS CATTELL
Head of Department: Value management; workplace facilities management; learning spaces; the impact of HIV/AIDS on the South African construction industry; corruption in the construction industry; and stress management for built environment professionals.

PROFESSOR PA BOWEN
Value management; the impact of HIV/AIDS on the South African construction industry; corruption in the construction industry; and stress management for built environment professionals.

ASSOCIATE PROFESSOR KA MICHELL
Facilities management as a social and community enterprise in low-income areas of cities; urban facilities management; work space planning and management in buildings; learning spaces.

ASSOCIATE PROFESSOR F VIRULY
Urban economics; property development; property feasibility studies; property and building cycles; property and the macro economy; econometric forecasting of the commercial and residential property markets; institutions and the structure of property markets.

MRS E EDWARDES
Senior Lecturer: Education in construction studies; enhancement of skills required for construction studies.

MRS K EVANS
Senior Lecturer: Work with the African Centre for Cities Research Laboratory; innovative financing of medium to low-income housing from the perspective of end-users; working capital, bridging finance and wholesale finance.

MR I JAY
Senior Lecturer: Project Management – particularly in the area of project strategy and project portfolio (Programme) management. Application of value models to portfolio balancing, and enterprise wide project management structures and systems. Value Management – particular focus on client values, determination of project measures of success (success criteria) and modelling of client values.

MRS K LE JEUNE
Senior Lecturer: Gender related issues within the Built Environment professions; green buildings; service learning and application in construction education; social responsibility and construction education.

MR M MASSYN
Senior Lecturer: Skills and competencies of SME's within the construction industry; procurement systems used in housing delivery with particular emphasis on the PHP delivery system.

MR R MCGAFFIN
Senior Lecturer: The relationship between land economics and planning; property markets and value-capture; housing and affordable housing markets.

DR M MOOYA
Senior Lecturer: Informal/Low income property markets; property market processes; property valuation theory and practice; epistemology and methodology in property market research.

DR A WINDAPO
Senior Lecturer: Contractor performance and development studies; housing procurement and development studies; risk and quality management processes on construction projects; and health, safety and environmental issues.

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Research Output

Authored books

Windapo, A.O. 2013. Fundamentals of Construction Management. 182pp. Cape Town: bookboon.com. ISBN 9788740303629.

Chapters in books

McGaffin, R. and Wanjiku K., C. 2013. Defining markets: a set of transactions between actors. In H. Perold and P. Jooste (eds), Trading Places - Accessing Land in African Cities, pp. 21-46. Somerset West, South Africa: African Minds. ISBN 9781920489991.

Articles in peer-reviewed journals

Bowen, P.A., Cattell, K.S. and Edwards, P. 2013. Workplace stress experienced by quantity surveyors. Acta Structilia, 20(2): 1-29.

Bowen, P.A., Edwards, P. and Lingard, H. 2013. Workplace stress among construction professionals in South Africa: the role of harassment and discrimination. Engineering, Construction and Architectural Management, 20(6): 620-635.

Bowen, P.A., Edwards, P. and Lingard, H. 2013. Workplace stress experienced by construction professionals in South Africa. Journal of Construction Engineering and Management-Asce, 139(4): 393-403.

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Bowen, P.A., Edwards, P., Simbayi, L.C. and Cattell, K.S. 2013. HIV/AIDS Interventions by construction firms in the Western Cape, South Africa: a thematic analysis of qualitative survey data. The International Journal of Construction Management, 13(4): 1-125.

Oyewobi, L., Windapo, A.O. and Cattell, K.S. 2013. Impact of business diversification on South African construction companies' corporate performance. Journal of Financial Management of Property and Construction, 18(2): 1-203.

Windapo, A.O. 2013. Relationship between degree of risk, cost and level of compliance to occupational health and safety regulations in construction. The Australasian Journal of Construction Economics and Building, 13(2): 67-82.

Windapo, A.O. and Cattell, K.S. 2013. The South African construction industry: perceptions of key challenges facing its performance, development and growth. Journal of Construction in Developing Countries, 18(2): 65-79.

Windapo, A.O. and Goulding, J. 2013. Value-based perspectives of stakeholders' building requirements in low cost and government subsidised housing projects in South Africa. Construction Innovation, 13(4): 424-444.

Windapo, A.O. and Jegede, O.P. 2013. A study of health, safety and environment (HSE) practices of Nigerian construction companies. The Professional Builder, Journal of the Nigerian Institute of Building, 4(1): 127.

Peer-reviewed published conference proceedings

Bowen, P.A., Edwards, P., Cattell, K.S. and Simbayi, L.C. 2013. HIV/AIDS interventions by construction firms - a mixed methods analysis of survey data. In P. Chynoweth (ed), Proceedings of RICS COBRA 2013 - The Construction, Building and Real Estate Research Conference of the Royal Institute of Chartered Surveyors, 10-12 September 2013, New Delhi, India. New Delhi, India: RICS. ISBN 9781783210305.

Edwardes, E. 2013. Financial impact of carbon emissions tax on construction costs. In K. Le Jeune and K. Michell (eds), Proceedings of SACQSP Research Conference on "Green Vision 20/20" - Proceedings of the Cape Town 2013 6th Annual Research Conference, 20-21 June 2013, Vineyard Hotel, Cape Town, South Africa. Cape Town: Department of Construction Economics and Management, University of Cape Town. ISBN 9780620568906.

Jay, C.I., Massyn, M.W., Viruly, F.M. and Le Jeune, K. 2013. Sustainability and value management. In K. Le Jeune and K. Michell (eds), Proceedings of SACQSP Research Conference on "Green Vision 20/20" - Proceedings of the Cape Town 2013 6th Annual Research Conference, 20-21 June 2013, Vineyard Hotel, Cape Town, South Africa. Cape Town: Department of Construction Economics and Management, University of Cape Town. ISBN 9780620568906.

Le Jeune, K., Nurick, S. and Roux, J. 2013. The business case for building green: using life cycle cost analysis to motivate for energy saving design. In K. Le Jeune and K. Michell (eds), Proceedings of SACQSP Research

Conference on "Green Vision 20/20" - Proceedings of the Cape Town 2013 6th Annual Research Conference, 20-21 June 2013, Vineyard Hotel, Cape Town, South Africa. Cape Town: Department of Construction Economics and Management, University of Cape Town. ISBN 9780620568906.

Nurick, S. and Cattell, K.S. 2013. An investigation into the mechanisms driving large property owning organisations to implement green building features. In K. Le Jeune and K. Michell (eds), Proceedings of SACQSP Research Conference on "Green Vision 20/20" - Proceedings of the Cape Town 2013 6th Annual Research Conference, 20-21 June 2013, Vineyard Hotel, Cape Town, South Africa. Cape Town: Department of Construction Economics and Management, University of Cape Town. ISBN 9780620568906.

Oyewobi, L., Windapo, A.O., Cattell, K.S. and Rotimi, J. 2013. A framework for identifying construction companies best practice: a panacea for corporate performance failure. In S. Kajewski, K. Manley and K. Hampson (eds), Proceedings of the 19th CIB World Building Congress 2013: Construction and Society, 5-9 May 2013, Brisbane, Australia. Australia: CIB conference. ISBN 9780987554208.

Oyewobi, L., Windapo, A.O., Cattell, K.S. and Rotimi, J. 2013. Impact of organisational structure and strategies on construction organisations' performance. In T.W. Yiu and V. Gonzalez (eds), Proceedings of 38th Australasian University Building Educators Association Conference, 20-22 November 2013, Auckland, New Zealand. Auckland, New Zealand: The University of Auckland Department of Civil and Environmental Engineering. ISBN 9780908689873.

Oyewobi, L., Windapo, A.O. and Rotimi, J. 2013. The effects of business environments on corporate strategies and performance of construction organisations. In S.D. Smith and D.D. Ahiaga-Dagbui (eds), Proceedings of the 29th Annual ARCOM Conference 2013, 2-4 September 2013, Reading. Reading, UK: ARCOM. ISBN 9780955239076.

Tucker, G., Windapo, A.O. and Cattell, K.S. 2013. Correlates between construction company size and corporate performance: an exploratory study. In S. Laryea and S.A. Agyepong (eds), Proceedings of West African Built Environment Research (WABER) Conference 2013, 12-14 August 2013, Accra, Ghana. Witwatersrand: West Africa Built Environment Research (WABER) Conference. ISBN 9780956606068.

Tucker, G., Windapo, A.O. and Cattell, K.S. 2013. Impact of construction firms' competitiveness on corporate performance: an exploratory study. In S. Kajewski, K. Manley and K. Hampson (eds), Proceedings of the 19th CIB World Building Congress 2013: Construction and Society, 5-9 May 2013, Brisbane, Australia. Australia: CIB conference. ISBN 9780987554208.

Windapo, A.O., Cattell, K.S. and Oyewobi, L. 2013. Knowledge, attitude and perception of contractors on green building legislation requirements. In K. Le Jeune and K. Michell (eds), Proceedings of SACQSP Research Conference on "Green Vision 20/20" - Proceedings of the Cape Town 2013 6th Annual Research Conference, 20-21 June 2013, Vineyard Hotel, Cape Town, South Africa. Cape Town: Department of Construction Economics and Management, University of Cape Town. ISBN 9780620568906.

DEPARTMENT OF MECHANICAL ENGINEERING

(Including the Blast Impact and Survivability Research Unit (BISRU), the Centre for Materials Engineering (CME), the Centre for Research in Computational and Applied Mechanics (CERECAM), the Energy Research Centre (ERC), and the SASOL Advanced Fuels Laboratory (SAFL)).

Head of Department: Professor Robert Knutsen

Department Profile

The Department of Mechanical Engineering includes the following recognized research groupings: Blast Impact and Survivability Research Unit (BISRU), the Centre for Materials Engineering (CME), the Centre for Research in Computational and Applied Mechanics (CERECAM), the Energy Research Centre (ERC) and the SASOL Advanced Fuels Laboratory (SAFL). The research interests of BISRU cover all engineering aspects of blast and impact scenarios, including the impact/blast process, structural response and material characterisation of structural components, as well as human bio-mechanical response under impact conditions. Research in CME is directed at an understanding of the relationships between the production processes and structure, properties and performance of engineering materials. CERECAM focuses on mathematical modelling of complex material behaviour, simulation of processes of deformation and failure of engineering components and artefacts, development of stable and accurate computational solution techniques and computational fluid dynamics. The ERC researches

energy efficiency, energy modelling, climate change issues and sustainable energy. The SAFL is arguably the most sophisticated engines laboratory undertaking fuels research in the country. A number of smaller research groupings focus on areas such as advanced manufacturing, aeronautics, orthopaedics, composite materials engineering, computational fluid dynamics, engineering education, engineering management, fracture and fatigue, non-destructive testing and robotics.

Departmental Statistics

Permanent and long-term contract staff (excluding research officers)

Professors	5
Adjunct Professors	2
Emeritus Professor	2
Honorary Professor	1
Associate Professors	8
Senior Lecturers	8
Lecturers	2
Part-time Lecturer	2
Academic Development Lecturer	1
Teaching Assistants	10
Technical Support Staff	11
Administrative and Clerical Staff	4
Workshop Apprentices	5
Total	**61**

Students

Postdoctoral	**3**
PG Diploma	5
Doctoral	30
Occasional – Non degree UG	**0**
Occasional – Non degree PG	**3**
Master's	126
Honours	13
Undergraduate	602
Total	**782**

Research Fields and Staff

Permanent Staff

ASSOCIATE PROFESSOR TUNDE BELLO-OCHENDE
Convective and numerical heat transfer; thermodynamic optimisation, renewable and complex energy system, constructal theory and design
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DR GEORGE VICATOS
Senior Lecturer; heat transfer and refrigeration; combined absorption and compression refrigeration cycles; bioengineering prosthesis design
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ASSOCIATE PROFESSOR CHRIS VON KLEMPERER
Composite materials; processing and modelling of composite materials and structures
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Contract Staff

MS TRACY BOOYSEN
Lecturer; Electro Mechanical engineering, robotics and agents
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DR WIM FULS
Senior Lecturer; research specialisation in energy efficiency; power plant process flow modeling
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DR ANDREW MCBRIDE
Senior Research Officer: CERECAM and Applied Mechanics;
Nonlinear continuum mechanics; plasticity; finite element method; granular systems
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PROFESSOR BERNHARD SONDEREGGER
Centre for Materials Engineering, creep, damage and mechanical behaviour of power plant materials
Bernhard.Sonderegger@uct.ac.za

Adjunct Professor

PROFESSOR ANDY YATES
Adjunct Professor, SASOL Advanced Fuels Lab, engines and fuels
Andy.Yates@Sasol.com

PROFESSOR LOUIS JESTIN
Power Generation systems design and operation
Louis.Jestin@uct.ac.za

Emeritus Professors

Professor Kevin Bennett
Energy Research Centre; energy research
Kevin.Bennett@uct.ac.za

PROFESSOR JASSON GRYZAGORIDIS
CERECAM; heat transfer and refrigeration; combined absorption and compression refrigeration cycles; optical techniques in non-destructive testing; holographic interferometry; ESPI; shearography; materials properties evaluation
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Contract Research Staff

MR VICTOR BALDEN
Research Officer, BISRU; impact dynamics
MS ANYA BOYD
Assistant Research Officer, ERC; energy, environment and climate change

MS L CHILOANE
Research Officer, ERC; energy efficiency, measurement and verification

A DANE
Research Officer, ERC; energy, environment and climate change

DR STEEVE CHUNG KIM YUEN
Research Officer, BISRU; structural dynamics, blast response, crashworthiness

W ENGEL
Senior Research Officer, ERC; energy, environment and climate

GC GARISEB
Energy Efficiency Engineer, ERC

MR ANDREW HIBBERD
Energy Efficiency Engineer, ERC; measurement and verification

MS ALISON HUGHES
Senior Research Officer, ERC; energy efficiency; energy modeling

D KAPONGO
Energy Efficiency Engineer, ERC

MR RICHARD LARMOUR
Research Officer, ERC; Measurement and verification

MR THAPELO LETETE
Research Officer, ERC: climate change

DR ANDREW MARQUARD
Senior Research Officer, ERC; energy and climate change team

MS MASCHA MOORLACH
Energy Efficiency Engineer, ERC; measurement and verification

MR ALFRED MOYO
Research Officer, ERC; energy & climate change group

DR GISELA PRASAD
Chief Research Officer, ERC; energy, poverty and development

DR SEBATAOLO RAHLAO
Researcher, ERC; energy, environment and climate change

DR B RENNKAMP
Research Officer, ERC; energy and climate change

MRS M SENATLA
Research Officer, energy systems analysis & planning

DR DEBBIE SPARKS
Senior Research Officer, ERC; energy and climate change

A STEWART
Senior Energy Efficiency Engineer, ERC

MR AC STONE
Senior Research Officer, ERC; energy systems analysis, modelling

DR M TORRES GUNFAUS
Chief Research Officer, ERC; climate change

MR AJAY TRIKAM
Research Officer, ERC; energy efficiency; greenhouse gases; mitigation modeling

PROFESSOR HARALD WINKLER
Director: ERC; climate change (economics, mitigation & policy) and environmental economics

MS HOLLE WLOKAS
Assistant Research Officer, ERC; energy, poverty & development group

Postdoctoral Research Fellows

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Energy studies specialisation

DR JULIEN GHIGHI
Materials engineering specialisation

DR TAMARYN NAPP
Energy studies specialisation

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Research Output

Chapters in books

Collier-Reed, B. I., and Ingerman, Å. (2013). Phenomenography: from critical aspects to knowledge claim. In M. Tight and J. Huisman (eds), Theory and Method in Higher Education Research, Vol. 9, pp. 243-260. Emerald. ISBN 9781781906828.

Davydov, D., Javili, A., Steinmann, P. and McBride, A. (2013). A comparison of atomistic and surface enhanced continuum approaches at finite temperature. In H. Altenbach and N.F. Morozov (eds), Surface Effects in Solid Mechanics, pp. 43-57. Springer-Verlag. ISBN 9783642357831.

Moorlach, M.F.C. and Larmour, R. 2012. Awareness programmes in the residential sector. In X. Xia and J. Zhang (eds), Measurement & Verification Practices, pp. 281-290. South Africa: Media in Africa (Pty) Ltd. ISBN 9781620543668.

Articles in peer-reviewed journals

Adewumi, O.O., Bello-Ochende, T. and Meyer, J.P. 2013. Constructal design of combined microchannel and micro pin fins for electronic cooling. International Journal of Heat and Mass Transfer, 66: 315-323.

Appa, H., Deglon, D.A. and Meyer, C.J. 2013. Numerical modelling of hydrodynamics and gas dispersion in an autoclave. Hydrometallurgy, 131-132: 67-75.

Becker, T., Mostafavi, M., Tait, R.B. and Marrow, T.J. 2012. An approach to calculate the J-integral by digital image correlation displacement field measurement. Fatigue & Fracture of Engineering Materials & Structures, 35: 971-984.

Bello-Ochende, T. 2013. Maximum flow access in heat exchangers, heat generating bodies and inanimate flow systems: constructal law and the emergence of shapes and structures in thermo-fluid mechanics comment on the emergence of design in pedestrian dynamics: locomotion, self-organization, walking paths and constructal law by Antonio F Miguel. Physics of Life Reviews, 10: 191-192.

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Collier-Reed, B.I. 2013. Considering two audiences when recording lectures as lecturecasts. The African Journal of Information Systems, 5(3): 71-79.

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Collier-Reed, B.I., Case, J.M. and Stott, A. 2013. The influence of podcasting on student learning: a case study across two courses. European Journal of Engineering Education, 38(3): 329-339.

Chung Kim Yuen, S., Altenhof, W., Opperman, C. and Nurick, G.N. 2013. Axial splitting of circular tubes by means of blast load. International Journal of Impact Engineering, 53: 17-28.

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Chung Kim Yuen, S., Nurick, G.N., Ranwaha, R. and Henchie, T. 2013. The response of circular plates to repeated uniform blast loads. Key Engineering Materials, 535-536: 44-47.

Durbach, I.N. and Davis, S.J. 2012. Decision support for selecting a shortlist of electricity-saving options: a modified SMAA approach. Orion: Journal of the Operations Research of South Africa, 28(2): 99-116.

George, S. and Knutsen, R.D. 2013. Evolution of the solidification microstructure of rheocast high purity aluminium. Solid State Phenomena, 192-193: 109-115.

Govender, R., Langdon, G.S., Nurick, G.N. and Cloete, T.J. 2013. Impact delamination testing of fibre reinforced polymers using Hopkinson pressure bars. Engineering Fracture Mechanics, 101: 80-90.

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DEPARTMENT OF ELECTRICAL ENGINEERING

Head of Department: Professor M Braae

Departmental Profile

The Department of Electrical Engineering has 25 permanent academic staff, 157 MSc. students and 77 PhD students. The research activities and projects are largely industrially based. The main funding sources are Eskom, Telkom, Siemens, De Beers, Sasol, Mintek, , Anglo Platinum, Department of Trade and Industry, Dept of Science and Technology (DST), South African National Defence Force, and the NRF.

The Department has seen a growth in the number of undergraduate students over the past ten years, which is expected to result in higher postgraduate numbers. There are six large research groups in the Department, which attract 80% of the postgraduate students. These are:

- Broadband, Wireless, Communication, and Networks
- Electrical Machines, Drives and Power Electronics
- Image Processing and Vision Systems
- Control and Instrumentation
- Power Engineering
- Remote Sensing and Radar

Departmental Statistics

Permanent and Long-term Contract Staff

Professors	6
Associate Professors	6
Adjunct Professor	1
Adjunct Associate Professor	1
Adjunct Senior Lecturer	1
Senior Lecturers	8
Lecturers	6
Research Staff	2
Senior Scholar	3
Senior Research Scholar	1
Technical Support Staff	7
Administrative Staff	6
Total	**41**

Emeritus Professors	5

Students

Doctoral	77
Masters	157
Undergraduates	758
Total	**992**

Research Fields and Staff

PROFESSOR A. BAGHAI-WADJI
Electronic and Accelerated Computational Engineering

PROFESSOR E.S. BOJE
Control Systems and Mechatronics

PROFESSOR M. BRAAE
Multivariable control; mineral extraction control applications; computer-based education

PROFESSOR C.T. GAUNT
Electricity delivery networks

PROFESSOR M.R. INGGS
Radar remote sensing; synthetic aperture radar; software defined radio; parallel computing

PROFESSOR P. PILLAY
Electrical machines and drives

ASSOCIATE PROFESSOR S.P. CHOWDHURY
Renewable Energy, Distributed Generation and Grid Integration, Microgrids and Smartgrids, Energy Efficiency and Demand Side Management, Fuel Cells and Energy Storage, Electrical Drives, Power System Operation, Control and Stability

ASSOCIATE PROFESSOR M. E. DLODLO
3G mobile and future communication systems

ASSOCIATE PROFESSOR K. FOLLY
Power system stability and control

ASSOCIATE PROFESSOR R.H. GESCHKE
Microwave Engineering

ASSOCIATE PROFESSOR M.A. KHAN
Electrical Machines, Electric Drives and Wind Energy Systems

ASSOCIATE PROFESSOR A.J. WILKINSON
Senior Lecturer; Signals and image processing; radar; SAR interferometry; tomography, Bayesian interference; inverse problems; RF power amplifiers

ADJUNCT PROFESSOR P.J. CILLIERS
Geomagnetic and electric fields, ionospheric modelling, space weather impacts on technology

ADJUNCT ASSOCIATE PROFESSOR M. MALENGRET
Power electronics; remote area power supplies and rural Electrification

DR P.S. BARENDSE
Senior Lecturer; Machines, Drives, Power Electronics and Condition Monitoring

DR S. CHOWDHURY
Senior Lecturer, Power System Protection, Renewable Energy Systems and Distributed Generation, Microgrids and Smart grids

DR O.E. FALOWO
Senior Lecturer, Communications

MR S. GINSBERG
Senior Lecturer; Digital systems

DR M. HANIF
Senior Lecturer, Power Electronics

DR A. MISHRA
Senior Lecturer; Radar Signal Processing and Machine Learning

DR A MURGU
Senior Lecturer, Telecommunications, Networks, IP and Network Reliability

DR F.C. NICOLLS
Senior Lecturer; Image processing, signal processing and computer vision

ADJUNCT SENIOR LECTURER, MR I. KHAN
Lecturer, High frequency power electronics, induction heating

MRS K.E. AWODELE
Lecturer, Power System Reliability

MR A. PATEL
Lecturer, Bio-Inspired Robotics

MR M.S. TSOEU
Lecturer, Control and Instrumentation

MS R.A. VERRINDER
Lecturer, Robotics, Control and Instrumentation

DR S. WINBERG
Lecturer, High Performance Computing & Software Defined Radio

MS R. SMIT
Academic Development Senior Lecturer, Engineering Education, Philosophy of Engineering and Technology

DR R. HERMAN
Senior Research Officer, The modelling and assessment of uncertainty in power systems

MR M.J.E. VENTURA
Senior Research Officer, Broadband communications & applications; digital systems

DR A. VAN DER BYL
Research Officer, Image and signal processing and re-configurable computing

Honorary/Emeritus Professors

PROFESSOR B.J. DOWNING
Microwave systems and circuits

EMERITUS PROFESSOR G. DE JAGER
Image processing; machine vision and image compression

EMERITUS PROFESSOR A. PETROIANU
Power system analysis; operation and control

EMERITUS PROFESSOR K.M. REINECK
Antennas

EMERITUS ASSOCIATE PROFESSOR J.R. GREENE
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Research Output

Articles in peer-reviewed journals

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