

ALUMNI UPDATE

August 2012

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MESSAGE FROM THE DEAN



From my office in the Menzies Building I have watched the progress of the New Engineering Building which has now reached the sixth level and is on target to be completed by early 2013. The building is going to bring in a new era for the faculty – with the state-of-the-art surface science laboratory, world-class facilities, open student learning spaces and an environment which is conducive to learning and research. We are very grateful to our industry partners who have supported the new building.



Mandisa Zitha

The faculty continues to strengthen its research and innovation focus and over the past year has been awarded a number of research chairs. Through the DST/NRF South African Research Chairs Initiative (SARChI), Chemical Engineering was awarded a chair in reaction engineering and Mechanical Engineering was awarded a chair in industrial computational fluid dynamics. In addition, Civil Engineering was awarded a SANRAL Research Chair in transport engineering, and Mechanical Engineering was awarded two ESKOM Research Chairs, one in materials engineering and one in energy efficiency. We continue to develop strong partnerships and collaboration with researchers in the rest of Africa, and other parts of the world.

Safety, health and the environment remain on top of the faculty's agenda and the second semester started with awareness campaigns around safety, energy efficiency and HIV/AIDS.

I am delighted to introduce **Ms Mandisa Zitha** (pictured above), the EBE Alumni Officer who joined the faculty in July. Ms Zitha will be providing opportunities for EBE alumni to reconnect with the faculty, and she will be developing a programme to foster and support a continuing relationship between the faculty and the EBE graduates with a view to developing a strong sense of community amongst the EBE alumni.

As June was youth month in South Africa, we are celebrating a number of achievements by our young alumni in this issue.

Francis Petersen, Dean of Engineering & the Built Environment

NOVEL MATERIALS INVESTIGATED WITH NEW GLEEBLE

A state-of-the-art **Gleeble 3800** has been installed in the Centre for Materials Engineering thanks to a National Research Foundation (NRF) special equipment award. The Gleeble 3800, worth US\$1.05 million, is a fully integrated digital closed-loop control thermal and mechanical testing system which is able to very closely simulate actual industrial metal processes, including hot rolling, forging and extrusion.

The equipment, which can heat specimens at rates of up to 10 000°C/sec, and hold steady state equilibrium temperatures, will place the Centre at the forefront of research into the behaviour of materials during manufacture. The high compression capacity (20 ton, 200kN) allows for simulation of the plane-strain condition in the roll-gap during metal rolling.

"By emphasising technical innovation in our student training, and interacting with local industries, we will develop skills in innovative manufacturing and production," said Professor Rob Knutsen, Director of the Centre for Materials Engineering.

This provides opportunities for collaboration with the local metals-producing industries that have not been possible before owing to the limitations of existing equipment in SA. Examples include deformation



Tobile Kwavula and Dr Sarah George test the new Gleeble 3800

and recrystallisation texture studies on stainless steels and aluminium, which are critical for developing and producing competitive commodity products.

"The research that will be possible with the use of the Gleeble 3800 will directly impact on the competitiveness and growth of the existing local metals-producing industries," said Professor Knutsen.

Furthermore, a new research thrust in the deformation processing of titanium alloys has been initiated to foster the development of a titanium metal producing industry in South Africa that will create additional opportunities for employment and economic growth. This activity is sponsored by the Department of Science and Technology (DST) through the national Titanium Centre of Competence at the CSIR.

INNOVATION FOR DEVELOPMENT AND SOCIO-ECONOMIC CHANGE



“Innovation for development and socio-economic change” was the theme for the Department of Science and Technology’s budget vote on 15 May. The HySA/Catalysis Competence Centre from the University of Cape Town was part of an exhibition at the Iziko South African Museum which showcased some of South Africa’s best innovations. **Dr Olaf Conrad**, the Programme Director of the HySA/Catalysis Competence Centre (pictured above) was the expert selected to do a presentation to the members of the Parliament’s Portfolio Committee for Science and Technology on Hydrogen and fuel cells: The potential for economic development.

Conrad said the hydrogen economy is seen as the future of a sustainable energy infrastructure. All key technologies, hydrogen production, hydrogen storage and electricity generation from hydrogen, are very likely going to use platinum group metals (PGMs). About 73 percent of the world’s known reserves and resources in PGM are in South Africa. The government has set into motion a programme (HySA) to develop a competency, the skilled workforce and ultimately the manufacturing industry in South Africa to become an important exporter of value-added products into this future market. Conrad added that the major economies (US and Canada, Europe, Japan) are leading by about 20 years, so the HySA programme’s first objective is to leapfrog the technology development and prepare for commercialisation when the markets begin to grow (early next decade).

The Dean of Engineering & the Built Environment Francis Petersen, who attended the budget vote said, “The presentation was well received as it confirmed the DST’s vision of South Africa’s future role in the hydrogen economy as an exporter of value-added products based on the PGM mineral wealth.”

LANDMARK CONVENTION SHOWCASES SA INDUSTRIAL EXPERTISE TO GLOBAL MARKET



In early April, c*change, the DST NRF Centre of Excellence in Catalysis in the Department of Chemical Engineering hosted the Syngas Convention, in association with Sasol and PetroSA.

This was a first-of-its-kind convention dedicated to synthesis gas conversion – one of the key industrial technologies underpinning the South African economy – and it brought together some of the world’s top scientists and industry experts to build valuable international collaborations. These relationships could foster greater industrial and scientific developments and benefit both the South African economy and the environment.

The technology, known as the Fischer–Tropsch process, provides 40 percent of South Africa’s current liquid fuels requirements from coal and natural gas. And as oil reserves dwindle and the world looks for greater diversity and

security of energy supply, opportunities are opening up to deliver these same benefits to others.

Professor Michael Claeys (pictured above) director of c*change, said that as the host of the event, c*change was extremely happy at the very strong turnout both from local players and international delegates. “This was the first syngas convention of its kind and presented us with a great opportunity to tell one of the great research and technology development success stories of this country, as well as foster valuable links and build our research capabilities. We hope that it will become an annual affair as this technology continues to gain ground,” said Claeys.

The convention was preceded by an Autumn School on “Fundamental aspects in Heterogeneous Catalysis” with lectures by leading experts in their field.

No ivory tower for planning students



UCT students and staff from the School of Architecture, Planning and Geomatics

‘Nothing for us, without us.’ This was a key message from the impoverished community in Langrug, Franschhoek, for UCT students and staff from the School of Architecture, Planning and Geomatics who visited the area in February. The students were in Langrug for their first official site visit and data gathering expedition as they began researching ways to improve living conditions in the informal settlement.

First-year master’s students in city and regional planning and landscape architecture are collaborating with community leaders, residents, and municipal officials for the purpose of recommending a number of different spatial development options and housing upgrades for the area under study. The project also forms the core of the department’s basic planning skills *in situ* upgrade course that aims to introduce South Africa’s future planners and designers to the physical, social, economic, environmental and political circumstances that inform the current social structure.

Deputy Director of Integrated Human Settlements for the Stellenbosch Municipality, David Carolissen, said it was important for government and other partners to work with communities like Langrug instead of “talking down” to them if it hoped to correct social ills. “Informal

settlements in Franschhoek present a complex challenge,” Carolissen said. “Langrug has 4 088 people. All have challenges like access to water and electricity.”

In the first of six formal visits to the area, hidden from view from the picturesque and wealthy Franschhoek town centre, students were taken aback by the physically and economically stifling conditions. Many agreed that the most pressing need was the installation of running water and sanitation facilities.

“Proper facilities like water and sanitation are definitely the most urgent needs,” said Aa-ishah Petersen, a master’s student in city and regional planning.

Professor Vanessa Watson, Deputy Dean of the Faculty of Engineering & the Built Environment, explained that the project stemmed from a 2010 memorandum of understanding signed by a number of African planning schools with Slum Dwellers International. The Schools pledged to teach students to plan with communities, as opposed to for them.

“Planners had a very bad reputation worldwide, because they liked to control things,” Watson explained. “So now we’re trying to train planners to learn from communities as well as from books.”

RADAR TRANSCIEVER to track moving targets

Electrical engineering master’s graduate **Stacey Rukezo** (right) built a radar transceiver for her master’s project using some of the hardware from the South African Synthetic Aperture Radar II (SASAR II) project to develop a new line of research.

Rukezo’s modified transceiver is intended as a prototype for a ‘network radar’, which uses multiple receivers scattered over a large area. “This type of radar provides improved detection of moving targets, such as drug and contraband smugglers in small aircraft, and also poachers operating off the coastline,” she explained.

A paper on her project, co-authored by herself, her supervisor Professor Mike Inggs and Dr Amit Mishra, was presented by Mishra at the International Radar Symposium in Warsaw, Poland. Rukezo could not attend because of work commitments in Germany, where she is currently doing a STEP (Students’ Experience Programme) internship in the department of environment perception at Daimler AG. “This is broadening my understanding of radar and giving me much-needed practical experience,” she said.

SASAR II, the project Rukezo’s radar transceiver was partly derived from, was



originally undertaken by UCT’s Radar Remote Sensing Group from 2004 to 2007. It was designed as a ‘flying laboratory’ that could provide radar images of the earth’s surface. SASAR II was later abandoned, but has regained momentum with plans by the South African Space Agency to launch a South African radar satellite within the next decade.

Graduate builds world's fastest rapid-compression machine



Mechanical engineering PhD graduate **Gavin Evezard** has singlehandedly built the world's fastest rapid-compression machine, or RCM, that could set the tone for improved fuel combustion in car engines.

Evezard first explored the concept of a faster RCM in his final undergraduate year; building a prototype for his master's; and completed the real thing for his PhD. The machine investigates what happens when an air/fuel mixture is squeezed very suddenly.

"It reveals a lot about the fuel," explains Evezard's supervisor, Adjunct Professor Andy Yates, "What happens is that it 'thinks' about burning for a moment, starts to burn, stops burning and then explodes. These timescales are crucial to extracting the optimal combustion performance from fuels," he said.

The automated RCM Evezard built stops a piston that is moving at up to 40km/hr in less than one half of a millisecond (ie: one half of a thousandth of a second). That's twenty times faster than the blink of an eye. The best rapid compression machines elsewhere in the world are slow by comparison, needing at best two milliseconds to stop a piston.

Speaking from his office at specialised energy operation company Associated Energy Services in Cape Town, Evezard says that for all intents and purposes the machine is ready for use. "The RCM is typically used in research facilities for fuel characterisation," he says. "Once fuel characteristics have been established and published, the data can be used for various new and existing combustion devices, normally with the intention of improving performance and efficiency." His study has paved the way for further research at UCT and there are currently master's students working on the machine to see how hard it can be pushed.

Fulbright Scholarship

Mandisa Mazibuko started her studies at UCT on the Academic Support Programme for Engineering in Cape Town (ASPECT), the academic development initiative of the Faculty of Engineering & Built Environment.

Since graduating with a degree in civil engineering in 2009, Mazibuko (pictured here with Linda Nkomo) has steadily been making her mark in the industry. Between working as a design and contracts engineer for Aurecon in the Free State, Pretoria and Limpopo, Mazibuko was chosen as a delegate at 2010's Brightest Young Minds Summit, sat on the national executive committee of South African Women in Engineering – an association of young women engineers started at UCT – and received a scholarship from information and communications technology company T-systems that took her to Germany for a course on how to run a global technology corporation.

She has also co-founded a not-for-profit organisation called Letha Ithuba ("bringing opportunity"), which is aimed at rural empowerment through education, beginning with a rural area in Estcourt, KwaZulu-Natal, where she was born.



She has been awarded a Fulbright Scholarship to do her master's degree in engineering management at Duke University in the US and will be starting her studies in September 2012. Mazibuko hopes that the Fulbright Scholarship – which includes an internship in the US after graduation – will broaden her perspective of the inner workings of the engineering industry. "I want to take it all in and see how I can use it to my advantage when I get back," says Mazibuko.



WORKING IN PARADISE

Yaseen Kajee graduated with a BSc (Eng) in mechanical engineering in June 2006 and with his master's degree in 2010. Kajee would have laughed if someone had told him that his first job would be in a tropical paradise. But in January 2011 he was doing just that – working as a project engineer for Dredging Environmental and Marine Engineering in Panama where he was involved in the widening and deepening of

the Panama Canal. "My work has been very exciting and I have had the privilege to work with the world's most powerful dredging vessel, the d'Artagnan," said Kajee. The work is completed in Panama and he is now working on a construction project for a new coal terminal on the North Coast of Colombia where they are dredging the entrance channel and foundation for the jetty with the vessel Breydel.



FLYING THE FLAG for youth, women and South Africa

UCT EBE Alumni and Women in Engineering, South Africa (SAWomEng) co-founder, **Naadiya Moosajee** has been flying the South African flag high in global discussions around “Women in Engineering and Innovation” as well as the “Economic opportunities for youth.”

Moosajee is an elected board member of the International Youth Foundation (IYF), based in

Baltimore, US, which works in 79 countries on youth leadership, skills development and access to opportunities for youth. In a recent call to action, with Microsoft and IYF, she lent her voice in calling to action industry on the opportunities that youth participation could have in the global economy.

Moosajee recently returned from a three-week tour across the US as part of the US State Department International Visitor Leadership Programme. The visit included state departments, universities, schools, corporations, NGOs and organisations working in the promotion of science, technology, engineering and mathematics. “I was happy to note that not only is SAWomEng the leading organisation in Africa in promoting women and girls in engineering, but SAWomEng programmes are on par, if not better than some US initiatives,” said Moosajee. The journey saw the formation of partnerships with a number of US-based organisations, and is part of SAWomEng’s continued success, as the organisation geared up for its annual national conference and networking event in July and its GirlEng events in August. We look forward to following Moosajee’s career and wish her all the best as she heads off to Washington to be on the panel Youth Voices: Creating Educational, Economic, and Civic Opportunities, at the IYF Youth@Work conference.

In 2006, Naadiya graduated with a BSc in civil engineering and completed her master’s degree in transport studies in 2009. She is presently working as an engagement manager at Pegasys Strategy and Development.

First YOUNG ENGINEERS SCHOLARSHIP (YES) winner

Mandiwakhe Ntlabathi, a first-year chemical engineering student, is the first recipient of the Young Engineers Scholarship (YES). The scholarship is the brainchild of two chemical engineering graduates, Harshad Bhikha and Sergio Cieverts, who work at Sasol in Secunda. They got the buy-in from

their colleagues at Sasol and 17 of them contributed to the YES scholarship to support a first-year engineering student who, despite the odds, was able to excel at school, and needed financial assistance to pursue their dream of studying engineering at UCT. The scholarship is worth R45 500.

Ntlabathi is from Nyanga, Cape Town, and attended Nelson Mandela High school in Crossroads. His mother and father are both informal traders. Ntlabathi achieved seven distinctions in matric which is testament to his hard-working nature. He loves figuring out how things work and that is what led him to chemical engineering.

The donors of the scholarship will make themselves available via email to answer any questions Ntlabathi may have on life in the



engineering industry and offer some guidance and mentorship should he desire it. “We would like the scholarship to more than just a name on a page but something interactive and personal which will really benefit the student,” said Bhika.

INFRASTRUCTURE PROJECTS

The faculty has three major infrastructure projects which are going to provide much needed space in the faculty. Civil Engineering and research groups from the Department of Chemical Engineering will be housed in the **New Engineering Building (NEB)**.

The Department of Civil Engineering is expected to move into the new building in November 2012. Construction on this building on upper campus started in August last year and should be completed by March 2013, when the Department of Chemical Engineering, the Dean of the Faculty of Engineering & the Built Environment and the Faculty Office are expected to join civil engineering.

The original Snape Building – currently occupied by civil engineering – is going to be transformed into a new five-storey **Teaching and Learning Building (TLB)**, which will house the Department of Construction Economics and Management (CEM), and include nine multi-functional lecture theatres, a micro-lab, and a satellite campus of the Library Knowledge Commons. Building will start at the beginning of next year.

“The civil engineering laboratories as well as a new, spacious teaching laboratory will be housed in the basement of the building. Civil engineering staff and postgraduate students will occupy the offices in the south end of the NEB,” said deputy dean Associate Professor Neil Armitage, during a tour of the construction site earlier this week.

Armitage says that the main gains to the faculty will be the state-of-the-art lecture theatres – which will be part of the TLB – more space for the Departments of Chemical Engineering and the School of Architecture, Planning and Geomatics (through the move of CEM), and a dedicated Surface Science laboratory (for the electron microscopes) shared between three faculties and situated between the two larger buildings.

With the Department of Construction Economics and Management moving out of Centlivres, much needed space will be made available for growth in the School of Architecture and Planning. An amount has been provided to retrofit the **Centlivres Building** and work began in June to optimise and upgrade the space within the building.

WE REMEMBER



Emeritus Associate Professor Loewenthal started working at UCT in September 1974 as a Senior Lecturer and was promoted to Associate Professor on 1 January 1987. He retired from UCT on 1 December 2006 and moved to his olive farm in Vermaaklikheid where he died on 6 January 2011 at the age of 69.

Prof Loewenthal did his postgraduate studies at UCT. He was well liked by his students who enjoyed his eccentricities. He always entered the lecture theatre without a single lecture note, believing that keeping notes would make his lectures stale and repetitive. Some of the words and phrases students used to describe him have been recorded for posterity in student yearbooks...here are a few: *“...understands the mind of a student through and through...”*

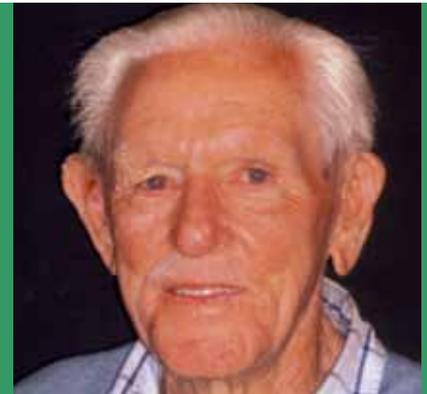
“...he made complex concepts so simple to understand ... that you went away wondering what the problem was...”

“...has the weathered face of a Keith Richards and a devilish sense of humour...”

“...he often lit two cigarettes and placed one on each side of the lecture theatre, so that he could pace back and forth taking regular puffs at each end as the ideas flowed...”

Professor Loewenthal had a magnetism that drew people to him from all walks of life. He had the rare gift of making people feel more special, more alive in his presence.

That was his magic and a huge part of his legacy. In the end, he faced death as he faced the trials of life: squarely and bravely with honesty and integrity and with that magnificent mix of flippancy and profundity that he made uniquely his own. He wanted all that were dear to him, not to wallow in sadness, but to celebrate his life.



Michiel Kenne Botha (BSc 1943), 91, died peacefully on 12 August 2011 after a short illness at Anchusa Frail Care. He studied engineering at UCT from 1938 to 1942 and graduated with a BSc in 1943. He then joined the SAAF where he remained in service in South Africa until the end of the war. He joined the Divisional Council of the Cape as an assistant engineer (civil) in 1946 and was promoted to chief engineer in 1965, a position he held until his retirement in 1983. During his tenure he oversaw some major road projects like the building of the Blue Route, Ou-Kaapse Weg and Black Hill for the council. After his retirement, he served time as chairman of several old-age homes for the Cape Peninsula Organisation for the Aged (CPOA) until a few years before his death. He is survived by five children, 13 grandchildren and five great-grandchildren.

Departmental News

Chemical Engineering

Professor Alison Lewis will be the new Head of Department from January 2013. She will be taking over from **Professor Jack Fletcher** who will return to his research position in the Centre of Excellence in Catalysis. After 32 years in the department, **Professor Duncan Fraser** retired at the end of 2011.

Electrical Engineering

Professor Martin Braae will be the new Head of Department from January 2013. He will be taking over from **Professor Barry Downing** who officially retired in 2010 after 27 years in the department but returned as HOD for an additional two years. In December 2011, **Mr Adrian Jongens**, a senior lecturer in the department retired after 37 years in the department. His research area was acoustics.

Civil Engineering

Associate **Professor Neil Armitage** will be the new Head of Department from January 2013. He takes over from **Professor Alphose Zingoni**. **Mr Theo Moyana** from the Civil Engineering workshop took early retirement in 2011 after 21 years at UCT.

Mechanical Engineering

Professor Tony Sayers retired after 41 years in the Department of Mechanical Engineering. *Popular Mechanics* magazine named **Dr George Vicatos** as South Africa's Inventor of the Year in 2011 for his development of a versatile and potentially life-changing facial reconstruction system.

School of Architecture, Planning & Geomatics

In 2011 **Professor Lucien Le Grange** took early retirement after 32 years at UCT. **Professor Alta Steenkamp** took over as head of the school in July 2011. Emeritus **Professor Dave Dewar** received the Mayor's medal for Social Affairs and Services for his great contribution to the study of Planning in South Africa and **Professor Jo Noero** received UCT's Creative Works award for 2011.

Construction Economics and Management

Associate **Professor Kathy Michell** has been elected to the Education Standards Board for the RICS Middle East Africa region and Associate **Professor Francois Viruly** was appointed President of the African Real Estate Society.

Message from the EBE Alumni Officer

As part of the Faculty of Engineering & the Built Environment alumni, you are part of a global community. My main responsibility is to strengthen and support the Faculty's relationship with the EBE alumni. I will be developing an alumni programme that will offer you unique benefits and services. There is also the opportunity to reconnect with the Faculty and other alumni members.

I encourage you to keep up-to-date with Faculty news and opportunities, as well as share interesting news of your professional achievements.

While developing the alumni programme I welcome your suggestions on your preference for engagement. Please contact me at mandisa.zitha@uct.ac.za should you be interested in hearing more about a Gauteng function in October.

I look forward to a continuous and meaningful relationship with you.

Mandisa Zitha
Alumni Officer



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