

Faculty of Engineering & the Built Environment

DEAN'S REPORT

Research and innovation remains one of the key pillars of the faculty strategy and we continue to build and strengthen work undertaken in these areas. Research education is fundamental to the faculty and underpins everything we do.



was created as a partnership between government, industry and academia, to promote the development of research needed by the mineral processing industry in South Africa, and to increase the number of postgraduate students entering the mineral processing industry.

Faculty highlights

Professor Alphonse Zingoni, head of the Department of Civil Engineering, was the first South African to be made a fellow of the International Association for Bridge and Structural Engineering.

I am pleased to report that our academic staff continues to be recognised for their research work and have received a number of prestigious awards, fellowships, and memberships to international associations and science academies. In 2011, the number of NRF-rated researchers increased to 37. A total of 63 academics participated in the activities of the Emerging Researcher Programme to develop their research skills in order to obtain NRF rating.

2011 saw 1 096 postgraduate students registered in the faculty and 15 doctoral, 209 master's, and 122 honours degree students graduate at the two graduation ceremonies.

Through strategic partnerships and ongoing facilitation with government, the private sector, and industry, the number of research contracts has increased steadily over the years, and in 2011, the faculty was awarded 299 contracts, to the value of R94,18 million. The Faculty Research Committee continues to develop a strategy to increase research output and I am pleased to note that there has been a steady increase in the number of publications in peer-reviewed, accredited journals from 71.36 in 2005 to 94.68 in 2010.

Funding has been secured from industry for three research chairs in the fields of transport, energy efficiency and materials science. The Department of Mechanical Engineering's research capabilities were extended into the area of computational fluid dynamics, with the appointment of Associate Professor Arnaud Malan, an internationally recognised leader in this field.

This year saw the introduction of the new master's degree programme in radar and the faculty is in the process of finalising the curriculum and governance structure for a master's degree in Education for Sustainable Development. The South African Minerals to Metals Research Institute

Associate Professor Genevieve Langdon from the Department of Mechanical Engineering was selected as a founding member of the South African Young Academy of Science.

Professor Vanessa Watson was elected as a fellow of the university in recognition of her work in the field of planning.

Professor Daya Reddy, director of CERECAM, had his DST/NRF SARCHI Chair in Computational Mechanics renewed after the first cycle review.

Associate Professor Francis Carter and Emeritus Professor Dave Dewar received honourable mentions for the papers that they submitted to the first international competition for research papers in *Architecture and Urban Design*.

Associate Professor Kobus van Zyl in the Department of Civil Engineering was appointed to the board of the *Urban Water Journal*.

Dr Dyllon Randall, a research officer in the Department of Chemical Engineering, was awarded second place at the 2011 Young Persons' World Lecture competition.

Dr George Vicatos, of the Department of Mechanical Engineering, was named South Africa's Inventor of the Year by *Popular Mechanics*, for his development of a versatile and potentially life-changing facial reconstruction system.

Professors Alison Lewis, Dave Deglon and Eric van Steen were elected as fellows of the South African Academy of Engineering.



DEPARTMENTS

School of Architecture,
Planning & Geomatics

Department of Chemical Engineering

Department of Civil Engineering

Department of Construction
Economics and Management

Department of Electrical Engineering

Department of Mechanical
Engineering

Professor Rob Knutsen, from the Centre for Materials Engineering, was successful in his bid to obtain funding from the NRF for the purchase of a state-of-the-art thermo-mechanical process simulator (Gleeble 3 800) for hot deformation processing of metal alloys.

Professor Alison Lewis, Dr Dyllon Randall and Jeeten Nathoo from the Department of Chemical Engineering, jointly won the Research Paper of the Year (2011) at the South African Institution of Chemical Engineers Chemical Technology Awards, based on a paper that was published in *Desalination*.

The Women in Informal Employment: Globalising and Organising (WIEGO) Research Conference on the Informal Economy was hosted by the African Centre for Cities (ACC). More than 60 participants from 16 different countries attended the conference. The ACC published the first edition of *CityScapes*, a high-quality illustrated magazine devoted to broadening the urban research agenda set by the global South. The ACC also hosted the second South African Cities Conference over two days in September; at which more than 120 academics, students, and practitioners presented papers. The centre continued to develop collaborative research partnerships in and beyond South Africa, partly under the auspices of the State of Cities in Africa programme. The ACC secured

US\$ 850,000 in funding for 2011 to 2013 from the Rockefeller Foundation, to pursue the Revitalising Planning Education agenda, and to implement a collaborative partnership forged with Shack/Slum Dwellers International.

Dr Olaf Conrad was appointed as Programme Director for Hydrogen Economy South Africa (HySA)/Catalysis. During 2011, the student training contribution of HySA/Catalysis grew to 17 postgraduate students and two postdoctoral fellows. Since August 2011, HySA/Catalysis has been able to produce industry-standard fuel cell electrocatalysts at a commercially relevant scale, and this capability will make HySA a credible participant in the fuel cell research and development industry globally. Substantial progress was made in the establishment of an international high-

profile collaboration network, with regular mutual visits to Imperial College London, the Paul Scherrer Institute in Switzerland and the Centre for Fuel Cell Technology (ZBT), in Germany. During 2011, student visits took place to each of these institutions.

Sustainable energy, innovation and challenges was the theme of the South African Universities' Power Engineering Conference, which was hosted by the Department of Electrical Engineering, the Institution of Engineering Technology (UK), and IEEE Power and Energy Society.

The faculty has appointed three senior scholars to assist in the mentoring of younger staff, and also to contribute to the research agenda of the faculty. Furthermore, three to four postdoctoral fellowships (per annum) have been made available to increase the number of postdoctoral fellows in the faculty. We believe that the role of postdoctoral fellows is critical in promoting research performance. In order to enhance the quality of research theses and dissertations, but also to develop appropriate capacity in the faculty, young academics will co-supervise research projects with senior, more experienced supervisors.

One of the key strategies in the faculty is to develop a critical mass of research excellence through its research chairs. The faculty has embarked on an exercise of increasing the number of dedicated research chairs and building a core of postgraduate students, postdoctoral fellows, and other researchers with sustainable funding around them. Incentive funding has been earmarked to be utilised strategically to ensure that active researchers have more productive time to conduct research.

With the Faculty Research Committee's firm commitment to implementing its key research and innovation objectives, a strong and exciting foundation has been laid to promote and enhance research and innovation into the future.

PROFESSOR FRANCIS PETERSEN

Dean of the Faculty of Engineering & the Built Environment

DOCTORAL GRADUATIONS

T.H. BECKER (MECHANICAL ENGINEERING)

Understanding and modelling damage and fracture in nuclear grade graphite.

Supervised by Professor B. Tait

O.M. BELLO (ELECTRICAL ENGINEERING)

Multi-layer traffic engineering framework for inter-working multi-hop wireless networks.

Supervised by Professor H.A. Chan, Dr A. Bagula and Dr O.E. Falowo

E.A. BEUKES (CIVIL ENGINEERING)

Context sensitive road planning for developing countries.

Supervised by Associate Professor M. Vanderschuren

N. FISCHER (CHEMICAL ENGINEERING)

Preparation of nano and Ångström sized cobalt ensembles and their performance in the Fischer-Tropsch synthesis.

Supervised by Professor M. Claeys and Professor E. van Steen

R.A. GOVENDER (MECHANICAL ENGINEERING)

Characterisation of glass fibre polypropylene and GFPP-based fibre metal laminates at high strain rates.

Supervised by Professor G. Nurick and Associate Professor G.S. Langdon

M.J. GRIFFITHS (CHEMICAL ENGINEERING)

Optimising microalgal lipid productivity for biodiesel production.

Supervised by Professor S.T.L. Harrison and Dr R. van Hille

D.S. IKUMI (CIVIL ENGINEERING)

The development of a three-phase plantwide mathematical model for sewage treatment.

Supervised by Professor G.A. Ekama

K.I. JACOBS (MECHANICAL ENGINEERING)

A new product development practices model for small and medium engineering enterprises.

Supervised by Professor J. Gryzagoridis

B.C. KLOOT (CHEMICAL ENGINEERING)

A Bourdieuan analysis of foundation programmes within the field of engineering education: Two South African case studies.

Supervised by Associate Professor J. Case and Professor D. Marshall

L. KOTTA (CHEMICAL ENGINEERING)

Structural conditioning and mediation by student agency: A case study of success in chemical engineering design.

Supervised by Associate Professor J. Case

G. LUSILAO-ZODI (ELECTRICAL ENGINEERING)

Real-time data flow models and congestion management for wire and wireless IP networks.

Supervised by Associate Professor M.E. Dlodlo, Professor G. de Jager and Professor J.F. Ferguson

S.H. MORAR (CHEMICAL ENGINEERING)

The use of machine vision to describe and evaluate froth phase behaviour and performance in mineral flotation systems.

Supervised by Associate Professor D. Bradshaw and M. Harris

T.J. NDWE (ELECTRICAL ENGINEERING)

Usability engineering of interactive voice response (IVR) systems in oral users of Southern Africa.

Supervised by Associate Professor M.E. Dlodlo and Associate Professor D. Mashao

R.G. STEPHEN (ELECTRICAL ENGINEERING)

Objective determination of optimal power line designs.

Supervised by Professor C.T. Gaunt

A.J.D. VAN GRAAN (SCHOOL OF ARCHITECTURE AND PLANNING)

Negotiating Modernism in Cape Town: 1918–1948.

An investigation into the introduction, contestation, negotiation, and adaptation of modernism in the architecture of Cape Town.

Supervised by Associate Professor I. Low

PATENTS

FILED APPLICATIONS

BACON, T. AND MCNAUGHT, A.M.

Prosthesis with underactuated prosthetic fingers.
Provisional Patent Application South Africa 2011/08606.

BÖHRINGER, W., FLETCHER, J.C.Q. AND TOMA, V.N.

Stabilised and activated metal cluster complex-based catalysts and their preparation. Provisional Patent Application South Africa 2011/08677.

BOONZAIR, J.A., HENDRICKS, M.R. AND VICATOS, G.

Transport distraction apparatus. Provisional Patent Application South Africa 2011/08678.

CLAEYS, M. AND FISCHER, N.F.

Sample presentation device for radiation-based analytical equipment. Provisional Patent Application South Africa 2011/04917.

CLAEYS, M. AND FISCHER, N.F.

Sample presentation device for radiation-based analytical equipment. Provisional Patent Application United States 13/180,718.

CLAEYS, M., VAN DE LOODSDRECHT, J., VAN STEEN, E.W.J. AND VISAGIE, J.L.

A magnetometer. National Phase Patent Application Europe 09794057.1.

CLAEYS, M., VAN DE LOODSDRECHT, J., VAN STEEN, E.W.J. AND VISAGIE, J.L.

A magnetometer. National Phase Patent Application Japan JPxPCT/IB2009/00621.

CLAEYS, M., VAN DE LOODSDRECHT, J., VAN STEEN, E.W.J. AND VISAGIE, J.L.

A magnetometer. National Phase Patent Application United States 13/003,109.

GINSBERG, S.I.

A laser cutter. PCT Patent Application PCT PCT/IB2011/001640.

GINSBERG, S.I.

An adjustable hanging device. Provisional Patent Application South Africa 2011/04961.

GINSBERG, S.I., PARSONS, A.T. AND VICATOS, G.

An endoprosthesis. Provisional Patent Application South Africa 2011/04740.

LEWIS, A.E. AND NATHOO, J.A.

Method for separating components out of a eutectic solution.
National Phase Patent Application Australia 2009283940.

LEWIS, A.E. AND NATHOO, J.A.

Method for separating components out of a eutectic solution. National Phase Patent Application Canada 2,732,629.

LEWIS, A.E. AND NATHOO, J.A.

Method for separating components out of a eutectic solution. National Phase Patent Application Europe 09807969.2.

LEWIS, A.E. AND NATHOO, J.A.

Method for separating components out of a eutectic solution. National Phase Patent Application South Africa 2011/01228.

LUSILAO-ZODI, G.-A. AND MORRISON, N.

A system and method for estimating round-trip time in telecommunication networks. PCT Patent Application PCT PCT/IB2011/000393.

GRANTED

CLAEYS, M., RAUSCH, A., RÖSSNER, F. AND VAN STEEN, E.W.J.

A process for the production of hydrocarbons including olefins from synthesis gas. National Phase Patent South Africa 2010/07627.

CLAEYS, M., RAUSCH, A., RÖSSNER, F. AND VAN STEEN, E.W.J.

A process for the production of hydrocarbons including olefins from synthesis gas. National Phase Patent South Africa 2010/07629.

CLAEYS, M., VAN DE LOODSDRECHT, J. AND VAN STEEN, E.W.J., VISAGIE, J.L.

A magnetometer. National Phase Patent South Africa 2010/08984.

DANN, M. AND PETERSEN, J.

Apparatus and method for measuring flow. Complete Patent South Africa 2010/06168.

LEWIS, A.E. AND NATHOO, J. A.

Method for separating components out of a eutectic solution. National Phase Patent South Africa 2011/01228.

RESEARCH CONTRACTS

299

VALUE OF RESEARCH CONTRACTS

R94,18 million

NRF-RATED RESEARCHERS

37

SARCHI RESEARCH CHAIRS

5

ACCREDITED RESEARCH GROUPINGS

12

DOCTORAL GRADUATIONS

15

ERP PARTICIPANTS

63

DHET-ACCREDITED JOURNALS

94.68

PEER-REVIEWED PUBLICATIONS

375

FILED PATENTS

16

GRANTED PATENTS

5

POSTGRADUATE STUDENTS

1 096

POSTGRADUATE FUNDING

R24,61 million

POSTDOCTORAL RESEARCH FELLOWS

13

POSTDOCTORAL RESEARCH FUNDING

R1,84 million

SCHOOL OF ARCHITECTURE, PLANNING & GEOMATICS

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.

There are a few projects underway in the School that evidences this: the PERC - VPUU "Participatory Design" project, the community-led and involved Planning & Landscape Architecture Studio Project that focuses on the informal settlements of Barcelona & Europe (run in conjunction with CORC [Community Organisation Resource Centre] with support by the international NGO Slum and Shack Dwellers International [SDI]), and the 2nd year BAS Platform building project in the informal settlement of Imizamo Yethu.

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 is now five years old. In its short life it 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.

The ACC is linked tightly to the flourishing Association of African Planning Schools (47 members across the continent) and it leads a multinational 'state of the cities' audit in four African capitals. Extending the ACC's cross-continent work is under consideration. The ACC has good links with UCT's newly established African Climate & Development Initiative (ACC was present at COP17), and will work closely with the new Violence Signature theme. Exchange of PhD students with City officials is starting in 2012 in an exciting programme for co-production of urban knowledge.

The Cape Urban Observatory is an ACC project, run from within the Geomatics Division, which aims to facilitate evidence-based decision making and improved collaboration by providing a public internet-based platform for the storage, dissemination and analysis of geo-spatial information and analysis of themes relevant to integrated development planning.

Noteworthy achievements in 2011

Professor Jo Noero was awarded UCT's Creative Works Award for the Red Location Museum of Struggle in Port Elizabeth.

Professor Vanessa Watson was elected as a fellow of the University.

Emeritus Professor Dave Dewar received the Mayor's Medal for Social Affairs and Services for his contribution to the study of Planning in South Africa.

SCHOOL STATISTICS

Permanent and Long-term Contract Staff

Professors	5
Associate Professors	4
Senior Lecturers	8
Lecturers	8
Technical Support Staff	9
Administrative Staff	8
Total	42

Students

Doctoral	8
Master's	90
Honours	41
Undergraduates	323
Total	462

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.

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.

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.

LIANA MULLER

Lecturer: Landscape Architecture
Heritage and management of cultural landscapes, heritage landscapes and representation, specifically focussing on people's connection with the environment and landscape as an anchoring point for memory and meaning.

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 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.

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.

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.

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

School of Architecture, Planning and Geomatics, University of Cape Town, Private Bag X3, Rondebosch, 7701, Republic of South Africa

Telephone and Fax:

Architecture: Tel: SA (21) 650-2374 and Fax: SA (21) 650-2383

Planning: Tel: SA (21) 650-2359 and Fax: SA (21) 689-9466

Geomatics: Tel: SA (21) 650-3577 and Fax: SA (21) 650-3572

Webpage: <http://www.apg.uct.ac.za>

RESEARCH OUTPUT

Chapters in books

Bodin, O., Ramirez-Sanchez, S., Ernstson, H. and Prell, C. 2011. A social relational approach to natural resource governance. In O. Bodin and C. Prell (eds), *Social Networks and Natural Resource Management*, pp. 3-28. United Kingdom: Cambridge University Press. ISBN 978 0 5217 6629 6.

Crona, B., Ernstson, H., Prell, C., Reed, M. and Hubacek, K. 2011. Combining social network approaches with social theories to improve understanding of natural resource

governance. In O. Bodin and C. Prell (eds), *Social Networks and Natural Resource Management*, pp. 44-71. United Kingdom: Cambridge University Press. ISBN 978 0 5217 6629 6.

Ernstson, H. 2011. Transformative collective action: a network approach to transformative change in ecosystem-based management. In O. Bodin and C. Prell (eds), *Social Networks and Natural Resource Management*, pp. 255-287. United Kingdom: Cambridge University Press. ISBN 978 0 5217 6629 6.

Muller, L. 2011. Tangible and intangible ngquza: A study of Landscape and memory. In T. Kepe and L. Ntsebeza (eds), *Rural Resistance in South Africa: The Mpondo Revolts after Fifty Years*, pp. 209-230. Netherlands: Brill. ISBN 9789004214460.

Watson, V.J. 2011. Communicative planning: experiences, prospects and predicaments. In *International Handbook of Urban Policy*, pp. 133-145. United Kingdom: Edward Elgar Publishing. ISBN 978 1 84720 460 8.

Articles in Peer-reviewed Journals

Berrisford, S. 2011. Revising spatial planning legislation in Zambia: a case study. *Urban Forum*, 22: 229-245.

Berrisford, S. 2011. Unravelling apartheid spatial planning legislation in South Africa. *Urban Forum*, 22: 247-263.

Berrisford, S. 2011. Why it is difficult to change urban planning laws in African countries. *Urban Forum*, 22: 209-228.

Brown-Luthango, M. 2011. Capturing Land Value Increment to Finance Infrastructure Investment-Possibilities for South Africa. *Urban Forum*, 22(1): 37-52.

Odendaal, N. 2011. Splintering Urbanism or Split Agendas? Examining the Spatial Distribution of Technology Access in Relation to ICT Policy in Durban, South Africa. *Urban Studies*, 48: 2375-2397.

Pieterse, E.A. 2011. Grasping the unknowable: coming to grips with African urbanisms. *Social Dynamics*, 37(March): 5-23.

Pieterse, E.A. 2011. Recasting urban sustainability in the South. *Development*, 54(3): 309-316.

Pieterse, E.A. 2011. Symposium: African Urbanism 1 Introduction: rogue urbanisms. *Social Dynamics*, 37(1): 1-4.

Robinson, J. 2011. Cities in a world of cities: the comparative gesture. *International Journal of Urban and Regional Research*, 35(1): 1-23.

Robinson, J. 2011. The Travels of urban neoliberalism: taking stock of the internationalisation of urban studies. *Urban Geography*, 32(8): 1087-1109.

Simone, A. 2010. A Town on Its Knees? Economic Experimentations with Postcolonial Urban Politics in Africa and Southeast Asia. *Theory Culture and Society*, 27(7-8): 130-154.

Simone, A. 2011. Deals with imaginaries and perspectives: reworking urban economies in Kinshasa. *Social Dynamics*, 37(1): 111-124.

Simone, A. 2011. The ambivalence of the arbitrary: a supplement to Ash Amin's 'The Remains of Race'. *Theory, Culture and Society*, 28(1): 129-137.

Simone, A. 2011. The ineligible majority: Urbanizing the post colony in Africa and Southeast Asia. *Geoforum*, 42: 266-270.

Simone, A. 2011. The Surfacing of Urban Life? *City*, 15: 355-364.

Simone, A. 2011. The urbanity of movement: dynamic frontiers in contemporary Africa. *Journal of Planning Education and Research*, 31(4): 379-391.

Smit, W., Hancock, T., Kumaresen, J., Santos-Burgoa, C., Sanchez-Kobashi Meneses, R. and Friel, S. 2011. Toward a Research and Action Agenda on Urban Planning/Design and Health Equity in Cities in Low and Middle-Income Countries. *Journal of Urban Health-Bulletin of the New York Academy of Medicine*, 88(5): 875-885.

Steenkamp, A. 2011. Ambiguous associations: Monuments referred to in the design of the Voortrekker Monument. *South African Journal of Art History*, 26(3): 79-89.

Stein, C., Ernstson, H. and Barron, J. 2011. A social network approach to analysing water governance: The case of the Mkindo catchment, Tanzania. *Physics and Chemistry of the Earth*, 36: 1085-1092.

Tawodzera, G. 2011. Vulnerability in crisis: Urban household food insecurity in Epworth, Harare, Zimbabwe. *Food Security*, 3: 503-520.

Turok, I. 2011. Deconstructing density: Strategic dilemmas confronting the post-apartheid city. *Cities*, 28: 470-477.

Vlahov, D., Agarwal, S.R. and Watson, V.J. 2011. Roundtable on urban living environment research (RULER). *Journal of Urban Health-Bulletin of the New York Academy of Medicine*, 88(5): 793-857.

Watson, V.J. 2011. Changing planning law in Africa: an introduction the issue. *Urban Forum*, 22: 203-208.

Watson, V.J. 2011. Engaging with citizenship and urban struggle through an informality lens. *Planning Theory & Practice*, 12(1): 150-153.

Whittal, J.F. 2011. The potential use of cellular phone technology in maintaining an up-to-date register of land transactions for the urban poor. *Potchefstroom Electronic Law Journal*, Volume 14(3): 1-33.

Winkler, T. 2011. Retracking Johannesburg: Spaces for Participation and Policy Making. *Journal of Planning Education and Research*, 31(3): 258-271.

Winkler, T.A. 2011. On the Liberal Moral Project of Planning in South Africa. *Urban Forum*, 22(2): 135-148.

Peer-reviewed published conference proceedings

Akrofi, E.O. and Whittal, J.F. 2011. Traditional governance and customary peri-urban land delivery: a case study of Asokore-Mampong in Ghana. In *Proceedings of the First AfricaGEO Conference (2011 AfricaGeo)*, 31 May - 1 June 2011, Cape Town. Cape Town: AfricaGEO. ISBN 978-0-620-48428-2.

Louw, J. and Sithole, G. 2011. Context based detection of urban land use zones. In *Proceedings of the First AfricaGEO Conference (2011 AfricaGeo)*, 31 May - 1 June 2011, Cape Town. Cape Town: AfricaGEO. ISBN 978-0-620-48428-2.

Mabesa, M.J. and Whittal, J.F. 2011. Analysis of the current cadastral system in Lesotho using Viable Systems Modelling (VSM). In *Proceedings of the First AfricaGEO Conference (2011 AfricaGeo)*, 31 May - 1 June 2011, Cape Town. Cape Town: AfricaGEO. ISBN 978-0-620-48428-2.

Meelun, G., Whittal, J.F. and Evans, K.M. 2011. Analysis of spatial heterogeneity in modelling high-priced residential properties of Cape Town using neural networks. In *Proceedings of the First AfricaGEO Conference (2011 AfricaGeo)*, 31 May - 1 June 2011, Cape Town. Cape Town: AfricaGEO. ISBN 978-0-620-48428-2.

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Odendaal, N. 2011. The Incomplete Web: Constraints to digital networking amongst African Planning Schools. In *Proceedings of INTED 2011 Conference Proceedings*, 7-9 March 2011, Valencia Spain. Spain: International Association of Technology, Education and Development (IATED). ISBN 978-84-614-7423-3.

Odendaal, N. 2011. The Spaces Between: ICT and Marginalization in the South African City. In J. Kjeldskov and J. Paay (eds), *Proceedings of 5th International Conference on Communities and Technologies (C&T 2011)*, 29 June - 2 July 2011, Brisbane, Australia, 29 June - 2 July 2011. Brisbane, Australia: ACM. ISBN 978-1-4503-0824-3.

Sanya, T. 2011. Teaching Architectural Technology with Technology (TEATWIT). In L. Gomez Chova, D. Marti Belenguer and A. Lopez Martinez (eds), *Proceedings of EDULEARN11 Conference*, 4-6 July 2011, Barcelona, Spain. South Africa: IATED. ISBN 978-84-615-0441-1.

Sithole, G. and Mapurisa, W. 2011. 3D object segmentation of point clouds using profiling techniques. In *Proceedings of the First AfricaGEO Conference (2011 AfricaGeo)*, 31 May - 1 June 2011, Cape Town. Cape Town: AfricaGEO. ISBN 978-0-620-48428-2.

Whittal, J.F. and Fisher, F. 2011. Implications of the Integrated Coastal Management Act No 24 of 2008 on the South African coastal cadastre and its survey and management. In *Proceedings of the First AfricaGEO Conference (2011 AfricaGeo)*, 31 May - 1 June 2011, Cape Town. Cape Town: AfricaGEO. ISBN 978-0-620-48428-2.

Artistic works

Dewar, D., Louw, P. and Rocher, E. 2011. A Concept for a Regional Market at Okahandja, Namibia. Commissioned by Okahandja Municipality.

Dewar, D. and Louw, P. 2011. A Development Framework for De Elzenheim Nature Reserve, Windhoek, Namibia.

Dewar, D. and Louw, P. 2011. An Investigation into affordable housing in South Africa. Commissioned by Murray and Roberts.

Dewar, D. and Louw, P. 2011. An Urban Design Concept for an Agri-Village at Mautius-Rozubou, Stellenbosch.

Dewar, D. and Louw, P. 2011. An Urban Design Concept for the Youth Hostel Precinct, George. Commissioned by Western Cape Provincial Government.

Dewar, D., Louw, P., Meyer, T. and Makeka, M. 2011. An Urban Design Framework for the Nelson Mandela Metropolitan University.

Dewar, D. 2011. Developing a Capital Expenditure Framework for KwaZulu-Natal. Commissioned by KwaZulu-Natal Provincial Government.

Exhibitions

Todeschini, F. 2011. National Heritage Site Ida's Valley, Stellenbosch: Guidelines for Conservation and Development. Stellenbosch, 1 October – 1 November. Commissioned by Ida's Valley Heritage and Environmental Association.

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
JCQ FLETCHER

DEPARTMENTAL PROFILE

The Department of Chemical Engineering has a proud national and international reputation both for the quality of its graduates at the BSc and postgraduate levels and for its research programs, thriving on the dynamic created by a synergy between research, industry and education. The undergraduate program enjoys accreditation with the Engineering Council of South Africa. The postgraduate program forms the largest academic research activity in Chemical Engineering on the continent, and is focused on mineral processing, catalysis, bioprocess engineering, environmental and process systems analysis as well as precipitation and crystallization. One of the overarching research themes in the department is the UCT strategic research theme 'Minerals to Metals' engaging with most of the research groupings. Based on close contacts with the chemical, petrochemical, biotechnology and mining industries, the research programs in the Department, although fundamental in nature, have a strong industrial flavour. The Department of Chemical Engineering is host to two DST/NRF SARCHI Research Chairs, the national DS/NRF Centre of Excellence in Catalysis, (c*change) and the National Hydrogen Catalysis Competence Centre (*HySA/catalysis*).

DEPARTMENTAL STATISTICS

Professors	9
Professor (contract)	1
Associate Professors	2
Senior Lecturers	5

Lecturer	1
Lecturers - Contract	2
Research Staff (permanent)	10
Research Staff (contract)	7
Technical & Scientific Staff (permanent & Long-term Contract)	26
Technical & Support Staff (contract)	12
Administrative and Clerical Staff (permanent)	19
Administrative and Clerical Staff (contract)	3
Total	97

Honorary Staff

Honorary Professor	1
Honorary Associate Professor	1
Honorary Research Associate	1
Adjunct Professors	2
Total	5

Students

Doctoral	55
Master's	123
BSc(Eng)	511
Total	689

RESEARCH FIELDS AND STAFF

HONORARY SENIOR LECTURER WALTER BÖHRINGER
Centre for Catalysis Research - Acid catalysis.

HONORARY PROFESSOR DEE BRADSHAW
Centre for Minerals Research – Process mineralogy, froth flotation including Machine Vision Systems and chemical interactions.

PROFESSOR JENNI CASE
Centre for Research in Engineering Education – student experience of learning in science and engineering, gold catalysis.

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.

PROFESSOR DAVE DEGLON
Centre for Minerals Research - modelling of mechanical mineral flotation cells, computational fluid dynamics, hydrodynamics, gas dispersion, solids suspension.

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

PROFESSOR JACK FLETCHER

Head of Department - 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

Director - Minerals to Metals Initiative, integrating and expanding capacity in minerals beneficiation research.

PROFESSOR DUNCAN FRASER

Environmental and Process Systems Engineering – synthesis of heat and mass exchange networks. Centre for Research in Engineering Education - Student learning, use of computer simulations, factors affecting student success.

HONORARY SENIOR LECTURER MARTIN HARRIS

Centre for Minerals Research – flotation, modelling, simulation.

ADJUNCT PROFESSOR PETER HARRIS

Centre for Minerals Research - froth flotation.

PROFESSOR SUE HARRISON

Director of the Centre for Bioprocess Engineering Research – Fundamental studies in the interaction of micro-organisms with the biochemical, thermal and hydrodynamic environment. Microbial community dynamics in planktonic and sessile environments. Biokinetics and metabolic modelling of the biomass and bioproduct components, applied to alkane biotechnology, human health products, mineral bioleaching through heap and tank processes, AMD prevention and remediation, algal bioprocesses for bioenergy and fine chemicals. Bioprocesses for sustainable process engineering.

DR ADENIYI ISAFIADE

Environmental and Process Systems Engineering – Process design and optimization.

MISS LINDA KOTTA

Academic Development Lecturer – Academic mentor; Centre for Research in Engineering Education – student learning and curriculum studies in engineering.

PROFESSOR ALISON EMSLIE 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.

DR AUBREY MAINZA

Centre for Minerals Research – Comminution and classification, PEPT, DEM, CFD.

DR SANET MINNAAR

Centre for Bioprocess Engineering Research - mineral biotechnology, bioprocesses for pharmaceuticals.

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

Director of the Centre for Minerals Research, flotation, reagent evaluation, cell design. Centre for Catalysis Research - heterogeneous catalyst and catalytic processes, zeolites.

DR JOCHEN PETERSEN

Centre for Bioprocess Engineering Research – Heap bioleaching of low grade minerals, heap reactor modelling, bio-oxidation kinetics, leaching hydrometallurgy.

PROFESSOR JIM PETRIE

Honorary Professor UCT and Emeritus Professor University of Sydney; environmental performance; technology development; life cycle assessment and management systems; waste management; site remediation and recovery from waste.

DR 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 ROB VAN HILLE

Centre for Bioprocess Engineering Research – mineral biotechnology, algal biotechnology, microbial ecology, carbon cycling, sulphide chemistry and bioremediation.

PROFESSOR ERIC VAN STEEN

Director Postgraduate Studies, Centre for Catalysis Research - Fischer-Tropsch synthesis, catalysis by gold, nano-materials, molecular modeling of heterogeneous catalytic systems, reaction kinetics.

ASSOCIATE PROFESSOR HARRO VON BLOTTNITZ

Environmental and Process Systems Engineering - environmental systems analysis using Life Cycle Assessment, waste management.

POSTDOCTORAL FELLOWS

DR MAYELI ALVAREZ-SILVA

An investigation into the role of the froth phase in the flotation of UG2 ore using a laboratory column flotation cell

DR THERESA FELTES

Preparation and characterization of nano-materials for Fischer-Tropsch synthesis.

DR THEBE MOKONE

Acid mine drainage remediation using sulphate reduction technology

DR QILING NAIDOO

Synthesis core-shell platinum group metal electrocatalysts by different approaches

DR JOHN STENSON

Impact on yeast cell wall structure on cell strength, resilience and product release.

DR ANGELA STOTT

Developing interactive quizzes for improving conceptual learning in science education.

INTERNATIONAL VISITORS

PROF FRANO BARBIR

University of Split, Croatia

PROF ELDRED CHIMOVITZ

University of Rochester (USA)

SUSAN COZZENS

Georgia Institute of Technology, USA

ANNA DANIELSON

University of Cambridge, UK

DR MARK DEBE

3M, Minneapolis, USA

DR DENIS KRAMER

Imperial College, University of London

DR ANTHONY KUCERNAK

Imperial College, University of London, UK

PROF CLAUDE LAMY

University of Poitiers, France

PROF MARCELO LINARDI

Nuclear & Energy Research Institute (IPEN), Sao Paulo, Brazil

PROF DON MCKEE

Retired Professor & Founding Director of the Sustainable Minerals Institute, University of Brisbane

DR JENS MUELLER

Smart Fuel Cells, Germany

HIDEYUKI MURAKAMI

National Institute for Materials Science, Japan

DR BARRY MURRER

Johnson Matthey (UK)

DR PETER NEUBAUER

Technische Universität Berlin

DR MIKE NICHOL

Murdoch University, Perth, Australia

PROF PATRICE NORTIER

Grenoble INP - Pagora, France

A/PROF KATSUHIRO NOSE

University of Tokyo, Japan

DR LIZ ROUSSEL

Johnson Matthey (UK)

PROF GUNTHER SCHERER

Paul Scherer Institut Switzerland

PROF THOMAS SCHMIDT

Paul Scherrer Institut, Switzerland

PROF ALLA SMIRNOVA

Eastern Connecticut State University, USA

DR NATALIA STRELTSOVA

Vale, USA

PROF YASUYUKI TAKATA

Graduate School of Engineering, Kyushu University, Japan

A/PROF RIE UMETSU

Tohoku University, Japan

MASAHIRO YAMAMURA

Department of International Affairs JST, Japan

PROF ANDY YORK

Johnson Matthey (UK)

GRAHAM SIM, LAUREL PICKETT AND MABUYA CANON

GE Power and Water, Australia

PIERO ARCANGELI AND CHRIS DE JAGER

Mettler Toledo, Switzerland

DELEGATION FROM

Zhejiang Environmental Protection Bureau, Hangzhou, China

CONTACT DETAILS

Postal Address: Department of Chemical Engineering, University of Cape Town, Private Bag X3, Rondebosch, 7701

Telephone: +27 21 650 2509

Fax: +27 21 650 5501

Web: <http://www.chemeng.uct.ac.za/>

UCT general phone number: +27 21 650 9111

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

RESEARCH OUTPUT

Chapters in books

Clark, J., Case, J.M., Davies, N.J., Sheridan, G.L. and Toerien, R. 2011. „Struggling Up Mount Improbable“ A Cautionary (Implementation) Tale of a Vision II Scientific Literary Curriculum in South Africa. In C. Linder, L. Ostman, D.A. Roberts, P.-O. Wickman and G. Erickson (eds), *Exploring the Landscape of Scientific Literacy*, pp. 272-287. New York: Taylor & Francis Ltd. ISBN 9780415874366.

Griffiths, M., Dicks, R., Richardson, C. and Harrison, S.T.L. 2011. Advantages and challenges of microalgae as a source of oil for biodiesel. In M. Stoytcheva and G. Montero (eds), *Biodiesel Feedstocks and Processing Technologies*, pp. 177-200. Croatia: Intech. ISBN 978-953-307-713-0.

Articles in Peer-reviewed Journals

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Allison, S.A. and O'Connor, C.T. 2011. An investigation into the flotation behaviour pyrrhotite. *International Journal of Mineral Processing*, 98: 202-207.

Amigun, B. and Von Blottnitz, H. 2011. Operating Cost Analysis of an Annexed Ethanol Distillery in a Rural, Landlocked African Country. *Environmental Progress & Sustainable Energy*, 30(3): 500-515.

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Bromfield, L., Africa, C., Harrison, S.T.L. and van Hille, R.P. 2011. The effect of temperature and culture history on the attachment of *Metallosphaera hakonensis* to mineral sulfides with application to heap bioleaching. *Minerals Engineering*, 24: 1157-1165.

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Case, J.M. and Light, G. 2011. Emerging Methodologies in Engineering Education Research. *Journal of Engineering Education*, 100(1): 186-210.

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Chapman, N.A., Shackleton, N.J., Malysiak, V. and O'Connor, C.T. 2011. The effect of using different comminution procedures on the flotation of Platinum-Group Minerals. *Minerals Engineering*, 24: 731-736.

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Fischer, N., Van Steen, E.W.J. and Claeys, M.C. 2011. Preparation of supported nano-sized cobalt oxide and fcc cobalt crystallites. *Catalysis Today*, 171: 174-179.

Ghorbani, Y., Becker, M.E., Mainza, A.N., Franzidis, J.-P. and Petersen, J. 2011. Large particle effects in chemical/biochemical heap leach processes - A review. *Minerals Engineering*, 24: 1172-1184.

Ghorbani, Y., Becker, M.E., Petersen, J., Morar, S., Mainza, A.N. and Franzidis, J.-P. 2011. Use of X-ray computed tomography to investigate crack distribution and mineral dissemination in sphalerite ore particles.. *Minerals Engineering*, 24: 1249-1257.

- Govender, I., Mangesana, N., Mainza, A.N. and Franzidis, J.-P. 2011. Measurement of shear rates in a laboratory tumbling mill. *Minerals Engineering*, 24: 225-229.
- Govender, I., Tupper, G.B. and Mainza, A.N. 2011. Towards a mechanistic model for slurry transport in tumbling mills. *Minerals Engineering*, 24(3-4): 230-235.
- Griffiths, M., Garcin, C.J., van Hille, R.P. and Harrison, S.T.L. 2011. Interference by pigment in the estimation of microalgal biomass concentration by optical density. *Journal of Microbiological Methods*, 85: 119-123.
- Jayasundara, C.T., Yang, R.Y., Guo, B.Y., Yu, A.B., Govender, I., Mainza, A.N., Van der Westhuizen, A.P. and Rubenstein, J. 2011. CFD-DEM modelling of particle flow in IsaMills--Comparison between simulations and PEPT measurements. *Minerals Engineering*, 24(3-4): 181-187.
- Jones, G., Corin, K.C., van Hille, R.P. and Harrison, S.T.L. 2011. The generation of toxic reactive oxygen species (ROS) from mechanically activated sulphide concentrates and its effect on thermophilic bioleaching. *Minerals Engineering*, 24: 1198-1208.
- Kabana, C.G., Botha, S., Schmucker, C., Woolard, C. and Beaver, B. 2011. Oxidative Stability of Middle Distillate Fuels. Part 1: Exploring the Soluble Macromolecular Oxidatively Reactive Species (SMORS) Mechanism with Jet Fuels. *Energy & Fuels*, 25: 5145-5157.
- Kallon, D., Govender, I. and Mainza, A.N. 2011. Circulation rate modelling of mill charge using position emission particle tracking. *Minerals Engineering*, 24(3-4): 282-289.
- Keshav, P., de Haas, B., Clermont, B., Mainza, A.N. and Moys, M. 2011. Optimisation of the secondary ball mill using an on-line ball and pulp load sensor- The Sensomag. *Minerals Engineering*, 24: 325-334.
- Lewis, A.E. and Mangere, M. 2011. Reactive Crystallization of Copper Selenide at Very High Supersaturation: A Challenge to Classical Crystallization Theory for Sparingly Soluble Salts. *Chemical Engineering & Technology*, 34(4): 515-524.
- Melamu, R. and Von Blottnitz, H. 2011. 2nd Generation biofuels a sure bet? A life cycle assessment of how things could go wrong. *Journal of Cleaner Production*, 19: 138-144.
- Meyer, C.J. and Deglon, D.A. 2011. Particle collision modeling - A review. *Minerals Engineering*, 24: 719-730.
- Ndlovu, B., Forbes, E., Becker, M.E., Deglon, D.A., Franzidis, J.-P. and Laskowski, J.S. 2011. The effects of chrysotile mineralogical properties on the rheology of chrysotile suspensions. *Minerals Engineering*, 24: 1004-1009.
- Ndlovu, B., Becker, M.E., Forbes, E., Deglon, D.A. and Franzidis, J.-P. 2011. The influence of phyllosilicate mineralogy on the rheology of mineral slurries. *Minerals Engineering*, 24: 1314-1322.
- Nortier, P., Chagnon, P. and Lewis, A.E. 2011. Modelling the solubility in Bayer liquors: A critical review and new models. *Chemical Engineering Science*, 66: 2596-2605.
- Randall, D., Nathoo, J. and Lewis, A.E. 2011. A case study for treating a reverse osmosis brine using Eutectic Freeze Crystallization - Approaching a zero waste process. *Desalination*, 266: 256-262.
- Sheridan, C.M., Glasser, D., Hildebrandt, D., Petersen, J. and Roher, J. 2011. An Annual and Seasonal Characterisation of Winery Effluent in South Africa. *South African Journal of Enology and Viticulture*, 32(1): 1-8.
- Sichalwe, K., Govender, I. and Mainza, A.N. 2011. Characterising porosity of multi-component mixtures in rotary mills. *Minerals Engineering*, 24(3-4): 276-281.
- Soleimani, M., Petersen, J., Roostaazad, R., Hosseini, S., Mousavi, S.M., Najafi, A. and Vasiri, A.K. 2011. Leaching of a Zinc ore and concentrate using the Geocoat™ technology. *Minerals Engineering*, 24: 64-69.
- Solomon, N., Becker, M.E., Mainza, A.N., Petersen, J. and Franzidis, J.-P. 2011. Understanding the influence of HPGR on PGM flotation behavior using mineralogy. *Minerals Engineering*, 24: 1370-1377.
- Tupikina, O., Ngoma, E., Minnaar, S. and Harrison, S.T.L. 2011. Some aspects of the effect of pH and acid stress in heap bioleaching. *Minerals Engineering*, 24: 1209-1214.
- Van der Westhuizen, A.P., Govender, I., Mainza, A.N. and Rubenstein, J. 2011. Tracking the motion of media particles inside an IsaMill™ using PEPT. *Minerals Engineering*, 24: 195-204.
- van Schalkwyk, R.F., Eksteen, J.J., Petersen, J., Thyse, E.L. and Akdogan, G. 2011. An experimental evaluation of the leaching kinetics of PGM-containing Ni-Cu-Fe-S Peirce Smith converter matte, under atmospheric leach conditions. *Minerals Engineering*, 24: 524-534.
- Vogeli, J., Reid, D.L., Becker, M.E., Broadhurst, J.L. and Franzidis, J.-P. 2011. Investigation of the potential for mineral carbonation of PGM tailings in South Africa. *Minerals Engineering*, 24: 1348-1356.
- Volkwyn, T.S., Buffler, A., Govender, I., Franzidis, J.-P., Morrison, A., Odo, A., van der Meulen, N.P. and Vermeulen, C. 2011. Studies of the effect of tracer activity on time-averaged positron emission particle tracking

measurements on tumbling mills at PEPT Cape Town. *Minerals Engineering*, 24: 261-266.

Weststrate, C.J., Hauman, M.M., Moodley, D.J., Saib, A.M., Van Steen, E.W.J. and Niemantsverdriet, J.W. 2011. Cobalt Fischer-Tropsch Catalyst Regeneration: The Crucial Role of the Kirkendall Effect for Cobalt Redispersion. *Topics in Catalysis*, 54: 811-816.

Wiese, J.G., Harris, P.J. and Bradshaw, D.J. 2011. The effect of the reagent suite on froth stability in laboratory scale batch flotation tests. *Minerals Engineering*, 24: 995-1003.

Peer-reviewed published conference proceedings

Ahmadi, A., Ranjbar, M., Schaffie, M. and Petersen, J. 2011. Kinetic modeling of electro-biological leaching of copper flotation concentrates. In S. Eskikaya (ed.), *Proceedings of 22nd World Mining Congress & Expo*, 11-16 September 2011, Istanbul, Turkey, III. Ankara, Turkey: Aydogdu Ofset. ISBN 978-605-01-0146-1.

Bryan, C., Davis, C., van Wyk, N., Dew, D., Rautenbach, G.F. and Harrison, S.T.L. 2011. The effect of CO₂ availability on the growth, iron oxidation and CO₂ fixation rates of pure cultures of *Leptospirillum ferriphilum* and *Acidithiobacillus ferrooxidans*. In G. Qiu, T. Jiang, W. Qin, X. Liu, Y. Yang and H. Wang (eds), *Proceedings of the 19th International Biohydrometallurgy symposium (IBS 2011)*, 18-22 September 2011, Changsha, China. Changsha, China: Central South University Press. ISBN 978-7-5487-0356-3.

Cherkaev, A., Basson, P. and Petersen, J. 2011. Mathematical and computer modelling of the chloride assisted leaching of covellite. Pore diffusion phenomena. In *Proceedings of the Southern African Institute of Mining and Metallurgy Symposium Series 69: International Conference on Percolation leaching: The status globally and in southern Africa*, 8-9 November 2011, Johannesburg. Johannesburg, South Africa: SAIMM. ISBN 978-1-920410-24-7.

Dew, D.W., Rautenbach, G.F., van Hille, R.P., Davis-Belmar, C.S., Harvey, I.J. and Truelove, J.S. 2011. High temperature heap leaching of chalcopyrite: Method of evaluation and process model validation. In *Proceedings of the Southern African Institute of Mining and Metallurgy Symposium Series 69: International Conference on Percolation leaching: The status globally and in southern Africa*, 8-9 November 2011, Johannesburg. Johannesburg, South Africa: SAIMM. ISBN 978-1-920410-24-7.

Fraser, D., Case, J.M., Heydenrych, H. and Van Steen, E.W.J. 2011. Building a more responsive curriculum in chemical engineering at the University of Cape Town. In B. Collier-Reed (ed.), *Proceedings of the First Biennial Conference of the South African Society for Engineering Education (SASEE)*, 10-12 August 2011, Stellenbosch,

South Africa. Stellenbosch: South African Society for Engineering. ISBN 978-0-620-50774-5.

Ghorbani, Y., Petersen, J., Becker, M.E., Mainza, A.N. and Franzidis, J.-P. 2011. Investigation of heap leaching at the particle scale using X-ray computed tomography. In *Proceedings of the Southern African Institute of Mining and Metallurgy Symposium Series 69: International Conference on Percolation leaching: The status globally and in southern Africa*, 8-9 November 2011, Johannesburg. Johannesburg, South Africa: SAIMM. ISBN 978-1-920410-24-7.

Ghorbani, Y., Petersen, J., Becker, M.E., Mainza, A.N. and Franzidis, J.-P. 2011. Investigation of heap leaching of individual large particles using x-ray computed tomography. In S. Eskikaya (ed.), *Proceedings of 22nd World Mining Congress & Expo*, 11-16 September 2011, Istanbul, Turkey, III. Ankara, Turkey: Aydogdu Ofset. ISBN 978-605-01-0146-1.

Ghorbani, Y., Petersen, J., Tupikina, O., Harrison, S.T.L., Becker, M.E., Mainza, A.N. and Franzidis, J.-P. 2011. Investigation of the bioleaching of coarse sphalerite ore particles by a mixed culture of mesophilic chemolithotrophs in saturated leach reactors. In G. Qiu, T. Jiang, W. Qin, X. Liu, Y. Yang and H. Wang (eds), *Proceedings of the 19th International Biohydrometallurgy symposium (IBS 2011)*, 18-22 September 2011, Changsha, China. Changsha, China: Central South University Press. ISBN 978-7-5487-0356-3.

Jones, G., van Hille, R.P. and Harrison, S.T.L. 2011. Generation of reactive oxygen species from sulfide concentrates as a function of mineralogy. In G. Qiu, T. Jiang, W. Qin, X. Liu, Y. Yang and H. Wang (eds), *Proceedings of the 19th International Biohydrometallurgy symposium (IBS 2011)*, 18-22 September 2011, Changsha, China. Changsha, China: Central South University Press. ISBN 978-7-5487-0356-3.

Kotsiopoulos, A., Hansford, G.S. and Rawatlal, R. 2011. The dynamics of chalcopyrite bioleaching in batch and continuous flow reactor systems incorporating time-varying particle surface areas. In G. Qiu, T. Jiang, W. Qin, X. Liu, Y. Yang and H. Wang (eds), *Proceedings of the 19th International Biohydrometallurgy symposium (IBS 2011)*, 18-22 September 2011, Changsha, China. Changsha, China: Central South University Press. ISBN 978-7-5487-0356-3.

Mooruth, N. 2011. Passive treatment of Acid mine drainage via a linear flow channel reactor utilising a floating sulphur biofilm. In T.R. Rude, A. Freund and C. Wolkersdorfer (eds), *Proceedings of the 11th Congress of the International Mine Water Association*, 4-11 September 2011, Aachen, Germany. Germany: RWTH Aachen University, Institute of Hydrogeology on behalf of the International Mine Water Association. ISBN 978-3-00-035543-1.

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Petersen, J., Minnaar, S.H. and du Plessis, C.A. 2011. Respirometry studies of the bioleaching of a copper ore in large columns - effect of changing temperatures. In G. Qiu, T. Jiang, W. Qin, X. Liu, Y. Yang and H. Wang (eds), Proceedings of the 19th International Biohydrometallurgy symposium (IBS 2011), 18-22 September 2011, Changsha, China. Changsha, China: Central South University Press. ISBN 978-7-5487-0356-3.

Sibanda, L., Case, J.M. and Von Blottnitz, H. 2011. Sustainable development as a threshold concept in engineering education. In B. Collier-Reed (ed.), Proceedings of the First Biennial Conference of the South African Society for Engineering Education (SASEE), 10-12 August 2011, Stellenbosch, South Africa. Stellenbosch: South African Society for Engineering. ISBN 978-0-620-50774-5.

Tupikina, O., Minnaar, S., Rautenbach, G.F., Drew, D. and Harrison, S.T.L. 2011. Effect of inoculum size on the rates of whole ore colonisation of mesophilic, moderate thermophilic and thermophilic acidophiles. In G. Qiu, T. Jiang, W. Qin, X. Liu, Y. Yang and H. Wang (eds), Proceedings of the 19th International Biohydrometallurgy symposium (IBS 2011), 18-22 September 2011, Changsha, China. Changsha, China: Central South University Press. ISBN 978-7-5487-0356-3.

van Hille, R.P., van Wyk, N., Motleleng, L. and Mooruth, N. 2011. Lessons in passive treatment: Towards efficient operation of a sulphate reduction - sulphide oxidation system. In T.R. Rude, A. Freund and C. Wolkersdorfer (eds), Proceedings of the 11th Congress of the International Mine Water Association, 4-11 September 2011, Aachen, Germany. Germany: RWTH Aachen University, Institute of Hydrogeology on behalf of the International Mine Water Association. ISBN 978-3-00-035543-1.

van Zyl, A., Harrison, S.T.L. and van Hille, R.P. 2011. Biodegradation of thiocyanate by a mixed microbial population. In T.R. Rude, A. Freund and C. Wolkersdorfer (eds), Proceedings of the 11th Congress of the International Mine Water Association, 4-11 September 2011, Aachen, Germany. Germany: RWTH Aachen University, Institute of Hydrogeology on behalf of the International Mine Water Association. ISBN 978-3-00-035543-1.

DEPARTMENT OF CIVIL ENGINEERING

HEAD OF DEPARTMENT: PROFESSOR A. ZINGONI

DEPARTMENTAL PROFILE

The Department of Civil Engineering currently has an establishment of 14 permanent full-time academic positions, supported by a dedicated complement of 16 technical, administrative and secretarial 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 of the University of Cape Town. The Department currently has an enrolment of about 400 undergraduate students and 60 postgraduates.

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 and Water Engineering, 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). 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	3
Associate Professors	7
Emeritus Associate Professors	4
Senior Lecturers	3
Lecturers	1
Research Staff	1
Technical Support Staff	5
Administrative and Clerical Staff	7
Laboratory Support Staff	4
TOTAL	35

Students

Doctoral	15
Full time Master's	39
Undergraduate	410
TOTAL	464

RESEARCH FIELDS AND STAFF

Permanent Staff

PROFESSOR MARK ALEXANDER

Concrete durability; concrete materials; properties of aggregates; applications to structural design and construction.

ASSOCIATE PROFESSOR NEIL ARMITAGE

Hydraulics; urban drainage; urban catchment management.

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.

DR HANS BEUSHAUSEN

Concrete materials; structural engineering; repair of concrete structures.

ASSOCIATE PROFESSOR ROMANO DEL MISTRO

Urban engineering and management.

PROFESSOR GEORGE EKAMA

Chemical and biological wastewater treatment; physical and biological process modelling.

DR DENIS KALUMBA

Geotechnical engineering.

ASSOCIATE PROFESSOR PILATE MOYO

Structural health monitoring and testing.

ASSOCIATE PROFESSOR ULRIKE RIVETT

Spatial information systems and decision making in urban context; data acquisition using wireless technology.

DR SEBASTIAN SKATULLA

Structural engineering; computational structural mechanics; meshless methods.

ASSOCIATE PROFESSOR MARIANNE VANDERSCHUREN

Assessment of urban transport systems; urban transport decision-making; transport policy.

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.

HONORARY RESEARCH ASSOCIATES

MS LISA KANE

Transportation engineering and planning.

CONTACT DETAILS

Postal Address: Department of Civil Engineering, University of Cape Town, Private Bag X3, Rondebosch, 7701

Tel: +27 21 650 2584

Fax: +27 21 689 7471

E-mail: civil@ebe.uct.ac.za

Web: <http://www.civil.uct.ac.za/>

UCT general phone number: +27 21 650 9111

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

RESEARCH OUTPUT

Chapters in books

Ekama, G.A. 2011. Biological nutrient removal. In P. Wilderer (ed.), *Treatise on Water Science*, pp. 409-528. pp. 1-4. Oxford, Great Britain: Elsevier. ISBN 978-0444-531-933.

Sansour, C., Skatulla, S. and Arunachalakasi, A. 2011. A generalized framework and multiplicative formulation of electro-mechanical coupling. In G.A. Maugin and A.V. Metrikine (eds), *Mechanics of Generalized Continua - One Hundred Years After the Cosserats*, pp. 287-294. *Advances in Mechanics and Mathematics - Vol 21*. New York: Springer. ISBN 978-1-4419-5694-1.

Articles in Peer-reviewed Journals

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Bbosa, L.S., Govender, I., Mainza, A.N. and Powell, M.S. 2011. Power draw estimations in experimental tumbling mills using PEPT. *Minerals Engineering*, 24: 319-324.

Beukes, E., Vanderschuren, M.J.W.A. and Zuidgeest, M. 2011. Context sensitive multimodal planning: a case study in Cape Town, South Africa. *Journal of Transport Geography*, 19: 452-460.

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Ekama, G.A., Wilsenach, J. and Chen, G.H. 2011. Saline sewage treatment and source separation of urine for more sustainable urban water management. *Water Science and Technology*, 64(6): 1307-1316.

Lu, H., Wu, D., Tang, D., Chen, G.H., van Loosdrecht, M.C.M. and Ekama, G.A. 2011. Pilot scale evaluation of SANI process for sludge minimization and greenhouse gas reduction in saline sewage treatment. *Water Science and Technology*, 63(10): 2149-2154.

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- Mwebesa, J., Kalumba, D. and Kulabako, R. 2011. Stimulating bearing capacity failure of surface loading on sand using COMSOL. In J.A. Mwakali and H.M. Alinaitwe (eds), Proceedings of the Second International Conference on Advances in Engineering and Technology, 31 January - 1 February 2011, Entebbe, Uganda. Uganda: Macmillan. ISBN 978-9970-214-00-7.
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- Otieno, M., Beushausen, H. and Alexander, M.G. 2011. Correlations between natural and accelerated corrosion rates in RC structures - preliminary results. In C. Leung and K.T. Wan (eds), Proceedings of the International RILEM Conference - Advances in Construction Materials Through Science and Engineering, 5-7 September 2011, Hong Kong, China. Hong Kong, China: RILEM Publications S.A.R.L. ISBN 978-2-35158-116-2.
- Otieno, M., Beushausen, H. and Alexander, M.G. 2011. Pro-active maintenance and efficient repair strategies for corrosion-affected RC structures. In M. Motavalli, B. Havranek and E. Saqan (eds), Proceedings of SMAR 2011 - First Middle East Conference on Smart Monitoring, Assessment and Rehabilitation of Civil Structures, 8-10 February 2011, Dubai, UAE. Dubai, UAE: EMPA - Materials Science and Technology. ISBN 978-3-905594-58-4.
- Roux, Y., Del Mistro, R.F. and Mfinanga, D. 2011. A methodology for comparative analysis of public transport systems in African cities. In Proceedings of the 30th Annual Southern African Transport Conference (SATC 2011), 11-14 July 2011, Pretoria, South Africa. Pretoria, South Africa: Document Transformation Technologies cc. ISBN 978-1-920017-51-4.
- Sparks, A.D.W. 2011. Estimating the heave of clays. In C. Quadros and S.W. Jacobsz (eds), Proceedings of the 15th African Regional Conference on Soil Mechanics and Geotechnical Engineering, 18-21 July 2011, Maputo, Mozambique. Amsterdam Netherlands: IOS Press. ISBN 978-1-60750-777-2.
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lessons. In Proceedings of the 30th Annual Southern African Transport Conference (SATC 2011), 11-14 July 2011, Pretoria, South Africa. Pretoria, South Africa: Document Transformation Technologies cc. ISBN 978-1-920017-51-4.

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Wilson, W. and Behrens, R. 2011. „Boda Boda“ bicycle taxis and their role in urban transport systems: Case studies of Kisumu and Nakuru, Kenya. In Proceedings of the 30th Annual Southern African Transport Conference (SATC 2011), 11-14 July 2011, Pretoria, South Africa. Pretoria, South Africa: Document Transformation Technologies cc. ISBN 978-1-920017-51-4.

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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. Four research groups examine issues related to infrastructure delivery, construction industry development, 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, procurement, entrepreneurship and teaching and learning.

Strong research links exist with academic institutions in the United Kingdom, Australia, United States of America,

Central and East Africa, and India, as well as with institutions within South Africa.

During 2011, papers were presented at key international conferences in Port Elizabeth, Salford, Bristol and The Netherlands. 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, the Education Standards Board and on the MENE Region Education Standards Board;
- EU Framework 7 SME Thematic Area as the Assistant National Contact Point;
- The South African Facilities Management Association;
- The South African Property Owners Association; and
- The Construction Industry Development Board.

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 2011, namely: the University Research Committee, the National Research Foundation (NRF), and the Construction Industry Development Board. 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	1
Administrative and Clerical Staff	5
Departmental Assistant	1
TOTAL	21

Students

Doctoral	5
Masters	100
Postgraduate Diploma	17
Honours	87
Undergraduate	424
TOTAL	633

RESEARCH FIELDS AND STAFF

Permanent Staff

PROFESSOR K.S. 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 P.A. BOWEN

Value management; project procurement; project briefing as an interpersonal communication process; the sustainability assessment of buildings; 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 K.A. MICHELL

Facilities management as a social and community enterprise in low-income areas of cities; work space planning 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.

DR S. ALLEN

Senior Lecturer: Successful delivery of strategic economic infrastructure, programmes and construction projects and the realization of benefits arising from these, specifically through the optimization and appropriate use of project procurement systems; integrated construction project delivery processes; sustainable technologies; and performance measurement and benchmarking.

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 J. MARKS

Senior Lecturer: Entrepreneurial thinking; skills migration, learning spaces; experiential learning; integrated learning.

MR M. MASSYN

Senior Lecturer: Skills and competencies of SME's within the construction industry; procurement systems using 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 Process, 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.

DR E. HURST

Academic Development Lecturer: Academic literacies; student-centred learning and assessment; identity and agency; the sociolinguistic study of the links between language, style and identity.

CONTACT DETAILS

Postal address: Department of Construction Economics & Management,
University of Cape Town, Private Bag X3, Rondebosch,
7701, South Africa
Telephone: +27 21 650 3443
Fax: +27 21 689 7564
E-mail: Mareldia.Fagodien@uct.ac.za
Web: <http://www.cons.uct.ac.za>

RESEARCH OUTPUT

Articles in Peer-reviewed Journals

Bowen, P.A., Cattell, K.S., Jay, C.I. and Edwards, P. 2011. Value management in the South African manufacturing industry: exploratory findings. *Management Decision*, 49(1): 6-28.

Cattell, D.W., Bowen, P.A. and Kaka, A.P. 2011. Proposed framework for applying cumulative prospect theory to an unbalanced bidding model. *Journal of Construction Engineering and Management-Asce*, 137(12): 1052-1061.

Jay, C.I. and Bowen, P.A. 2011. What residents value in low-cost housing schemes: some South African concepts. *Building Research and Information*, 39(6): 574-588.

Mooya, M.M. 2011. Making urban real estate markets work for the poor: Theory, policy and practice. *Cities*, 28: 238-244.

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Peer-reviewed published conference proceedings

Ademeso, O.S., Izunwanne, O. and Windapo, A.O. 2011. Examining factors contributing to shortage of skilled workers in the construction industry. In F. Emuze (ed.), *Proceedings of NMMU Construction Management 40 Conference, 27-29 November 2011, Port Elizabeth, South Africa*. Port Elizabeth: Department of Construction Management, NMMU. ISBN 978-1-920508-04-3.

Bowen, P.A., Edwards, P., Lingard, H. and Cattell, K.S. 2011. The effects of workplace stress upon construction professionals in South Africa: a survey. In L. Ruddock, P. Chynoweth, C. Egbu, M. Sutrisna and A. Parsa (eds), *COBRA 2011 Proceedings of RICS Construction and Property Conference, 12-13 September 2011, University of Salford, UK*. United Kingdom: RICS. ISBN 978-1-907842-19-1.

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Edwardes, E. 2011. Teaching methodology in Construction Studies with specific reference to measurement and design appraisal. In Conference Proceedings of the SA Council for the Quantity Surveying Profession (SACQSP) - Research Conference 2011 - P4, 2 September 2011, Port Elizabeth, South Africa. Midrand: The South African Council for the Quantity Surveying Profession. ISBN 978-1-920508-06-7.

English, P.J. and Bowen, P.A. 2011. Factors in personal health and safety (H&S) of women in the South African construction industry explored from the perspectives of both genders. In L. Ruddock, P. Chynoweth, C. Egbu, M. Sutrisna and A. Parsa (eds), *COBRA 2011 Proceedings*

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DEPARTMENT OF ELECTRICAL ENGINEERING

HEAD OF DEPARTMENT: PROFESSOR B.J. DOWNING

DEPARTMENTAL PROFILE

The Department of Electrical Engineering has 25 permanent academic staff, 143 MSc. students and 48 PhD students. The research activities and projects are largely industrially based. The main funding sources are Eskom, Telkom, Siemens, De Beers, Mintek, Water Research Commission, Anglo Platinum, Department of Trade and Industry, South African National Defence Force, SunSpace, IQS and the NRF.

The Department has seen a growth in the number of undergraduate students over the past 10 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
 Image Processing and Vision Systems
 Instrumentation and Control
 Power Engineering
 Remote Sensing and Radar
 Speech Processing

DEPARTMENTAL STATISTICS

Permanent and Long-term Contract Staff

Professors	6
Associate Professors	5
Senior Lecturers	8
Lecturers	8
Research Staff	4
Technical Support Staff	6
Administrative and Clerical Staff	6
Departmental Assistants	1
Total	44

Students

Doctoral	48
Masters	143
Undergraduates	673
Total	864

RESEARCH FIELDS AND STAFF

Permanent Staff

PROFESSOR M. BRAAE

Multivariable control; mineral extraction control applications; computer-based education

PROFESSOR B.J. DOWNING

Microwave systems and circuits

PROFESSOR C.T. GAUNT

Electricity delivery networks

PROFESSOR M.R. INGG

Radar remote sensing; synthetic aperture radar; software defined radio; parallel computing

PROFESSOR J. TAPSON

Instrumentation and measurements; ultrasonics; microactuators; probe microscopy

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 A.J. WILKINSON

Signals and image processing; radar; SAR interferometry; tomography, Bayesian interference; inverse problems; RF power amplifiers

DR P.S. BARENDSE

Senior Lecturer; Electrical machines and drives

DR S. CHOWDHURY

Senior Lecturer, Power & Energy

DR M.A. KHAN

Senior Lecturer; Electrical machines and drives

ADJUNCT ASSOCIATE PROFESSOR M. MALENGRET

Power electronics; remote area power supplies and rural electrification

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

MR. A.W.D. JONGENS

Senior Lecturer; Acoustics, acoustical properties of materials; environmental & transportation noise

MR. M.J.E. VENTURA

Senior Research Officer, Broadband communications & applications; digital systems

MRS K.E AWODELE

Lecturer, Power System Reliability

DR O.E. FALOWO

Lecturer, Communications

MR S. GINSBERG

Lecturer, Digital systems

MR I. KHAN

Lecturer, High frequency power electronics, induction heating

MR M.S. TSOEU

Lecturer, Control and Instrumentation

MS R.A. VERRINDER

Lecturer, Evolutionary and Biorobotics, Control and Instrumentation

MR S. WINBERG

Lecturer, High Performance Computing & Software Defined Radio

Honorary/Emeritus Professors**EMERITUS PROFESSOR G. DE JAGER**

Image processing; machine vision and image compression

EMERITUS PROFESSOR S.G. MCLAREN

Machines

EMERITUS PROFESSOR A. PETROIANU

Power system analysis; operation and control

EMERITUS PROFESSOR K.M. REINECK

Antennas

EMERITUS ASSOCIATE PROFESSOR J.R. GREENE

Computational Intelligence

CONTACT DETAILS

Postal address: Department of Electrical Engineering, University of Cape Town,

Private Bag X3, Rondebosch, 7701

Telephone: +27 21 650 2811

Fax: +27 21 650 3465

E-mail: ElecEng@uct.ac.za

Web: <http://www.ee.uct.ac.za>

RESEARCH OUTPUT**Chapters in books**

Falowo, O.E. and Chan, H.A. 2011. Radio resource management in heterogeneous cellular networks. In A. Melikov (ed.), Cellular Networks Positioning, Performance Analysis Reliability. India: Intech. ISBN 9789533072463.

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Articles in Peer-reviewed Journals

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Town, South Africa. New York: ACM. ISBN 978-1-4503-0878-6.

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DEPARTMENT OF MECHANICAL ENGINEERING

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

HEAD OF DEPARTMENT: PROFESSOR CHRISTIAAN REDELINGHUY

DEPARTMENTAL 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 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

Professors	6
Adjunct Professors	1
Emeritus Professor	1
Honorary Professor	1
Associate Professors	7
Senior Lecturers	7
Lecturers	3
Part-time Lecturer	2
Teaching Assistants	9
Technical Support Staff	10
Administrative and Clerical Staff	3
Workshop Apprentices	3
Total	54

Students

Postdoctoral	3
PG Diploma	8
Doctoral	29
Occasional – Non degree UG	12
Occasional – Non degree PG	2
Master's	149
Honours	11
Undergraduate	575
Total	789

RESEARCH FIELDS AND STAFF

PROFESSOR KEVIN BENNETT

Director, Energy Research Centre; Energy research.

MS TRACY BOOYSEN

Chief Scientific Officer; Electro Mechanical engineering, robotics and agents.

ASSOCIATE PROFESSOR BRANDON COLLIER-REED

Director of the Centre for Research in Engineering Education (CREE); the sociocultural characterization of the student experience; social aspects of technology; technological literacy of adolescents; podcasting in engineering education.

MR TREVOR CLOETE

Senior Lecturer; BISRU, CERECAM; deformation and tearing of blast loaded metal plates; high strain rate plasticity; constitutive modeling.

MR DIRK FINDEIS

Senior Lecturer; non-destructive testing; portable ESPI and shearography.

EMERITUS PROFESSOR JASSON GRYZAGORIDIS

CERECAM; heat transfer and refrigeration; combined absorption and compression refrigeration cycles; optical techniques in non-destructive testing; holographic interferometry; ESPI; shearography; materials properties evaluation.

MR ERNESTO ISMAIL

Lecturer; BISRU, CERECAM; meshless methods, non-linear elasticity.

PROFESSOR DORA KARAGIOZOVA

Honorary Professor; BISRU; analytical and computational analysis of dynamic systems.

ASSOCIATE PROFESSOR FRANZ-JOSEF KAHLEN

Lean/advanced manufacturing; laser materials processing; laser diagnostics.

ASSOCIATE PROFESSOR RAMESH KUPPUSWAMY

Advanced manufacturing; micro/nano systems.

PROFESSOR ROBERT KNUTSEN

Deputy Head of Department; Director, Centre for Materials Engineering; physical metallurgy; thermo-mechanical processing; texture; microstructure; microscopy.

PROFESSOR CANDACE LANG

Deputy Dean; Centre for Materials Engineering; physical metallurgy; electrical properties; electron microscopy.

ASSOCIATE PROFESSOR GENEVIEVE LANGDON

BISRU; CREE; blast response of structures and materials; high strain rate behaviour; structural impact.

ASSOCIATE PROFESSOR ARNAUD MALAN

Computational Fluid Dynamics

MR STEPHEN MARAIS

Senior Lecturer; Electro Mechanical design.

PROFESSOR GERALD NURICK

Director, BISRU; structural impact; crashworthiness; high strain rates; impact biomechanics.

MR RODGER NKUMBWA

Lecturer; advanced manufacturing processes, manufacturing IT integration, lean & green manufacturing, Engineering Management

PROFESSOR CHRIS REDELINGHUYS

Head of Department; autonomously guided parafoils, airliners in formation flight.

ASSOCIATE PROFESSOR ANTHONY SAYERS

CERECAM; fluid mechanics; industrial aerodynamics; CFD; vehicle aerodynamics; engineering of sport.

MS CORRINNE SHAW

Senior Lecturer; Engineering Management; management and engineering education, systems theory and practice.

PROFESSOR ROBERT TAIT

Centre for Materials Engineering; fracture mechanics; fatigue; assessment of residual stresses in structural components; applied non-destructive testing.

DR GEORGE VICATOS

Senior Lecturer; heat transfer and refrigeration; combined absorption and compression refrigeration cycles; bioengineering prosthesis design.

ASSOCIATE PROFESSOR CHRIS VON KLEMPERER

Composite materials; processing and modelling of composite materials and structures.

DR CHRIS WOOLARD

Site leader; Sasol Advanced Fuels Laboratory; fuels chemistry; polymeric materials; thermal analysis.

HONORARY LECTURERS

MR PAUL SCHABERG

Honorary Lecturer, SASOL Advanced Fuel Lab, engines and fuels research.

PROFESSOR ANDY YATES

Adjunct Professor, SASOL Advanced Fuels Lab, engines and fuels.

PERMANENT AND CONTRACT RESEARCH STAFF

MR VICTOR BALDEN

Research Officer, BISRU; impact dynamics.

MS ANYA BOYD

Assistant Research Officer, ERC; energy, environment and climate change.

DR BRETT COHEN

Senior Research Officer, ERC; energy & modeling group.

DR STEEVE CHUNG KIM YUEN

Research Officer, BISRU; structural dynamics, blast response, crashworthiness.

MR STEPHEN DAVIS

Research Officer, ERC; energy modelling team.

MS CATHERINE FEDORSKY

Research Officer, ERC; energy, poverty & development.

DR GARETH FLOWEDAY

Projects co-supervisor, SASOL Advanced Fuels Lab, engines and fuels.

MR ANDREW HIBBERD

Energy Efficiency Engineer, ERC; measurement and verification.

MS ALISON HUGHES

Senior Research Officer, ERC; energy efficiency; energy modeling.

MR RICHARD LARMOUR

Research Officer, ERC; measurement & verification.

MR THAPELO LETETE

Assistant Research Officer, ERC: climate change.

DR ANDREW MARQUARD

Senior Research Officer, ERC; energy and climate change team.

MR MKHULULI MAGWACA

Energy Efficiency Engineer, ERC; measurement and verification.

MR BRUNO MERVEN

Senior Research Officer, ERC; energy modelling team.

MR PULE MONAMODI

Assistant Research Officer, ERC; renewable energy, energy efficiency, and commercial and residential energy issues.

MS MASCHA MOORLACH

Energy Efficiency Engineer, ERC; measurement and verification.

MR ALFRED MOYO

Assistant Research Officer, ERC; Assistant Research Officer; energy & climate change group.

DR GISELA PRASAD

Chief Research Officer, ERC; energy, poverty and development.

DR SEBATAOLO RAHLAO

Researcher, ERC; energy, environment and climate change.

DR DEBBIE SPARKS

Senior Research Officer, ERC; energy and climate change.

DR MIRA TOPIC

Senior Research Scientist, iThemba Laboratory for Accelerator Based Sciences, Centre for Materials Engineering; solid-state phase transformation, thin films and coatings, materials characterization by nuclear microprobe, X-ray, neutron and synchrotron diffraction techniques.

MR AJAY TRIKAM

Research Officer, ERC; energy efficiency; greenhouse gases; mitigation modeling.

PROFESSOR HARALD WINKLER

ERC; climate change (economics, mitigation & policy) and environmental economics.

MS HOLLE WLOKAS

Assistant Research Officer, ERC; energy, poverty & development group.

RESEARCH HIGHLIGHTS 2011

Inaugural lecture: Wednesday 17 August, Professor Harald Winkler from the Energy Research Centre gave his inaugural lecture on 'Climate change mitigation in the context of development'.

SAYAS: Genevieve Langdon was announced as a founding member of the SA Young Academy of Science (SAYAS), see: http://www.uct.ac.za/usr/press/2011/new_science_academy.pdf, <http://www.ebe.uct.ac.za/usr/ebe/staff/November2011.pdf>

Popular Mechanics named bioengineer Dr George Vicatos as South Africa's "Inventor of the Year" for his development of a versatile and potentially life-changing facial reconstruction system. His R50 000 prize money included an award for top spot in the Cutting Edge category of a nationwide inventors' competition. The judges remarked that Vicatos's invention "demonstrated his commitment to a better understanding of the human organism and the tireless pursuit of practical solutions for its frailties".

Plenary addresses: Professor Gerald Nurick gave two plenary addresses in 2011. (1) International Conference on Impact Loading of Lightweight Structures (Valenciennes, France) and (2) Lightweight Armour Group Meeting (Portugal)

DISTINGUISHED VISITORS

Prof Wesley Cantwell, University of Liverpool
Dr Luke Louca, Imperial College London

CONTACT DETAILS

Postal Address: Department of Mechanical Engineering,
University of Cape Town, Private Bag X3, Rondebosch,
7701

Telephone: +27 21 650 3231

Facsimile +27 21 650 3240

E-mail: MEC-mechanicalengineering@uct.ac.za

Web: <http://www.mecheng.uct.ac.za/>

RESEARCH OUTPUT

Articles in Peer-reviewed Journals

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- Williamson, R., Field, J., Shillington, F.A., Jarre, A.C. and Potgieter, A.E.G. 2011. A Bayesian approach for estimating vertical chlorophyll profiles from satellite remote sensing: proof-of-concept. *Ices Journal of Marine Science*, 68(4): 792-799.
- Winkler, H.E., Simoes, A.F.S., La Rovere, E.L.L.R., Atiq Rahman, M.A.A.R. and Mwakasonda, S. 2011. Access and affordability of electricity in developing countries. *World Development*, 39(6): 1037-1050.
- Winkler, H.E. and Marquard, A.K. 2011. Analysis of the economic implications of a carbon tax. *Journal of Energy in Southern Africa*, 22(February): 55-68.
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- Bartle, S., McBride, A.T. and Reddy, B.D. 2011. Shell finite elements, with applications in biomechanics. In S. Kok, D.N. Wilke and H.M. Inglis (eds), *Proceedings of the 7th South African Conference on Computational and Applied Mechanics (SACAM10)*, 10-13 January 2010, University of Pretoria, South Africa. Pretoria, South Africa: SACAM. ISBN 978 0 620 49192 1.
- Booyesen, T., Rieger, M.F.R. and Ferrein, A. 2011. Towards inexpensive robots for science & technology teaching and education in Africa. In *Proceedings of IEEE 2011 AFRICON*, 13-15 September 2011, Victoria Falls, Livingstone, Zambia. Zambia: IEEE. ISBN 978-1-61284-991-1.
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- Luckay, M. and Collier-Reed, B.I. 2011. The development and validation of an instrument - the Technological Profile Inventory - to determine students' levels of technological literacy in South Africa. In I. Candel Torres, L. Gomez Chova and A. Lopez Martinez (eds), *Proceedings of iCeri2011 Conference - 4th International Conference of Education, Research and Innovation*, 14-16 November 2011, Madrid, Spain. Spain: International Association of Technology, Education and Development (IATED). ISBN 978-84-615-3324-4.
- Morrissey, H., Reddy, B.D., McBride, A.T. and Bowles, H.C. 2011. The modelling of fibre-reinforced composites using a multi-scale methodology. In S. Kok, D.N. Wilke and H.M. Inglis (eds), *Proceedings of the 7th South African Conference on Computational and Applied Mechanics (SACAM10)*, 10-13 January 2010, University of Pretoria, South Africa. Pretoria, South Africa: SACAM. ISBN 978 0 620 49192 1.
- Prasad, G. 2011. Universal access to modern energy by 2030 what does it mean for Africa? In N. Beute (ed.), *Proceedings of the Nineteenth Conference on the Domestic Use of Energy (DUE)*, 11-13 April 2011, Cape Peninsula University of Technology, Cape Town, South Africa. Cape Town, South Africa: CPUT. ISBN 978-0-9814311-4-7.
- Richardson, N., McBride, A. and Reddy, B.D. 2011. An investigation of algorithms for rate-independent single crystal plasticity. In S. Kok, D.N. Wilke and H.M. Inglis (eds), *Proceedings of the 7th South African Conference on Computational and Applied Mechanics (SACAM10)*, 10-13 January 2010, University of Pretoria, South Africa. Pretoria, South Africa: SACAM. ISBN 978 0 620 49192 1.
- Wolmarans, N. and Shaw, C.B. 2011. "Wearing that hard hat and those boots and being there with all the dust": Students' conceptions of becoming a civil engineer. In *Proceedings of the 2011 American Society for Engineering Education (ASEE) Annual Conference and Exposition*, 26-29 June 2011, Vancouver, Canada. Vancouver, Canada: ASEE - American Society for Engineering Education. ISBN 978-0-87823-234-5.