

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., Levecq, 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 Impedance 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 Impedance 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 Programme

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:

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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.

Chapters in books

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.

Duminy, J., Watson, V.J. and Odendaal, N. 2013. Doing research in African cities: the case study method. In P. Kresl and J. Sobrino (eds), Handbook of Research Methods and Applications in Urban Economies, pp. 153-172. UK: Edward Elgar Publishing. ISBN 9780857934611.

Gurney, K.J. 2013. Abracadabra. In E. Pieterse and A. Simone (eds), Rogue Urbanism-Emergent African Cities, pp. 421-425. Auckland Park: Jacana Media (Pty) Ltd. ISBN 9781431406234.

Haysom, G., Kelly, C., Schulschenk, J. and Landman, A. 2012. Food - a sustainable system for Stellenbosch. In M. Swilling, B. Sebitosi and R. Loots (eds),

Sustainable Stellenbosch opening dialogues, pp. 102-115. Stellenbosch: SUN MeDIA Stellenbosch. ISBN 9781920338558.

Katzschner, T. 2013. Cape Flats Nature: rethinking urban ecologies. In L. Green (ed), *Contested Ecologies: Dialogues in the South on Nature and Knowledge*, pp. 202-226. Cape Town: HSRC Press. ISBN 9780796924285.

Low, I. 2012. A perspective of emergencies: a case of Langa. In G. Bruyns and A. Graafland (eds), *African Perspectives - [South] Africa. City, Society, Space, Literature and Architecture*, pp. 64-73. Rotterdam: 010 Publishers Rotterdam. ISBN 9789064507977.

Low, I. 2013. South Africa: [Enabling space / Enabling people]. In C. Ohajunwa and J. McKenzie (eds), *Disability Catalyst Africa - Series no. 4 : Beyond "if" to "how": Disability inclusion in Higher education*, pp. 63-73. Cape Town: Disability Innovations Africa, Disability Studies Programme, DHRS, UCT. ISBN 9780987020938.

Mbaye, J.F. 2013. On the rogue practices of West African musical entrepreneurs. In E. Pieterse and A. Simone (eds), *Rogue Urbanism-Emergent African Cities*, pp. 253-263. Auckland Park: Jacana Media (Pty) Ltd. ISBN 9781431406234.

Pieterse, E.A. and Tavengwa, T. 2013. Designing against the grain: confronting the political economy of knowledge production. In E. Pieterse and A. Simone (eds), *Rogue Urbanism-Emergent African Cities*, pp. 455-465. Auckland Park: Jacana Media (Pty) Ltd. ISBN 9781431406234.

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.

Tawodzera, G. and Crush, J. 2013. The perilous trek: Zimbabwean migrant children and teachers in South Africa. In L. Bartlett and A. Ghaffar-Kucher (eds), *Refugees, Immigrants, and Education in the Global South-Lives in Motion*, pp. 54-69. New York: Routledge (Taylor & Francis Group). ISBN 9780415813969.

Watson, V.J. 2013. Planning theory and practice in a global context. *The Ashgate Research Companion to Planning and Culture*, pp. 121-133. United Kingdom: Ashgate Publishing. ISBN 9781409422242.

Watson, V.J. 2013. The Postcolonial Dimension. In M. Acuto and W. Steele (eds), *Global City Challenges*, pp. 88-100. United Kingdom: Palgrave Macmillan. ISBN 9781137286864.

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.

Battersby, J. 2013. Hungry cities: a critical review of urban food security research in sub-Saharan African cities. *Geography Compass*, 7(7): 452-463.

Battersby, J. and Marshak, M. 2013. Growing communities: integrating the social and economic benefits of urban agriculture in Cape Town. *Urban Forum*, 24: 447-461.

Borland, H. and Saunders, S. 2013. Marketing-driven philanthropy: the case of PlayPumps. *European Business Review*, 25(4): 321-335.

Brown-Luthango, M. 2013. Community-university engagement: the Philippi Citylab in Cape Town and the challenge of collaboration across boundaries. *Higher Education*, 65(3): 309-324.

Brown-Luthango, M., Makanga, P. and Smit, J.L. 2013. Towards effective city planning - the case of Cape Town in identifying potential housing land. *Urban Forum*, 24: 189-203.

Carter, F. 2013. Structures of knowledge and pedagogy. *Architecture South Africa: Journal of the South African Institute of Architects*, May/June (61): 36-46.

Cartwright, A., Blignaut, J., de Wit, M.P., Goldberg, K., Mander, M., O'Donoghue, S.H. and Roberts, D. 2013. Economics of climate change adaptation at the local scale under conditions of uncertainty and resource constraints: the case of Durban, South Africa. *Environment and Urbanization*, 25(1): 139-156.

Colding, J., Barthel, S., Bendt, P., Snep, R., Van Der Knaap, W. and Ernstson, H. 2013. Urban green

- commons: insights on urban common property systems. *Global Environmental Change: Human and Policy Dimensions*, 23(5): 1039-1051.
- Dewar, D. and Todeschini, F. 2013. Lessons from the old city of Ahmedabad. *Architecture South Africa: Journal of the South African Institute of Architects*, 63: 36-42.
- Earle, L. 2013. Drawing the line between state and society: social movements, participation and autonomy in Brazil. *Journal of Development Studies*, 49(1): 56-71.
- Ernstson, H. and Sorlin, S. 2013. Ecosystem services as technology of globalization: on articulating values in urban nature. *Ecological Economics*, 86: 274-284.
- Ernstson, H. 2013. The social production of ecosystem services: a framework for studying environmental justice and ecological complexity in urbanized landscapes. *Landscape and Urban Planning*, 109(1): 7-17.
- Hull, S. and Whittal, J.F. 2013. Good e-Governance and cadastral innovation: in pursuit of a definition of e-cadastral systems. *South African Journal of Geomatics*, 2(4): 342-357.
- Hyman, K.R. 2013. Urban infrastructure and natural resource flows: evidence from Cape Town. *Science of the Total Environment*, 461-462: 839-845.
- Ikokou, G. and Smit, J.L. 2013. A technique for optimal selection of segmentation scale parameters for object-oriented classification of urban scenes. *South African Journal of Geomatics*, 2(4): 358-369.
- Jenner, S. and Abiodun, B.J. 2013. The transport of atmospheric sulfur over Cape Town. *Atmospheric Environment*, 79: 248-260.
- Lawhon, M. 2012. The meaning of global engagements with Africa (for us). *Political Geography*, 31(8): 530-533.
- Lawhon, M. 2013. Flows, friction and the sociomaterial metabolization of alcohol. *Antipode*, 45(3): 681-701.
- Lawhon, M. 2013. Situated, networked environmentalisms: a case for environmental theory from the south. *Geography Compass*, 7(2): 128-138.
- Lawhon, M. 2013. Why I want to be a South African geographer: a response to Hammett's (2012) "W(h)ither South African human geography?" *Geoforum*, 47: A3-A5.
- Lawhon, M. and Herrick, C. 2013. Alcohol control in the news: the politics of media representations of alcohol policy in South Africa. *Journal of Health Politics Policy and Law*, 38(5): 987-1021.
- Lawhon, M. and Patel, Z. 2013. Scalar politics and local sustainability: rethinking governance and justice in an era of political and environmental change. *Environment and Planning C-Government and Policy*, 31: 1048-1062.
- Nell, D., Vogel, R.J., Muller, E., Barday, Z. and Kahn, D. 2012. Slowly early graft function: a neglected entity after renal transplantation. *Nephron Clinical Practice*, 120(4): c200-c204.
- Nxumalo, C. and Whittal, J.F. 2013. Municipal boundary demarcation in South Africa: processes and effects on governance in traditional rural areas. *South African Journal of Geomatics*, 2(4): 325-341.
- Pieterse, E.A. 2013. City/university interplays amidst complexity. *Territorios: Revista de Estudios Regionales Y Urbanos*, 66: 26-32.
- Pirie, G.H. 2013. Automobile organizations driving tourism in pre-independence Africa. *Journal of Tourism History*, 5(1): 73-91.
- Salazar Ferro, P., Behrens, R. and Wilkinson, P.B. 2013. Hybrid urban public transport systems in developing countries: portents and prospects. *Transportation Research Part A - General*, 39(1): 121-132.
- 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.
- Simone, A. and Uzair Fauzan, A. 2013. Majority time: operations in the midst of Jakarta. *Sociological Review*, 61(S1): 109-123.
- Sitas, F. and Pieterse, E.A. 2013. Democratic renovations and affective political imaginaries. *Third Text*, 27(3): 327-342.
- Turok, I. 2013. Transforming South Africa's divided cities: can devolution help? *International Planning Studies*, 18(2): 168-187.
- Watson, V.J. 2013. Planning and the 'stubborn realities' of global south-east cities: some emerging ideas. *Planning Theory*, 12(1): 81-100.
- Watson, V.J. 2013. The ethics of planners and their professional bodies: response to Flyvbjerg. *Cities*, 32: 167-168.
- 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.

Peer-reviewed published conference proceedings

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 - *Afritecture* - 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 ISAFI ADE

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 KOTSIPOPOULOS

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 SAWI

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

DR MAMOHLE 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 VIJJOEN, 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.

Apsey, G. and Lewis, A.E. 2013. Selenium impurity in sodium sulphate decahydrate formed by eutectic freeze crystallization of industrial waste brine. *Journal of the South African Institute of Mining and Metallurgy*, 113: 415-421.

Azeez, O., Isafiade, A.J. and Fraser, D. 2013. Supply-based superstructure synthesis of heat and mass exchange networks. *Computers & Chemical Engineering*, 56: 184-201.

Becker, M.E., Yorath, G.A., Ndlovu, B., Harris, M.C., Deglon, D.A. and Franzidis, J.-P. 2013. A rheological investigation of the behaviour of two Southern African platinum ores. *Minerals Engineering*, 49: 92-97.

Bepswa, P.A. and Deglon, D.A. 2013. Numerical investigation of a heuristic methodology for designing precise metal accounting measurement networks. *Minerals Engineering*, 42: 50-61.

Case, J.M., Marshall, D. and Grayson, D. 2013. Mind the gap: science and engineering education at the secondary-tertiary interface. *South African Journal of Science*, 109: 0113(5pp). DOI: 10.1590/sajs.2013/20120113.

Chapman, N.A., Shackleton, N.J., Malysiak, V. and O'Connor, C.T. 2013. Comparative study of the use of HPGR and conventional wet and dry grinding methods on the flotation of base metal sulphides and PGMs. *Journal of the Southern African Institute of Mining and Metallurgy*, 113(5): 407-413.

Chimbganda, T., Becker, M.E., Broadhurst, J.L., Harrison, S.T.L. and Franzidis, J.-P. 2013. A comparison of pyrrhotite rejection and passivation in two nickel ores. *Minerals Engineering*, 46-47: 38-44.

Chonco, Z., Ferreira, A., Lodya, L., Claeys, M.C. and Van Steen, E.W.J. 2013. Comparing silver and copper as promoters in Fe-based Fischer-Tropsch catalysts using delafossite as a model compound. *Journal of Catalysis*, 307: 283-294.

Chonco, Z., Lodya, L., Claeys, M.C. and Van Steen, E.W.J. 2013. Copper ferrites: a model for investigating the role of copper in the dynamic iron-based Fischer-Tropsch catalyst. *Journal of Catalysis*, 308: 363-373.

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.

Corin, K.C., Mishra, J. and O'Connor, C.T. 2013. Investigating the role of pulp chemistry on the floatability of a CU-Ni sulfide ore. *International Journal of Mineral Processing*, 120: 8-14.

Dey, S., Paul, G.M. and Pani, S. 2013. Flotation behaviour of weathered coal in mechanical and column flotation cell. *Powder Technology*, 246: 689-694.

Fagan, M.A., Sederman, A.J., Harrison, S.T.L. and Johns, M.L. 2013. Phase distribution identification in the column leaching of low grade ores using MRI. *Minerals Engineering*, 48: 94-99.

Fischer, N., Van Steen, E.W.J. and Claeys, M.C. 2013. Structure sensitivity of the Fischer-Tropsch activity and selectivity on alumina supported cobalt catalysts. *Journal of Catalysis*, 299: 67-80.

Fuls, H.F. and Petersen, J. 2013. Evaluation of processing options for the treatment of zinc sulphide concentrates at Skorpion Zinc. *Journal of the South African Institute of Mining and Metallurgy*, 113: 423-434.

Fung, W., Ledwaba, L., Modiba, N., Claeys, M.C. and Van Steen, E.W.J. 2013. Choosing a suitable support for CO₃O₄ as an NH₃ oxidation catalyst. *Catalysis Science & Technology*, 3: 1905-1909.

Gaylard, P., Randolph, N.G. and Wortley, C.M.G. 2013. Metal accounting in the platinum industry: How effective is it? *Journal of the Southern African Institute of Mining and Metallurgy*, 113: 203-212.

Ghorbani, Y., Petersen, J., Becker, M.E., Mainza, A.N. and Franzidis, J.-P. 2013. Investigation and modelling of the progression of zinc leaching from large sphalerite ore particles. *Hydrometallurgy*, 131-132: 8-23.

- Ghorbani, Y., Mainza, A.N., Petersen, J., Becker, M.E., Franzidis, J.-P. and Kalala, J.T. 2013. Investigation of particles with high crack density produced by HPGR and its effect on the redistribution of the particle size fraction in heaps. *Minerals Engineering*, 43-44: 44-51.
- Ghorbani, Y., Becker, M.E., Petersen, J., Mainza, A.N. and Franzidis, J.-P. 2013. Investigation of the effect of mineralogy as rate-limiting factors in large particle leaching. *Minerals Engineering*, 52: 38-51.
- Govender, E., Bryan, C. and Harrison, S.T.L. 2013. Quantification of growth and colonisation of low grade sulphidic ores by acidophilic chemoautotrophs using a novel experimental system. *Minerals Engineering*, 48: 108-115.
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- Jones, G., Becker, M.E., van Hille, R.P. and Harrison, S.T.L. 2013. The effect of sulfide concentrate mineralogy and texture on reactive oxygen species (ROS) generation. *Applied Geochemistry*, 29: 199-213.
- Kazadi Mbamba, C., Franzidis, J.-P., Harrison, S.T.L. and Broadhurst, J.L. 2013. Flotation of coal and sulphur from South African ultrafine colliery wastes. *Journal of the Southern African Institute of Mining and Metallurgy*, 113: 399-405.
- Luo, J., Conrad, O. and Vankelecom, I.F.J. 2013. Imidazolium methanesulfonate as a high temperature proton conductor. *Journal of Materials Chemistry*, 1(6): 2238-2247.
- Manono, M., Corin, K.C. and Wiese, J.G. 2013. The effect of ionic strength of plant water on foam stability: a 2-phase flotation study. *Minerals Engineering*, 40: 42-47.
- McCoy, J., Soares, J.B.P. and Rawatlal, R. 2013. Analysis of slurry-phase co-polymerization of ethylene and 1-butene by Ziegler-Natta catalysts part 1: experimental activity profiles. *Macromolecular Reaction Engineering*, 7: 350-361.
- McFadzean, B.J., Mhlanga, S. and O'Connor, C.T. 2013. The effect of thiol collector mixtures on the flotation of pyrite and galena. *Minerals Engineering*, 50-51: 121-129.
- Nduna, M., Rodriguez-Pascual, M. and Lewis, A.E. 2013. Effect of dissolved precipitating ions on the settling characteristics of copper sulphide. *Journal of the South African Institute of Mining and Metallurgy*, 113(5): 435-439.
- Niyobuhungiro, R. and Von Blottnitz, H. 2013. Investigation of arsenic airborne in particulate matter around caterers' wood fires in the Cape Town region. *Aerosol and Air Quality Research*, 13: 219-224.
- Niyobuhungiro, R., Naidoo, S., Dalvie, M.A. and Von Blottnitz, H. 2013. Occurrence of CCA-treated timber in caterers' fuelwood stocks in the Cape Town region. *South African Journal of Science*, 109(1/2): 1-5.
- O'Connor, C.T. and Shackleton, N. 2013. Investigations into the recovery of platinum group minerals from the Platreef Ore of the bushveld complex of South Africa. *Platinum Metals Review*, 57(4): 302-309.
- Olaofe, O., Fenner, C.F., Gudiminci, R.K., Smit, M.S. and Harrison, S.T.L. 2013. The influence of microbial physiology on biocatalyst activity and efficiency in the terminal hydroxylation of n-octane using *Escherichia coli* expressing the alkane hydroxylase, CYP153A6. *Microbial Cell Factories*, 12(1): 8(12pp).
- Randall, D.G., Mohamed, R., Nathoo, J., Rossenrode, H. and Lewis, A.E. 2013. Improved calcium sulfate recovery from a reverse osmosis retentate using eutectic freeze crystallization. *Water Science and Technology*, 67(1): 139-146.
- Stafford, W., Cohen, B., Pather-Elias, S., Von Blottnitz, H., van Hille, R.P., Harrison, S.T.L. and Burton, S.G. 2013. Technologies for recovery of energy from wastewaters: applicability and potential in South Africa. *Journal of Energy in Southern Africa*, 24(1): 15-26.
- Stott, A. 2013. South African physical sciences teachers' understanding of force and the relationship to teacher qualification, experience and their school's quintile. *African Journal of Research in Mathematics, Science and Technology Education (AJRMSTE) or African Journal of Research in MST Education*, 17: 173-183.
- Tupikina, O., Minnaar, S.H., van Hille, R.P., Van Wyk, N., Rautenbach, G.F., Dew, D.W. and Harrison, S.T.L. 2013. Determining the effect of acid stress on the persistence and growth of thermophilic microbial species after mesophilic colonisation of low grade ore in a heap leach environment. *Minerals Engineering*, 53: 152-159.
- Tupper, G.B., Govender, I., Mainza, A.N. and Plint, N. 2013. A mechanistic model for slurry transport in tumbling mills. *Minerals Engineering*, 43-44: 102-104.

Eleftheriades, N. and Von Blottnitz, H. 2013. Thermodynamic and kinetic considerations for biodiesel production by reactive distillation. *Environmental Progress & Sustainable Energy*, 32(2): 373-376.

Peer-reviewed published conference proceedings

Broadhurst, J.L., Bryan, C.G., Becker, M.E., Franzidis, J.-P. and Harrison, S.T.L. 2013. Characterising the acid generating potential of mine wastes by means of laboratory-scale static and biokinetic tests. In A. Brown, L. Figuero and C. Wolkersdorfer (eds), *Proceedings of the International Mine Water Association Annual Conference 2013*, 6-9 August 2013, Colorado, USA. USA: International Mine Water Association. ISBN 9780615793856.

Case, J.M., Von Blottnitz, H., Fraser, D., Heydenrych, H. and Petersen, J. 2013. Thinking and practising curriculum: a new first year course in chemical engineering at UCT. 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.

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Do Amaral Filho, J.R., Weiler, J., Schneider, I.A.H. and Broadhurst, J.L. 2013. Using humidity cells tests to evaluation an ARD minimization approach in Santa Catarina coal field, Brazil. In A. Brown, L. Figuero and C. Wolkersdorfer (eds), *Proceedings of the International Mine Water Association Annual Conference 2013*, 6-9 August 2013, Colorado, USA. USA: International Mine Water Association. ISBN 9780615793856.

Duku, P., Minnaar, S.H., Harrison, S.T.L. and Petersen, J. 2013. A novel apparatus to determine the bio-oxidation kinetics of sessile *Leptospirillum ferriphilum*. In N. Guiliani, C. Demergasso, R. Quatrini, F. Remonsellez and C. Davis-Belmar (eds), *Proceedings of Integration of Scientific and Industrial Knowledge on Biohydrometallurgy - Selected, Peer Reviewed Papers from the 20th International Biohydrometallurgy Symposium (IBS 2013)*, 8-11 October 2013, Antofagasta, Chile. Switzerland: Trans Tech Publications Ltd. ISSN 10226680.

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Fagan, M.A., Ngoma, I.E., Chiume, R., Minnaar, S.H., Sederman, A.J., Johns, M.L. and Harrison, S.T.L. 2013. The impact of drip irrigation on heap hydrology and microbial colonies in bioleaching. In N. Guiliani, C. Demergasso, R. Quatrini, F. Remonsellez, C. Davis-Belmar, et al. (eds), *Proceedings of Integration of Scientific and Industrial Knowledge on Biohydrometallurgy - Selected, Peer Reviewed Papers from the 20th International Biohydrometallurgy Symposium (IBS 2013)*, 8-11 October 2013, Antofagasta, Chile, Switzerland: Trans Tech Publications Ltd. ISSN 10226680.

Govender, E., Bryan, C.G. and Harrison, S.T.L. 2013. True growth rate kinetics: an account of the colonisation and transport of microorganisms on whole low grade ore, at the agglomerate scale. In N. Guiliani, C. Demergasso, R. Quatrini, F. Remonsellez, C. Davis-Belmar, et al. (eds), *Proceedings of Integration of Scientific and Industrial Knowledge on Biohydrometallurgy - Selected, Peer Reviewed Papers from the 20th International Biohydrometallurgy Symposium (IBS 2013)*, 8-11 October 2013, Antofagasta, Chile, Switzerland: Trans Tech Publications Ltd. ISSN 10226680.

Nwaila, G., Becker, M.E., Ghorbani, Y., Petersen, J., Reid, D.L., Bam, L.C., de Beer, F. and Franzidis, J.-P. 2013. A geometallurgical study of the Witwatersrand gold ore at Carletonville, South Africa. In S. Dominy (ed), *Proceedings of the Second AusIMM International Geometallurgy Conference (GeoMet 2013)*, 30 September - 2 October 2013, Brisbane, Australia, Carlton Victoria, Australia: The Australasian Institute of Mining and Metallurgy. ISBN 9781921522987.

Simunika, N., Broadhurst, J.L., Petersen, J., Harrison, S.T.L. and Franzidis, J.-P. 2013. Predicting the time-related generation of acid rock drainage from mine waste: a copper case study. In S. Winchester, F. Valenzuela and D. Mulligan (eds), *Proceedings of the 3rd International Seminar on Environmental Issues in Mining (Enviromine 2013)*, 4-6 December 2013, Santiago, Chile. Santiago, Chile: Gecamin. ISBN 9789569393044.

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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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UCT web site: <http://www.uct.ac.za>

Research Output

Chapters in books

Alexander, M.G. and De Belie, N. 2013. Testing for degradation by inorganic acids. In M. Alexander; A. Bertron and N. De Belie (eds), *Performance of Cement-Based Materials in Aggressive Aqueous Environments*, pp. 289-303. Netherlands: Springer. ISBN 9789400754126.

Loudon, M. and Rivett, U.K. 2013. Enacting openness in ICT4D research. In M.L. Smith and K.M.A. Riley (eds), *Open Development - Networked Innovations in International Development*, pp. 53-77. Cambridge, Massachusetts: The MIT Press. ISBN 9780262525411.

Articles in peer-reviewed journals

Adewumi, J., Ilemobade, A. and Van Zyl, J. 2013. Application of a multi-criteria decision support tool in assessing the feasibility of implementing treated wastewater reuse. *International Journal of Decision Support System Technology*, 5(1): 1-23.

Beukes, E., Vanderschuren, M.J.W.A., Zuidgeest, M., Brussel, M. and van Maarseveen, M. 2013. Quantifying the contextual influences on road design. *Computer-Aided Civil and Infrastructure Engineering*, 28: 344-358.

- Beushausen, H. and Chilwesa, M. 2013. Assessment and prediction of drying shrinkage cracking in bonded mortar overlays. *Cement and Concrete Research*, 53: 256-266.
- Bissonnette, B., Courard, L., Beushausen, H., Fowler, D., Trevino, M. and Vaysburd, A. 2013. Recommendations for the repair, the lining or the strengthening of concrete slabs or pavements with bonded cement-based material overlays. *Materials and Structures*, 46(3): 481-494.
- Carden, K. and Armitage, N.P. 2013. Assessing urban water sustainability in South Africa - not just performance measurement. *Water SA*, 39(3): 345-350.
- Cassa, A. and Van Zyl, J. 2013. Predicting the head-leakage slope of cracks in pipes subject to elastic deformations. *Journal of Water Supply Research and Technology-Aqua*, 62(4): 214-223.
- Fisher-Jeffes, L. and Armitage, N.P. 2013. Charging for stormwater in South Africa. *Water SA*, 39(3): 429-436.
- Githachuri, K. and Alexander, M.G. 2013. Durability performance potential and strength of blended Portland limestone cement concrete. *Cement & Concrete Composites*, 39: 115-121.
- Legner, D., Wackerfu, J., Klinkel, S. and Wagner, W. 2013. An advanced finite element formulation for piezoelectric beam structures. *Computational Mechanics*, 52(6): 1331-1349.
- Legner, D., Klinkel, S. and Wagner, W. 2013. An advanced finite element formulation for piezoelectric shell structures. *International Journal for Numerical Methods in Engineering*, 95(11): 901-927.
- Muigai, R., Alexander, M.G. and Moyo, P. 2013. Cradle-to-gate environmental impacts of the concrete industry in South Africa. *Journal of the South African Institution of Civil Engineering*, 55(2): 2-7.
- Nganga, G., Alexander, M.G. and Beushausen, H. 2013. Practical implementation of the durability index performance-based design approach. *Construction and Building Materials*, 45: 251-261.
- Rivett, U.K., Champanis, M. and Wilson-Jones, T. 2013. Monitoring drinking water quality in South Africa: designing information systems for local needs. *Water SA*, 39(3): 409-414.
- Salazar Ferro, P., Behrens, R. and Wilkinson, P.B. 2013. Hybrid urban public transport systems in developing countries: portents and prospects. *Transportation Research Part A - General*, 39(1): 121-132.
- Sansour, C., Skatulla, S. and Hijaj, M. 2013. A shell theory with scale effects and higher order gradients. *International Journal of Solids and Structures*, 50: 2271-2280.
- Schalekamp, H.V. and Behrens, R. 2013. Engaging the paratransit sector in Cape Town on public transport reform: Progress, process and risks. *Transportation Research Part A - General*, 39(1): 185-190.
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- Van Zyl, J., Alsaydalani, M., Clayton, C., Bird, T. and Dennis, A. 2013. Soil fluidisation outside leaks in water distribution pipes-preliminary observations. *Proceedings of the Institution of Civil Engineers - Water Management*, 166(10): 546-555.
- Wu, D., Ekama, G.A., Lu, H., Chui, H., Liu, W., Brdjanovic, D., van Loosdrecht, M.C.M. and Chen, G.H. 2013. A new biological phosphorus removal process in association with sulfur cycle. *Water Research*, 47: 3057-3069.
- Zingoni, A., Mudenda, K., French, V. and Mokhothu, B. 2013. Buckling strength of thin-shell concrete arch dams. *Thin-Walled Structures*, 64: 94-102.

Peer-reviewed published conference proceedings

Adams, J. and Zingoni, A. 2013. Collapse behaviour of double-layer grid structures in steel. 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.

Bhengu, Z., Kalumba, D. and Chebet, F. 2013. A study of frictional interface properties between typical South African sands and construction materials. In A. Zingoni (eds), *Proceedings of Research and Applications in Structural Engineering, Mechanics and Computation.*

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Essack, M. and Skatulla, S. 2013. Identification of nonlinear hyperelastic material parameters for healthy myocardial tissue via an inverse method based on modelling the passive filling stage of the cardiac cycle. In A. Zingoni (eds), 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.

Goqo, S., Skatulla, S. and Becker, T. 2013. Optimisation of the double torsion geometry. In A. Zingoni (eds), 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.

Grey, P. and Behrens, R. 2013. A case for smarter city growth: a strategic analysis of Cape Town's phase 1A BRT system and its supporting land use environment. In W.J. vd M. Steyn (ed), Proceedings of Southern African Transport Conference (SATC 2013), 8-11 July 2013, Pretoria, South Africa. Pretoria: Document Transformation Technologies cc. ISBN 9781920017620.

Ithana, T. and Vanderschuren, M.J.W.A. 2013. Investigation of separation distances between cyclists and motorists in Cape Town. In W.J. vd M. Steyn (ed), Proceedings of Southern African Transport Conference (SATC 2013), 8-11 July 2013, Pretoria, South Africa. Pretoria: Document Transformation Technologies cc. ISBN 9781920017620.

Kalumba, D. and Chebet, F. 2013. Utilisation of polyethylene (plastic) shopping bags waste for soil improvement in sandy soils. In P. Delage, J. Desrues, R. Frank, A. Puech and F. Schlosser (eds), Proceedings of

the 18th International Conference on Soil Mechanics and Geotechnical Engineering - Challenges and Innovations in Geotechnics, 2-6 September 2013, Paris, France. Paris: Presses des Ponts. ISBN 9782859784775.

Kane, L., Baleni, V. and Cooke, S. 2013. Impoverished data: experiences and lessons in collecting Cape Town data for the millennium cities database. In W.J. vd M. Steyn (ed), Proceedings of Southern African Transport Conference (SATC 2013), 8-11 July 2013, Pretoria, South Africa. Pretoria: Document Transformation Technologies cc. ISBN 9781920017620.

Moyo, P., Hattingh, L. and Oosthuizen, C. 2013. Ambient vibration measurements at Kouga dams - getting much more information than expected. In J.S. Wolfhope (ed), Proceedings ICOLD 2013 International Symposium. Changing Times: Infrastructure Development to Infrastructure Management, 14 August 2013, Seattle, Washington. USA: USSD - United States Society on Dams. ISBN 9781884575631.

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Rein, P., Champanis, M. and Rivett, U.K. 2013. Drop drop - prototyping a mobile application educating on the water system through private meter readings. In G. Marsden and J. May (eds), Proceedings of the Sixth International Conference on Information and Communications Technologies and Development (ICTD 2013), 7-10 December 2013, Cape Town. Cape Town: ACM. ISBN 9781450319072.

Sack, K., Skatulla, S. and Sansour, C. 2013. Biological tissue mechanics with fibres modelled as one-dimensional Cosserat continua. Applications to cardiac tissue in healthy and diseased states. 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.

Sobhee-Beetul, L. and Kalumba, D. 2013. An investigation into using stone columns in the improvement of marginal sites in South Africa. In B. Indraratna; C. Rujikiatkamjorn and J. Vinod (eds), Proceedings of the International Conference on Ground Improvement and Ground Control: Transport

Infrastructure Development and Natural Hazards Mitigation (ICGI 2012), 30 October - 2 November 2012, Wollongong, Australia. Singapore: Research Publishing. ISBN 9789810735616.

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.

Vezi, M., Moyo, P. and Oosthuizen, C. 2013. Dynamic modelling of arch dams in the ambient state. In D. Badenhorst (ed), Proceedings of Advances in Dam Technology for Water and Energy in Southern Africa - SANCOLD 2013, 5-7 November 2013, Thaba'Nchu, Free State. South Africa: SANCOLD - South African National Committee on Large Dams. ISBN 9780797214634.

Warren-Codrington, C. and Kalumba, D. 2013. Review pertaining to the determination of key soil parameters for wind turbine design in South Africa. In Y. Cui, F. Emeriault, F. Caira, S. Ghabezloo, J.M. Pereira, M. Reboul, H. Ravel and A. Tang (eds), Proceedings of the 5th International Young Geotechnical Engineers' Conference (5th iYGEC 2013), 31 August - 1 September 2013, Marne-la-Valle, France. France: IOS Press. ISBN 9781614992967.

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.

Bowen, P.A., Edwards, P., Lingard, H. and Cattell, K.S. 2013. Harassment and discrimination experienced by quantity surveyors in South Africa. *Acta Structilia*, 20(2): 50-77.

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.

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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.

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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.

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CIB World Building Congress 2013: Construction and Society, 5-9 May 2013, Brisbane, Australia. Australia: CIB conference. ISBN 9780987554208.

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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

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Emeritus Professors

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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

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MS ALISON HUGHES

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D KAPONGO

Energy Efficiency Engineer, ERC

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MR AC STONE

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Chief Research Officer, ERC; climate change

MR AJAY TRIKAM

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PROFESSOR HARALD WINKLER

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MS HOLLE WLOKAS

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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.

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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.

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- Kajee, Y., Pelteret, J. and Reddy, B.D. 2013. The biomechanics of the human tongue. *International Journal for Numerical Methods in Biomedical Engineering*, 29: 492-514.
- Kakogiannis, D.A., Chung Kim Yuen, S., Palanivelu, S., van Hemelrijck, D., van Paepegem, W., Wastiels, J., Vantomme, J. and Nurick, G.N. 2013. Response of pultruded composite tubes subjected to dynamic and impulsive axial loading. *Composites Part B-Engineering*, 55: 537-547.
- Karagiozova, D., Langdon, G.S. and Nurick, G.N. 2013. Compaction of metal foam subjected to an impact by a low-density deformable projectile. *International Journal of Impact Engineering*, 62: 196-209.
- Kuppuswamy, R., Bower, D. and March, P. (2013). Blend of sharpness and strength on a ball nose endmill geometry for high speed machining of Ti6Al4V. *The International Journal of Advanced Manufacturing Technology*, 2: 5345-5357.
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- Langdon, G.S., Chung Kim Yuen, S., Nurick, G.N. and Naidoo, K. 2013. Some insights into the response of "shallow V shape" structures to air blast loading. *Journal of Pain SA -The South African Chapter of the IASP*, 4: 695-703.
- Langdon, G.S., Karagiozova, D., von Klemperer, C.J., Nurick, G.N., Ozinsky, A. and Pickering, E.G. 2013. The air-blast response of sandwich panels with composite face sheets and polymer foam cores: experiments and predictions. *International Journal of Impact Engineering*, 54: 64-82.
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- Malan A.G. and Oxtoby O.F. 2013. An accelerated, fully-coupled, parallel 3D hybrid finite-volume fluid-structure interaction scheme, *Computer Methods in Applied Mechanics and in Engineering*, 253: 426-438.
- Martin, C. 2013. Generating low-cost national energy benchmarks: a case study in commercial buildings in Cape Town, South Africa. *Energy and Buildings*, 64: 26-31.
- Merrett, R.P., Langdon, G.S. and Theobald, M. 2013. The blast and impact loading of aluminium foam. *Materials and Design*, 44: 311-319.
- Mwesigye, A., Bello-Ochende, T. and Meyer, J.P. 2013. Numerical investigation of entropy generation in a parabolic trough receiver at different concentration ratios. *Energy*, 53: 114-127.
- Nwankwo, E., Soleiman Fallah, A., Langdon, G.S. and Louca, L. 2013. Inelastic deformation and failure of partially strengthened profiled blast walls. *Engineering Structures*, 46: 671-686.
- Ogunmodimu, O. and Marquard, A.K. 2013. CSP technology and its potential contribution to electricity supply in northern Nigeria. *International Journal of Renewable Energy Research - IJRER*, 3(3): 529-537.
- Pickering, E.G., Chung Kim Yuen, S. and Nurick, G.N. 2013. The influence of the height of burial of buried charges - some experimental observations. *International Journal of Impact Engineering*, 58: 76-83.
- Rampai, T., Lang, C.I. and Sigalas, I. 2013. Investigation of MAX phase/c-BN composites. *Ceramics International*, 39: 4739-4748.
- Schutte, A., Wright, C.Y., Langdon, G.S., Lochner, C. and Myers, B. 2013. What is the research experience of young scientists in South Africa? *South African Journal of Science*, 109(11-12): A0040(2pp).
- Smith, L., Oxtoby, O.F., Malan, A.G. and Meyer, J. 2013. An interactive boundary layer modelling methodology for aerodynamic flows. *International*

Journal of Numerical Methods for Heat & Fluid Flow, 23(8): 1373-1392.

Stafford, W., Cohen, B., Pather-Elias, S., Von Blottnitz, H., van Hille, R.P., Harrison, S.T.L. and Burton, S.G. 2013. Technologies for recovery of energy from wastewaters: applicability and potential in South Africa. Journal of Energy in Southern Africa, 24(1): 15-26.

Tembo, B. and Merven, B. 2013. Policy options for the sustainable development of Zambia's electricity sector. Journal of Energy in Southern Africa, 24(2): 16-27.

Tyler, E., Boyd, A., Coetzee, K., Torres Gunfaus, M. and Winkler, H. 2013. Developing country perspectives on 'mitigation actions', 'NAMAs', and 'LCDS'. Climate Policy, 13(6): 770-776.

Velaers, A.J., de Goede, S., Woolard, C. and Burnham, R. 2013. Injector fouling performance and solubility of GTL diesel dosed with zinc. SAE International Journal of Fuels and Lubricants, 6(1): 276-288.

Vilane, V. and Knutsen, R.D. 2013. Grain refinement in cast Ti-6Al-4V by hydrogenation, deformation and recrystallisation. Materials Science Forum, 753: 271-274.

Winkler, H., Letete, T. and Marquard, A. 2013. Equitable access to sustainable development: operationalizing key criteria. Climate Policy, 13(4): 411-432.

Peer-reviewed published conference proceedings

Booyesen, T. and Marais, S. 2013. The development of a remote controlled, omnidirectional six legged walker with feedback. Proceedings of IEEE Africon 2013 Conference, 9-12 September 2013, Le Meridien Hotel, Mauritius. Mauritius: IEEE. ISBN 9781467359405.

Craig, T.S. and Cloete, T.J. 2013. Observations and conclusions of Dynamics student's mathematical fluency. 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.

Zhou, E., Malan, A.G., Oxtoby, O., Coville, K. and Wyngaard, S. 2013. An implicit preconditioned GMRES solver on a graphic processing unit (GPU) with compute unified architecture device (CUDA), Third African Conference on Computational Mechanics – An International Conference – AfriCOMP13, 30 July – 2 August 2013, Livingstone, Zambia.

Gosai, P., Pretorius, J.P. and Malan, A.G. 2013. Numerical model that predicts the thermal response of a large cooling pond, Third African Conference on Computational Mechanics – An International Conference – AfriCOMP13, 30 July – 2 August 2013, Livingstone, Zambia.

Heyns, J.A., Oxtoby, O.F. and Malan, A.G. 2012. A weakly compressible formulation for modelling liquid-gas sloshing. In J. Eberhardsteiner, et al. (eds), Proceedings of ECCOMAS 2012, 10-14 September, Vienna, Austria. Austria: Eur. Congr. Comput. Methods. Appl. Sci. Eng (ECCOMAS). ISBN 9783950353709.

Hibberd, A.C.M. 2013. The energy management system pre-implementation phase. In E. Kruger (ed), Proceedings of South African Energy Efficiency Convention (2013SAEEC Proceedings), 13-14 November, Emperors Palace, Gauteng. Potchefstroom, South Africa: South African Association for Energy Efficiency. ISBN 9780620582049.

Kuppuswamy, R., Bower, D. and March, P. 2013. Effect of ball nose end mill geometry on high speed machining of Ti6Al4V. In F. Pfefferkorn (ed), Proceedings of ASME 2013 Manufacturing Science and Engineering Conference (MSEC2013), 10-14 June 2013, Wisconsin, USA. USA: Asme-Amer Soc Mechanical Eng. ISBN 9780791855461.

Kuppuswamy, R., Airey, K.A., Chenonya, G.M., Sardikamen, S. and Ozbayraktar, S. 2013. Use of polycrystalline diamond (PCD) end mills on high speed milling of Ti6Al4V alloy. In J. Mathew and R. Manu (eds), Proceedings of the International Conference on Precision, Meso, Micro and Nano Engineering (COPEN-8: 2013), 13-15 December 2013, India. New Delhi: Excel India Publishers. ISBN: 9789382880868.

Kuppuswamy, R., Shaba, V. and Bower, D. 2013. Micro-grinding of poly crystalline diamond insert using a controlled force technique, 1st National Conference on Micro and Nano Fabrication, 21-23 January 2013, CMTI, Bangalore, India.

Langdon, G.S., Chung Kim Yuen, S., Nurick, G.N. and Naidoo, K. 2013. Some insights into the response of "shallow V shape" structures to air blast loading. Proceedings of the Indian National Science Academy, Special Issue Part A, Vol 79(3): 695-704 ISSN 03700046.

Larmour, R. 2013. Commercial heat pumps: a retrospective M&V case study. In E. Kruger (ed), Proceedings of South African Energy Efficiency Convention (2013SAEEC Proceedings), 13-14 November, Gauteng. Potchefstroom, South Africa: South African Association for Energy Efficiency. ISBN: 9780620582049.

Luckay, M. and Collier-Reed, B.I. 2013. Validating an instrument for use in assessing the technological literacy of upper secondary school students. In M. Ogunniyi, O. Amosun, K. Langenhoven, S. Kwofie and S. Dinie (eds), Proceedings of the 21st annual meeting of the Southern African Association for Research in Mathematics, Science and Technology Education (SAARMSTE 2013), 14-17 January 2013, Bellville, South Africa. Bellville: SAARMSTE. ISBN 9780986980077.

Moorlach, M.F.C. 2013. The rationale behind power alert. In E. Kruger (ed), Proceedings of South African Energy Efficiency Convention (2013SAEEC Proceedings), 13-14 November, Gauteng. Potchefstroom, South Africa: South African Association for Energy Efficiency. ISBN 9780620582049.

Mowat, A.G.B., Malan, A.G., and Ismail, E.B. 2013. A 3D unified, strongly coupled fluid–structure-interaction modelling methodology, Third African Conference on Computational Mechanics – An International Conference – AfriCOMP13, 30 July – 2 August 2013, Livingstone, Zambia.

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
Computational Intelligence

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Research Output

Articles in peer-reviewed journals

Chukwuka, C. and Folly, K.A. 2013. Overview of concentrated solar power. *Journal of Energy and Power Engineering*, 7(12): 2291-2299.

Chukwuka, C. and Folly, K.A. 2013. Technical and economic modeling of the 2.5kW grid-tie residential photovoltaic system. *International Journal of Renewable Energy Research - IJRER*, 3(2): 412419.

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De Beer, C., Barendse, P.S. and Khan, M.A. 2013. Development of an HT PEM fuel cell emulator using a multiphase interleaved DC-DC converter topology. *IEEE Transactions on Power Electronics*, 28(3): 1120-1131.

Engelbrecht, J. and Inggs, M.R. 2013. Differential interferometry techniques on I-band data employed for the monitoring of surface subsidence due to mining. *South African Journal of Geomatics*, 2(2): 82-93.

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Ibrahim, M. and Pillay, P. 2013. Core loss prediction in electrical machine laminations considering skin effect and minor hysteresis loops. *IEEE Transactions on Industry Applications*, 49(5): 2061-2068.

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Nadjiasngar, R. and Inggs, M.R. 2013. Gauss-Newton filtering incorporating Levenberg-Marquardt methods for tracking. *Digital Signal Processing*, 23(5): 1662-1667.

Olaofe, Z. and Folly, K.A. 2013. Wind energy analysis based on turbine and developed site power curves: a case-study of Darling City. *Renewable Energy*, 53: 306-318.

Panigrahi, R.K. and Mishra, A. 2013. Unsupervised classification of scattering behaviour using hybrid-polarimetry. *IET Radar Sonar and Navigation*, 7(3): 270-276.

Pileggi, P., Iazeolla, G. and Kritzing, P.S. 2013. Demonstrating the synergy between CAC and scheduling in wireless networks. *International Journal of Modelling & Simulation*, 4(1): 1250027(23pp).

Radonic, V., Geschke, R. and Crnojević-Bengin, V. 2013. Dual-band filters with independent passbands based on perturbed grounded patch resonators. *Journal of Electromagnetic Waves and Applications*, 27(16): 2110-2122.

Siraki, A.G., Pillay, P. and Angers, P. 2013. Full load efficiency estimation of refurbished induction machines from no-load testing. *IEEE Transactions on Energy Conversion*, 28(2): 317-326.

Spottiswoode, B., van den Heever, D.J., Chang, Y., Engelhardt, S., du Plessis, S., Nicolls, F., Hartzenberg, H.B. and Gretscher, A. 2013. Preoperative three-dimensional model creation of magnetic resonance brain images as a tool to assist neurosurgical planning. *Stereotactic and Functional Neurosurgery*, 91(3): 162-169.

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2013), 31 January - 1 February 2013, Potchefstroom. Potchefstroom: SAUPEC. ISBN 9781868226306.

De Beer, C., Barendse, P., Pillay, P., Bullecks, B. and Rengaswamy, R. 2013. Degradation of high temperature PEM fuel cells and the impact on electrical performance. Proceedings ICIT 2013 - 2013 IEEE International Conference on Industrial Technology (ICIT), 25-28 February 2013, Cape Town, South Africa. Cape Town: IEEE. ISBN 9781467345699.

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De Beer, C., Barendse, P.S., Pillay, P., Bullocks, B. and Rengaswamy, R. 2013. Electrical circuit analysis of CO poisoning in high temperature PEM fuel cells for rapid fault diagnostics. Proceedings of IEEE Energy Conversion & Exposition (ECCE 2013), 15-19 September 2013, Colorado, Denver. Denver: IEEE. 9781479903351.

De Beer, C., Barendse, P.S., Pillay, P., Bullecks, B. and Rengaswamy, R. 2013. Online fault diagnostics and impedance signature mapping of high temperature PEM fuel cells using rapid small signal injection. Proceedings of IECON 2013 - 39th Annual Conference of the IEEE Industrial Electronics Society, 10-13 November 2013, Vienna, Austria. Austria: IEEE. ISBN 9781479902231.

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Dlamini, M., Barendse, P.S. and Khan, M.A. 2013. Autonomous detection of interturn stator faults in induction motors. Proceedings of International Conference on Industrial Technology (ICIT) 2013, 25-28 February 2013, Cape Town. Cape Town: IEEE. ISBN 9781467345699.

Edimu, M., Herman, R. and Gaunt, C.T. 2013. Impact of a network component failure model on the perception of its reliability. Proceedings of Southern African Universities Power Engineering Conference (SAUPEC 2013), 31 January - 1 February 2013, Potchefstroom. Potchefstroom: SAUPEC. ISBN 9781868226306.

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packet loss for proxy MIPv6 with coordinating MAG. In R. Volkwyn (ed), Proceedings of Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2013, 1-4 September 2013, Stellenbosch, Western Cape. Western Cape: SATNAC. ISBN 9780620578820.

Ernest, E., Falowo, O.E. and Chan, H.A. 2013. Network-based distributed mobility management: design and analysis. Proceedings of The 9th IEEE International Conference on Wireless and Mobile Computing, Networking and Communications (WIMob 2013), 7-9 October 2013, Lyon, France. France: IEEE. ISBN 9781479904280.

Esmail, M., Tsoeu, M.S. and John, L.R. 2013. Towards improving the statscan X-Ray image quality through sliding-mode control of the C-arm. In K. Elleithy and T. Sobh (eds), Proceedings of Innovations and Advances in Computer, Information, Systems Sciences and Engineering, 2013, USA. USA: Springer. ISBN 9781461435341.

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Fadiran, J. and Chowdhury, S. 2013. Possibilities of interfacing electric vehicle charging infrastructures with AC railways. Proceedings of 12th International Conference on Sustainable Energy Technologies (SET 2013), 26-29 August 2013, Hong Kong, China. Hong Kong: Faculty of Construction and Environment & Research Institute. ISBN 9789881543950.

February, J., Nguz, M. and Chowdhury, S. 2013. Economic analysis of a stand-alone residential solar PV system for a typical South African income household. Proceedings of UPEC 2013 Dublin 48th Universities' Power Engineering Conference (UPEC 2013), 2-5 September 2013, Dublin. Dublin: DIT. ISBN 9781479932535.

Folly, K.A. and Venayagamoorthy, G.K. 2013. Power system controller design using multi-population PBIL. Proceedings of the 2013 IEEE Computational Intelligence Applications in Smart Grid (CIASG), 16-19 April 2013, Singapore. Singapore: IEEE. ISBN 9781467360029.

Habumugisha, D., Chowdhury, S. and Chowdhury, S.P. 2013. A DC-DC interleaved forward converter to step-up DC voltage for DC microgrid applications. Proceedings of 2013 IEEE Power and Energy Society General Meeting (PES), 21-25 July 2013, Vancouver, British Columbia, Canada. Canada: IEEE. ISBN 9781479913015.

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Ibrahim, M. and Pillay, P. 2013. A hybrid model for improved hysteresis loss prediction in electrical machines. Proceedings of IEEE Energy Conversion & Exposition (ECCE 2013), 15-19 September 2013, Denver. Denver: IEEE. ISBN 9781479903351.

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Inggs, M.R., Van Der Byl, A. and Tong, C. 2013. Commensal radar: range-doppler processing using a recursive DFT. Proceedings of 2013 International Conference on Radar (Radar 2013), 9-12 September 2013, Adelaide, Australia. Australia: IEEE. ISBN 9781467351775.

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- John, C. and Ventura, N.M. 2013. Design of IP flow mobility functionality for a PMIPv6-based evolved packet core. In R. Volkwyn (ed), Proceedings of Southern Africa Telecommunication Networks and Applications Conference (SATNAC) 2013, 1-4 September 2013, Stellenbosch, Western Cape. Western Cape: SATNAC. ISBN 9780620578820.
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- Kakoty, J.H. and Mishra, A.K. 2013. Compression based class-specific target recognition using SAR images. Proceedings of 2013 IEEE International Conference on Control, Automation, Robotics and Embedded Systems (CARE-2013), 16-18 December 2013, Jabalpur, Madhya Pradesh, India. India: IEEE. ISBN 9781467361531.
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