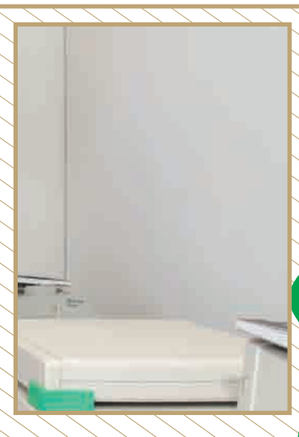
Faculty of Engineering, Science and the Built Environment

contents



Mission Statement

The Faculty is committed to develop within a values driven ethos, quality technicians and technologists that are practice oriented and responsive to the needs of the people of South Africa and Africa as a whole by providing the highest standards of teaching, learning and community engagement underpinned by a commitment to empowering staff and students to succeed.

Professor Darren Lortan
Executive Dean: Faculty of Engineering, Science and the Built Environment

Overview

As in 2005, the Faculty of Engineering, Science and the Built Environment had a number of successes and challenges for both staff and students during the 2006 academic year.

Students Successes included the following:

- Mr S Nhassengo and Mr M Ndebele were awarded the prestigious Rolls Royce Engineering Scholarships for Master's students. Both have registered for the M.Tech: Mechanical Engineering degree.
- Mr Z Rambukus (B.Tech cum laude) received the Silver Medal from the South African Institute of Chemical Engineers for being the best B.Tech student in KZN.
- Mr Rishaal Ramchander (Department of Civil Engineering) was awarded the Institute of Professional Engineering Technologists (IPET) gold medal for being the top B.Tech: Engineering graduate in the country.
- Staff and students of the Department of Construction Management and Quantity Surveying conducted and international study tour of medieval and modern buildings and construction projects in Paris and Dubai.

Staff Successes included the following:

- Mr Vincent Ndinisa, Head of Department of Chemical Engineering, was awarded a Ph.D. (Chemical Engineering) by the University of New South Wales.
- Mr Suresh Ramsaroop (Department of Chemical Engineering) received recognition for his work in curriculum development by being invited to be part of a European Union Curriculum Development Project in Chemical Enginneering. DUT is the only institution outside of Europe to be part of this initiative.
- Dr K Bisetty and Dr N Deenadayalu (Department of Chemistry) were awarded Associate Professorships by the DUT.
- Mr T McKune was elected Vice-President of the South African Institute of Civil Engineers.
- Professor Singh was elected the President of the South African Society for Microbiology.
- Mr G Reddy was elected the President of the Chartered Institute of Building Africa.
- Mr R Lekonyana was awarded an M.Tech: Civil Engineering by the DUT.
- Mr T Hunter was awarded a B.Tech: Survey by the DUT.
- Mr A Raghubar was awarded a B.Tech: Survey by the DUT.
- Mr S Saroop and Dr D Alloppi (of the Department of Civil Engineering) received the Institution of Municipal Engineering of Southern Africa (IMIESA) award for the best non-member paper in the IMIESA journal for 2005/2006.
- Staff and students of the Department of Construction Management and Quantity Surveying conducted an international study tour of medieval and modern buildings and construction projects in Paris and Dubai.
- Mr R Singh was awarded an M.Tech: Industrial Engineering by the DUT.
- Mr R Ranjit was awarded an M.Sc.Eng: (Mechanical) by the University of KwaZulu-Natal.
- Mr A Naicker fulfilled the requirement for registration by the Engineering Council of South Africa as a Professional Technologist (Industrial Engineering).

A number of challenges continue to confront the Faculty:

- Improving student access, success and throughput.
- Improving research participation and output.

Faculty of Engineering, Science and the Built Environment

- Staff capacity building:
  - Postgraduate qualifications.
  - Active teaching/learning approaches in health sciences education.
- Consolidating and strengthening community engagement activities.
- Achieving staff equity and redress.

Departments

- Architectural Technology
- Biotechnology
- Chemical Engineering
- Chemistry
- Civil Engineering and Surveying
- Clothing Technology
- Construction Management and Quantity Surveying
- Electrical Power Engineering
- Electronic Engineering
- Food Technology
- Horticulture
- Industrial Engineering
- Maritime Studies
- Mathematics
- Mechanical Engineering
- Physics
- Pulp and Paper Technology
- Textile Technology
- Town and Regional Planning

Enrolments

A total of 6684, 7157 and 6743 students were registered in the Faculty in 2004, 2005 and 2006 respectively. Apart from the 7% increase in student enrolment in 2005, growth has been kept to within 2% of enrolment figures for 2003 which is in line with the DoE's instruction that DUT should cap its growth. Of the students registered in the Faculty in 2004 to 2006, between 1% and 1.4% were registered for postgraduate qualifications. The proportion of students registered for the undergraduate degree varied from 14.8% to 16%. The number of students registered for M.Tech (full research) and Doctoral degrees increase from 67 to 94 over this period.

For the reporting year 2006, there was a 5.8% decrease in student enrolment in the Faculty. Apart from the context of the DoE's enrolment capping prescription with 2003 being the baseline year, this decrease has been attributed to the decision made by most Departments in the Faculty to increase their entrance requirements for Mathematics and Physical Science. In addition first time registrations in the second semester were discontinued. There were, however, no discernable major shifts in the shape of the faculty by qualifications and student enrolment. With regard to gender, the Faculty student population remained predominantly male, with no appreciable movement in the female student population in the three years under review. The 2006 overall student participation by race is as follows: Africans 4342 (64.4%), Coloureds 117 (1.7%), Indians 1854 (27.5%) and Whites 407 (6%), a reflected in Table 1. Postgraduate enrolment has improved slightly for the year 2006.

The data on student participation by race reveals that although the faculty's student demographics reflect the regional demographics, under-representation of Coloured and African students at postgraduate level continues. See Figure 3. In 2006, African and Coloured students respectively comprised only 24.7% and 2.7% of the 73 students registered for M.Tech degrees and they comprised only 19% and 0% of the 21 students registered for D.Tech degrees. The under-representation of Coloured and African students in higher degrees might be attributed to the fact suitably qualified undergraduates from the designated population group are highly sought after. The pool of B.Tech graduates from which the postgraduate students are drawn is made up of a large number of employed, part-time students for whom postgraduate degrees are either deemed to be unattainable on a part-time basis, or are not a requirement for further advancement in the workplace. The overall growth in the number of African students registered for the B.Tech degree (from 573 in 2004 to 701 in 2006) may have some a positive impact on participation rates at the postgraduate level.

Gender Participation (2004-2006)

Qualifications	2004			2005			2006		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
National Diplomas	1575	3961	5536	1763	4231	5994	1641	3901	5542
National Higher Diplomas	1	9	10	1	7	8		1	1
Bachelor of Technology	262	809	1071	281	777	1058	298	808	1106
M.Tech	21	31	52	33	43	76	34	39	73
D.Tech	5	10	15	7	14	21	7	14	21
Total									
Percentages	**1864**	**4820**	**6684**	**2085**	**5072**	**7157**	**1980**	**4763**	**6743**

Race Participation (2004-2006)

Qualifications	2004						2005					2006					
	African	Coloured	Indian	White	Other	Total	African	Coloured	Indian	White	Total	African	Coloured	Indian	White	Other	Total
National Diplomas	3706	102	1398	317	13	5536	3988	103	1559	335	5994	3618	96	1503	316	9	5542
National Higher Diplomas			3	7		10	1		1	6	8	1					1
Bachelor of Technology	573	28	340	128	2	1071	610	18	319	109	1058	701	19	300	78	8	1106
M. Tech	9		27	12	4	52	19	2	40	12	76	18	2	37	11	5	73
D Tech	1		10	4		15	3		14	4	21	4		14	2	1	21
Total	**4289**	**130**	**1778**	**468**	**19**	**6684**	**4621**	**123**	**1933**	**466**	**7157**	**4342**	**117**	**1854**	**407**	**23**	**6743**

Students Participation in Higher Degrees and Undergraduate Programs by Race (2004-2005)

Qualifications	2004					2005					2006					
	African	Coloured	Indian	White	Total	African	Coloured	Indian	White	Total	African	Coloured	Indian	White	Other	Total
National Diploma	67%	2%	25%	6%	100%	67%	2%	26%	6%	100%	65%	2%	27%	6%	0.2%	100%
National Higher Diploma			30%	70%	100%	13%		13%	75%	100%	100%					100%
B.TECH	54%	3%	32%	12%	100%	58%	2%	30%	10%	100%	63%	2%	27%	7%	1%	100%
M.TECH	17%		52%	23%	100%	25%	3%	53%	16%	100%	25%	3%	51%	15%	7%	100%
D.TECH	7%		67%	27%	100%	14%		67%	19%	100%	19%		67%	10%	5%	100%
TOTAL	64%	2%	27%	7%	100%	65%	2%	27%	7%	100%	64%	2%	27%	6%	0.3%	100%

Teaching and Learning

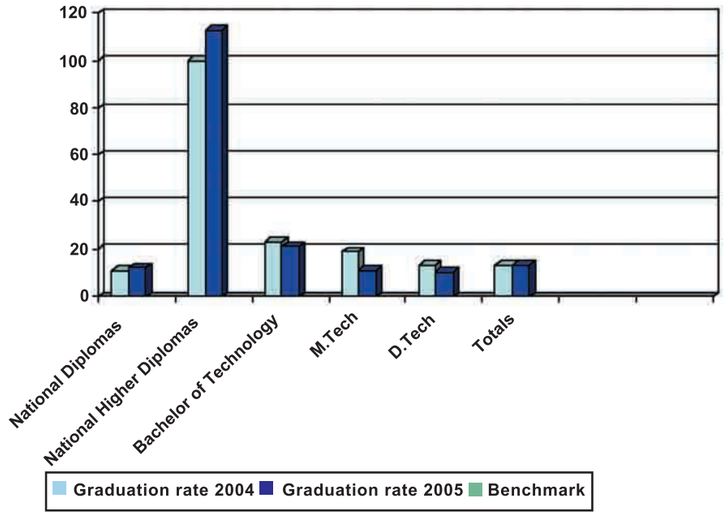
Student Performance

The table below presents data on graduation rates for 2004 and 2005. The Faculty performance on the whole with regard to N. Dip and B.Tech graduation rates is well below the national benchmarks for similar programmes. Individual programme data reveals dropout rates of between 25% and 100% percent for the National Diplomas. The Faculty is performing relatively well with regard to M. Tech graduation rates, although still below the national benchmark. The graduation rate for doctoral programmes could also improve.

Overall Faculty Student Graduation Rate by Programme Level (2004-2005)

	2004			2005		
	Total No. of Students	Completed end 2004	[1]Graduation Rate	Total No. of Students	Completed end 2004	[2]Grad Rate
National Diplomas	5536	596	11%	5994	702	12%
National Higher Diplomas	10	10	100%	8	9	113%
Bachelor of Technology	1071	241	23%	1058	218	21%
M. Tech	52	10	19%	76	8	11%
D. Tech	15	2	13%	21	2	10%
TOTALS	6684	859	13%	7157	939	13%

Graduation Rates by Academic Program (2004-2005)





It is evident that the Faculty's overall performance in Teaching and Learning is far from mediocre and barely satisfactory. The programme with worst performance is Maritime Studies with a throughput rate of 0% and a dropout rate of 100%. Although this throughput rate may be misconstrued to be disastrous, the context within which the programme operates provides an exonerating explanation.
By design, all students who have satisfied the requirements of the S1 and S2 components of the N. Dip (Maritime Studies) are required to conduct a minimum of one year's Experiential Learning aboard a seafaring vessel. It is a requirement of the South African Maritime Safety Authority (SAMSA) that the minimum period aboard the ship be 365 days. SAMSA, who are the accrediting professional body for Maritime Studies, then require the students to present themselves for the accreditation of competency, following which they are called Officers of the Watch, and require a minimum of a further year's training aboard a ship in this capacity. Therafter they may return to complete the S3. Upon completion of the S3, they present themselves to SAMSA for the accreditation of competency as Chief Mate or Second Engineer (depending on their stream of choice). Yet again they spend a minimum of a further year aboard a ship, trainining in this capacity. Therafter they may return to complete the S4. Upon completion of the S4, they finally present themselves to SAMSA for the accreditation of competency as Master or Chief Engineer (depending on their stream of choice). The minimum time taken to complete this National Diploma is therefore 6 years. The additional modules of technical workshop training, radio communications, safety and survival make the time taken for the qualification far greater than in any other industry. Students completing S2 may follow career paths in surveying or marine harbour services and have no need for the S3 and S4 modules. Exit levels for this programme require attention to meet institutional throughput requirements.

With the exception of Chemical Engineering, the Engineering programmes throughput rates and dropout rates are fairly dismal and have been so for time. All of these departments have affirmed that lack of placement opportunities for the experiental learning component of the programme is the most significant contributor to these poor rates. In addition, scores of students are distracted by lucrative salary offers and remain in work-based learning placements beyond the required period, postponing the conclusion of their studies indefinitely. Unfortunately these students are also labelled as drop-outs. In an attempt to counter some of these trends a permanent Industry Liaison Officer was appointed to continuosly recruit more workplaces to accredit for the purposes of experiential learning. Most departments are also urging students and industry partners not to engage in any experiential learning placements until the students have completed the theoretical component of the programme. The National Government's ASGISA initiatives have also played a significant role in matching students available for experiential learning with available workplaces.

Another contributor to the poor performance of the Engineering programmes is the low pass rate of Mathematics and a few other 'bottleneck' subjects that have identified by these programmes as major impediments to the success rate of the servicing department, e.g. Mechanics, Electronics, Applied Mechanics and Electrical Engineering. Special additional tuition has been provided for students registered in 23 of these targeted courses, with varying degrees of efficacy.

The final major contributing factor to poor throughput performance is the low course loads carried by most Engineering students. The opportunity for students to deregister from a course prior to the examination without 'failing' the course, is proving to be an Achilles Heel. Since the DoE definition of success rate is based on the number of FTEs passed, these students who may not fail are certainly not among the students that are accounted for in the FTEs passed. The prevalence of this false sense of achievement is staggering. Initiatives are afoot to limit this practice by enforcing deadline dates, after which deregistration will result in failing the course.

Finally, without detracting from the excellent performance of the few programmes with throughput rates of 30% or more and corresponding low drop-out rates, it is noteworthy that the other common factor linking these departments is their low student-staff ratio. The members of staff from Departments offering programmes in Biotechnology, Clothing Technology, Chemical Engineering, Food Technology, Landscape Technology and Town and Regional Planning are to be commended for outperforming the National Department of Education's benchmark for the minimum time throughput rate.

Staff Profile

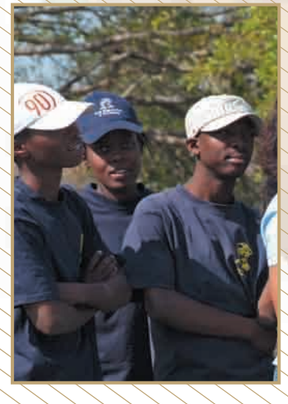
The race profile of staff in the Faculty reflects the difficulty in recruiting, attracting and retaining suitably qualified staff from the designated groups. Of the 255 permanent and contract staff employed in the Faculty in 2006 only 18.4% (n = 47) were African and only 2.7% (n = 7) were Coloured, with the remaining 50.2% (n = 128) and 27.8% (n = 71) being Indians and Whites respectively. Rank profile by race does not improve the outlook. Only 6 of the 22 African academic staff were at Senior Lecturer and Associate Director level (3 in each); of the remaining 16, 15 were Lecturers and 1 was a Junior Lecturer. Indian males were the dominant group in all but three (Associate Directors, Secretaries and Administrative Assistants) of the staffing categories.

With regard to higher degrees qualifications, in 2006 only 53.8% of the academic staff had postgraduate degrees (n = 173); 38.2% of the total held masters' qualifications and 15.6% held doctoral degrees. It is noteworthy that an increasing number of staff (including non-teaching staff) were registered for postgraduate degrees.

Research

Research ouputs were outstanding with a total of 42 accepted papers in international journals and accredited proceedings. In addition several papers were presented at both national (34) and international conferences (19). The gradual increase in postdoctoral fellows is commendable. The distribution of postdoctoral fellows for 2006 was: Four in the Department of Biotechnology; one in the Department of Chemistry; and one in the Department of Mechanical Engineering. In addition numerous Departments within the faculty hosted six visiting scientists. This bodes well for the fostering of a research culture in the various disciplines.

Two NRF niche areas were approved within the Faculty viz., Plant Biomass Processing and Water and Wastewater Technology. A research development grant of R1.3 million was granted to the Faculty to fast track these and other initiatives. Postgraduate enrolments has been outstanding in several Departments, however, this remains a challenge to most Departments within the Faculty. The number of permanent staff registered for Masters and Doctoral degrees has continued to increase. This will inevitably result in a spread of expertise and outputs across the Faculty.



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Identified Research Focus Areas can be Summarised as Follows:

- Water and Wastewater Technology (Prof F Bux – Department of Biotechnology).
- Enzyme Technology (Prof S Singh & Dr K Permaul– Department of Biotechnology).
- Plant Biotechnology (Prof B Odhav – Department of Biotechnology).
- Artificial Intelligence (Dr P Naidoo – Department of Electronic Engineering).
- Membrane Technology (Prof VL Pillay – Department of Chemical Engineering).
- Cleaner Production Technologies (Mr A Telukdarie – Department of Chemical Engineering).
- Prof M Walker – Department of Mechanical Engineering.
- Prof K Kanny – Department of Mechanical Engineering.
- Prof G Redhi – Department of Chemistry.
- Prof V Bisetty – Department of Chemistry.
- Mr F dalMaine – Department of Electrical Power Engineering.

Faculty Research Strategy For 2006

- Create an environment for staff to complete Masters and Doctoral studies.
- Departments to drive postgraduate research.
- Improve postgraduate throughput.

- All Departments to make new staff appointments with a minimum of a Masters degree.
- Appointment of postdoctoral fellows and visiting scientists in active research units within the Faculty.
- A minimum of one publication per Masters graduate and two publications per Doctoral graduate will be vigorously encouraged.
- Foster collaborations with national and international institutions.
- Pursue industrial funding initiatives.

DOE Accredited Journal Publications

Department of Biotechnology

1 Olaniran, O, Mfumo, N H, Pillay, D and Pillay, D B (2006). Synergistic utilization of dichloroethylenes as sole carbon source by bacterial consortia isolated from contaminated sites in Africa. Biotechnology and Bioprocess Engineering 11: 205 - 210.

2 Olaniran, O, Pillay, D, and Pillay, D B (2006). Aerobic cometabolic degradation of cis- and trans-dichloroethene by a consortium of bacteria isolated from contaminated sites in Africa. African Journal of Biotechnology 5: 1913-1917.

3 Olaniran, A O Pillay, D. and Pillay, D B (2006). Biostimulation and bioaugmentation enhances aerobic biodegradation of dichloroethenes. Chemosphere 63: 600-608

4 Chenia, H Y, Pillay, B and Pillay, D (2006) Mechanisms of fluoroquinolone resistance in urinary tract pathogens: Analysis of membrane composition, target gene alterations, accumulation of ciprofloxacin, and presence of the qnrA gene. Journal of Antimicrobial Chemotherapy 1404: 1-5.

5 Mokoena, M P, Chelule, P K and Gqaleni, N (2006). The toxicity and decreased concentration of aflatoxin B1 in natural lactic acid fermented maize meal. Journal of Applied Microbiology 100: 773-777.

6 Mohanlall, V and Odhav, B (2006). Biocontrol of aflatoxins B(2006). 1, B2, G1, G2, and fumonisin B1 with 6,7-Dimethoxycoumarin, a phytoalexin from citrus sinensis. Journal of Food Protection 69: 94-99.

7 Stephens, D E, Rumbold, K, Permaul, K, Prior, B A and Singh, S (2006). Directed evolution of the thermostable xylanase from Thermomyces lanuginosus. Journal of Biotechnology. In Press.

8 Reddy, L, Odhav, B and Bhoola, K (2006). Aflatoxin B1-induced toxicity in HepG2 cells inhibited by carotenoids: morphology, apoptosis and DNA damage. Biological Chemisry 387: 87-93.

9 Ramothokang, T R, D, Naidoo and F Bux (2006). "Morphological shifts in filamentous bacteria isolated from activated sludge processes". World Journal of Microbiology & Biotechnology 22: 845-850.

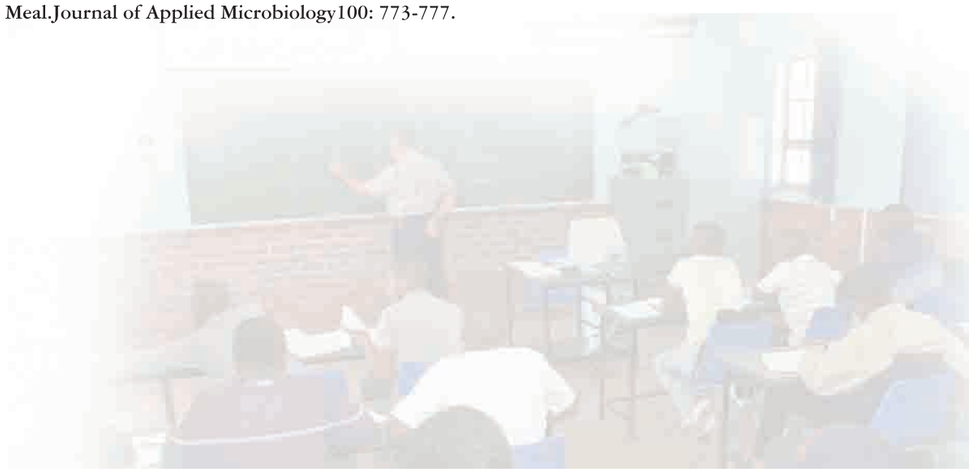
10 Ramothokang, T R , S C Simelane and F Bux. (2006). Biological Nitrogen and Phosphorus removal by filamentous bacteria in pure culture. Water SA5 (Special edn, Wisa 2006): p 667-672.

11 Padayachee, P, A Ismail and F Bux (2006). Elucidation of the microbial community structure within a laborotory - scale activated sludge process using molecular techniques. Water SA (32) 5 (Special edn, Wisa 2006): 679-686.

12 Ramothokang, T R, D Naidoo and F Bux (2006). Biochemical patterns of two different H. hydrossis isolates identified by FISH. Water Practice & Technology1. Online doi : 10.2166/WPT.2006072.

13 Kunamneni, A and Singh, S (2006). Improved high thermal stability of pullulanase from a newly isolated thermophilic Bacillus sp. AN-7. Enzyme and Microbial Technology 28: 36-43.

14 Mokoena M P, Chelule, P K, and Gqaleni, N (2006). Reduction of Fumonisin B1 and Zearalenone by Lactic Acid Bacteria in Fermented Maize Meal.Journal of Applied Microbiology100: 773-777.



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Department of Chemistry

1 Deenadayalu, N, Thango, S H, Letcher, T M and Ramjugernath, D (2006). Measurement of activity coefficients at infinite dilution using polar and non- polar solutes in the ionic liquid 1-methyl-3-octyl-imidazolium diethylrnrglycol-monomethylethersulfate at T= (288.15, 298.15, and 313.15) K Journal of Chemical Thermodynamics 38-542-564.

2 Deenadayalu, N, Bhujrajh, P (2006). Excess molar volumes and partial molar volumes for (propionitrile + an alkanol) at T = 298.15 K and p = 0.1 MPa. Journal of Chemical Thermodynamics 38 -278-282.

3 Bisetty, K, Corcho, F J, Canto, J, Kruger, H G and Perez, J J (2006). A theoretical study of pentacyclo-undecane cage peptides of the type (Ac-X-Y-NHMe). Journal of Peptide Science 12: 92-105.

4 Bisetty, K, Corcho, F J, Canto, J, Kruger, H G and Perez, J J (2006). Simulated annealing study of the pentacyclo-undecane cage amino acid tripeptides of the type (Ac-X-Y-Z-NHMe). 759Journal of Molecular Structure: THEMOCHEM 759:145-157.

5 Bisetty, K, Govender, P and Kruger, H G (2006). Analysis of the conformational profile of trishomocubane amino acid dipeptide. Biopolymers 81: 339-349.

6 Bisetty, K, Corcho, F J, Canto, J, Kruger, H G and Perez, J J (2006). A molecular dynamics study of the pentacyclo-undecane cage amino acid tripeptide. Journal of Molecular Structure THEOCHEM 770: 221-228.

7 Gengan, R M, Chuturgoon, A A and Dutton, M F (2006). Kinetics of the Oxidoreductase involved in the conversion of O-methylsterigmatocystin to Aflatoxin B1. Preparative Biochemistry and Biotechnology 36: 297-306.

Department of Mechanical Engineering

- Tabakov, P Y and Summers, E B (2006). Lay-up optimization of multilayered anisotropic cylinders based on a 3-D elasticity solution. Computers and Structures 84: 374 – 384.

- Walker, M & Hamilton, R, (2006), A technique for optimally designing fibre reinforced laminated plates under in-plane loads for minimum weight with manufacturing uncertainties accounted for, Engineering with Computers, 21-282-288.

- Walker, M & Smith, R, A procedure to select the best material combinations and optimally design composite sandwich cylindrical shells for minimum mass, Materials & Design, 27: 160-165.

Department of Electronic Engineering

1. Okoro, O I, Govender, P Govender, P and Chikuni, E (2006). Power sector reforms in Nigeria: opportunities and challenges. Proceedings of the 4th International cf3 Conference towards sustainable energy, solutions for the developing world 4-29-34.
2. Okoro, O I, Chikuni, E, Govender, P, Govender, P and Amuna, W (2006). Electrical and thermal analysis of asynchronous machine for wind energy generation. f2 Proceedings of the 4th International Conference towards sustainable energy, solutions for the developing world 4 -145 - 152.
3. Govender, P, Naidoo, D, Moodley, S A and Okoro, O I (2006). Residential consumer awareness of demand side management: are consumers aware & do they really understand? Proceedings of the 4th International Conference towards sustainable energy, solutions for the developing world 4 -21-25.
3. Govender, P and Bipraj, S (2006). Data transmission over the medium voltage power line communication channel. Proceedings of the IEEE ISIE 2006 International Conference. Pages 1905-1910 (Published on CD).

Department of Chemical Engineering

1. Telukdarie, A, Buckley, C and Koefoed, M (2006). The importance of assessment tools in promoting cleaner production in the metal finishing industry. Journal of Cleaner Production 14 (18): 1612-1621.
2. Telukdarie, A, Brouckaert, C and Haung, Y (2006). A case study on artificial intelligence based cleaner production evaluation system for surface treatment facilities. Journal of Cleaner Production 14 : 1622-1634.
3. Ramsuroop, S (2006). A green element solution to biologically reactive contaminant transport through porous media. Proceedings of the SACEC 2006 Conference: "Engineering Africa in the 21st century". Pages 1-13. Published on CD.
4. Ramsuroop, S (2006). Assessment dilemmas in Chemical Engineering education. Proceedings of the SACEC 2006 Conference: "Engineering Africa in the 21stcentury". Pages 1-9 (Published on CD).
5. Ndinisa, N V, Fane, A G & Wiley, D E (2006). Fouling Control in a Submerged Flat Sheet Membrane System: Part I – Bubbling and Hydrodynamic Effects; Separation Science & Technology Journal, 41: 1383 – 1409.
6. Ndinisa, N V, Fane, A G, Wiley, D E & Fletcher, D F(2006). Fouling Control in a Submerged Flat Sheet Membrane System: Part II –Two-Phase Flow Characterization and CFD SimulationS; SeparationScience & Technology Journal, 41: 1411 – 1445.

Department of Civil Engineering and Surveying

1. Saroop, S H and Allopi, D (2006) Optimum design solutions for housing and infrastructure projects. Allopi, D Proceedings of the First Built Environment Conference 1: 361-369.
2. Govender, R and Allopi, D (2006). Towards a safer minibus taxi industry in South Africa. Proceedings of the 25th Annual Southern African Transport Conference 25: 100-108.
3. Saroop, S H and Allopi, D (2006). Estimating tools for infrastructure projects. Proceedings of the 25th Annual Southern African Transport Conference 25:262 - 270.
4. Sunker, N and Allopi, D (2006). Introducing learners' licence testing at secondary school level. Proceedings of the 25th Annual Southern African Transport Conference 25-441-453.

Department of Mathematics

1. Moyo, S and Leach, P G L (2006). Reduction properties of ordinary differential equations of maximal symmetry, Proceedings of GIFT2006 (Global Integrability of Field Theories 2006), (Cockcroft Institute, Daresbury (UK)), November 1-3, 2006, 253 – 266.
2. Naidoo, N and Naidoo, R (2006). Enhancing the learning experience of primary school learners through the utilisation of a hybrid web-based learning model. Peer Reviewed. In Proceedings of the 17th International Conference of the Society for Information Technology and Teacher Education, Vol. 4, p. 2341.
3. Naidoo, N and Naidoo, R (2006). Improving Visual and Verbal Skills of Primary School Learners Through Effective Web-Based Learning. Peer Reviewed In Proceedings of the International Conference on e-Learning, p. 347.

Department of Town and Regional Planning

Pitout, B (2006) "Facilitating electronic learning activities for first year Town Planning students in an open learning system: is it worth the effort?" Proceedings of the 3rd African Regional Conference on Engineering Education 1: 177- 187.
(ISBN No 0-620-37232-x)

International Conference Attendance

Department of Biotechnology

1. Singh, S and Harrichan, N (2006). Alkaline protease production using a membrane bioreactor. The World Congress on Industrial Biotechnology and Bioprocessing, 11- 14 July 2006, Toronto, Canada.
2. Ramdhani, N and Bux, F (2006). Denitrifying bacteria isolated from activated sludge. IWA world congress and exhibition, 10-14 September 2006, Beijing, China.
3. Ramothokang, T R Naidoo, D and Bux, F (2006). Biochemical patterns of two H. hydrosis isolates. IWA world congress and exhibition, 10-14 September 2006, Beijing, China.

Department of Electronic Engineering

1. Govender, R Data Transmission over the Medium Voltage Power Line Communication Channel. IEEE- International Symposium on Industrial Electronics, 09 - 13 July 2006, Montreal Canada.

Department of Chemistry

1. Bisetty, K A Molecular Dynamics study of the Pentacyclo-undecane cage polypeptides of the type Ac-3Ala-Cage-3Ala-NHMe. FOMMS2006, Foundations of Molecular Modeling and Simulation, 09-14 July 2006, Washington, USA.
2. Gengan, R M Analysis of essential oil from polygalaceae rhinostigma by hydrodistillation. International conference on green chemistry, 16-21 September 2006, Sunway Pyramid convention Centre, Kuala Lumpur.

Department of Mechanical Engineering

1. Kekana, M 2006. action of eigenvalues of a piezoelastic beam with psuedospactral method. 8th International Conference on computational structures technology, 12-15 September 2006, Las Palmas de Gran Canaria, Spain.

Department of Chemical Engineering

1. Telukdarie, A 2006. Reduced data techniques for cleaner production for surface treatment plants. American Institute of Chemical Engineers, 12-17 November 2006.

2. Telukdarie A 2006. Mathematical optimization of plating processes. American Electroplating and Surface finishing conference, Oral, September 2006, Milwaukee, USA

3. Telukdarie A 2006. A case study on artificial intelligence based cleaner production evaluation system for surface treatment facilities, AIChE, San Francisco, Oral, November, 2006

Department of Civil Engineering and Surveying

Saroop, S H and Allopi, D 2006. Cost-effective solutions for infrastructure projects, Proceedings of the First International African Conference on Gender, Transport and Development, Nelson Mandela Metropolitan University, Port Elizabeth, South Africa, August 2006.

Department of Electronic Engineering

1. Govender, R. Data Transmission over the Medium Voltage Power Line Communication Channel. IEEE- International Symposium on Industrial Electronics, 09 - 13 July 2006, Montreal Canada.
2. Govender, P, Naidoo, D, Moodley, S A and Okoro, O I (2006). Residential consumer awareness of demand side management: are consumers aware & do they really understand? Proceedings of the 4th International Conference towards sustainable energy, solutions for the developing world 4: 21-25.
3. Govender, P and Bipraj, S. 'Data Transmission over the medium voltage power line communication channel, Proc. IEEE Int'l Symposium on Industrial Electronics, 2006.
4. Okoro, O I, Govender, P and Chikuni, E (2006). Power sector reforms in Nigeria: opportunities and challenges. Proceedings of the 4th International Conference towards sustainable energy, solutions for the developing world 4: 29-34.
5. Okoro, O I, Chikuni, E, Govender, P and Amuna, W (2006).Electrical and thermal analysis of asynchronous machine for wind energy generation. Proceedings of the 4th International Conference towards sustainable energy, solutions for the developing world 4: 145-152.

Department of Mathematics

Naidoo, D 2006. "Numerical integration of the extended plasma fluid equations with SD3 Kurganov-Levy Scheme". Germany.

Department of Physics

Lazarus, I 2006. Modified Korteweg-de Vries-Zakharov-Kuznetsov Solitons in Symmetric Two-temperature Electron-Positron Plasmas" at the "Dusty & Space Plasma Physics Workshop, Ghent(Belgium), 27-29 September 2006.

Department of Industrial Engineering

Duffy, K J. Modelling elephant movements. Australasian Wildlife Management Society conference and meetings, 1 -7 December 2006, Auckland, New Zealand.

National Conference Attendance

Faculty of Engineering, Science and the Built Environment

1. Mudzwiri, M, Odhav, B and Reddy, L (2006). Evaluation of the safety of traditional leafy vegetables for human consumption. National Conference of the South African Society for Microbiology, Pretoria, South Africa.
2. Ramothokang, T R, Mthembu, N N and Bux, F (2006). Physiological and biochemical evaluation of pure cultures of filamentous bacteria isolated from activated sludge. WISA Biennial Conference and Exhibition, Durban ICC, 21-25 May 2006.
3. Surujlal, S, Mavundla, N and Bux, F (2006). Isolation of microorganisms that have the potential to degrade endocrine disrupting chemicals in wastewater. 14th Biennial Congress of the South African Society for Microbiology , CSIR International Innovation Centre, Pretoria 9-12 April 2006.
4. Simelane, S C, Ramothokang, T R and Bux, F (2006). Biological nitrogen and phosphorus removal by filamentous bacteria in pure culture. WISA Biennial Conference and Exhibition, Durban ICC, 21-25 May 2006.
5. Padayachee, P, Ismail, A A H and Bux, F (2006). Elucidation of the microbial community structure within a laboratory scale activated sludge process using a combination of molecular techniques. WISA Biennial Conference & Exhibition 21-25 May. ICC, Durban.

6. Mthembu, N N, Ramothokang, T R and Bux, F (2006). Evaluation of growth characteristics of filamentous bacteria using optimized isolation techniques. WISA Biennial Conference and Exhibition, Durban ICC, 21-25 May 2006.
7. Stephens, D E, Singh, S and Permaul, K 2006. Enhancement of the properties of a fungal xylanase using protein engineering 2006.14th Biennial Congress of the South African Society of Microbiology, CSIR, Pretoria, 9-12 April.
8. Naidoo, K, Permaul, K, and Singh, S 2006. Production of inulinase from Xanthomonas campestris pathovar phaseoli. 2006.14th Biennial Congress of the South African Society of Microbiology, CSIR Pretoria, 9-12 April.
9. Maharaj, M, Permaul, K and Singh, S 2006. Structure-function relationship of xylanase from Thermomyces lanuginosus DSM 5826. 2006. 14th Biennial Congress of the South African Society of Microbiology, CSIR Pretoria, 9-12 April.
10. Mchunu, N P, Permaul, K and Singh, S 2006. Homologous recombination of a mutated fungal xylanase into Thermomyces lanuginosus and expression in yeast, 2006. 14th Biennial Congress of the South African Society of Microbiology, CSIR, Pretoria, 9-12 April.
11. Reddy, P, Naidoo, K, Kango, N, Singh, S, Permaul, K 2006. Production, application and action pattern of inulinases from Aspergillus niger NK-12 and Xanthomonas campestris pv. phaseoli. 2006. 14th Biennial Congress of the South African Society of Microbiology, CSIR Pretoria, 9-12 April.

Department of Chemical Engineering

1. Ramsuroop, S and Green, A. Element Solution to Biologically Reactive Contaminant Transport Through Porous Media. Verification. South African Chemical Engineering Congress, September 2006
2. Ramsuroop, S. Assessment Dilemmas in Chemical Engineering Education. South African Chemical Engineering Congress, September 2006.
3. Telukdarie A and Mbongwa N. Model for Metal Finishing Wastewater Treatment, SAIChE, Durban, South Africa, September 2006.

Department of Chemistry

1. Singh, T. An ab initio study of Pentacyclo Unedecane cage lactum formation. Frank Warren Conference on Organic Chemistry 22-25 January 2006, UCT, Cape Town.
2. Singh, T. A computational study of the Penta-Cyclo undecane (PCU) cage lactam formation. The 38th national Convention of the South African Chemical Institute, 3-8 December 2006, UKZN, Durban.
3. Gengan, R. Phytochemical constituents of limonia acidissima. The 38th national Convention of the South African Chemical Institute, 3-8 December 2006, UKZN, Durban.

Department of Civil Engineering and Surveying

1. Dhoda, S. Towards an Effective Road Safety Initiative for School Children in the EThekwini Municipality, South Africa. 8th World Conference on Injury Prevention and Safety Promotion, 2-5 April 2006, ICC, Durban.
2. Saroop H and Allopi D, Design cost planning on housing and infrastructure projects, Proceedings of the Planning Africa 2006 Conference, South African Planning Institute, Cape Town, South Africa, March 2006.
3. Saroop H and Allopi, D. Optimum design solutions for housing and infrastructure, Proceedings of the first built environment conference, Association of Schools of Construction of Southern Africa (ASOCSA), p 361-369, Johannesburg, South Africa, June 2006.
4. Govender, R and Allopi, D. Towards a safer minibus taxi industry in South Africa, Proceedings of the 25th Annual Southern Africa Transport Conference (SATC 2006), p 100-108, Pretoria, South Africa, July 2006.
5. Saroop, H and Allopi, D. Estimating tools for infrastructure projects, Proceedings of the 25th Annual Southern Africa Transport Conference (SATC 2006), p 262-270, Pretoria, South Africa, July 2006.
6. Sunker, N and Allopi, D. Introducing learners licence testing at secondary school level, Proceedingsof the 25th Annual Southern Africa Transport Conference (SATC 2006), p 441-453, Pretoria, South Africa, July 2006.

7. Saroop, H and Allopi, D. Affordable infrastructure with the aid of cost planning tools, Proceedings of the 3rd IRF/SARF Regional Conference for Africa: Roads for the African Renaissance - 2006, p 132-139, ISBN-0-620-37105-6, ICC, Durban, South Africa, September 2006.
8. Saroop, H and Allopi, D. The cost planning model: A decision support tool for infrastructure projects, Proceedings of the 70th Annual Conference of the Institution of Municipal Engineering of Southern Africa, Johannesburg, South Africa, October 2006.

Department of Town and Regional Planning

1. Gordon, T. Inner City Plan: reflections on the processes and outcomes of a strategic, integrated multi-sectoral project. Planning Africa 2006,21-24 March 2006, UCT, Cape Town.
2. Hansman, R J. Inner City Plan: reflections on the processes and outcomes of a strategic, integrated multi-sectoral project. Planning Africa 2006, 2 1 -24 March 2006, UCT, Cape Town.
3. Pitout, B R. Facilitating electronic learning activities for first year students in an open learning system: Is it worth the effort? 3rd African Regional Conference on Engineering Education (ARCEE 2006), 25-30 September 2006, Pretoria.

Department of Physics

Lazarus, I J. Modified Korteweg dE Vries-Zakharov-Kznetsov solitions in Electron-Positron Plasmas. 51st Annual Conference of the SAIP, 3-7 July 2006, University of the Western Cape.

Department of Mathematics

Misthry, S. Exact solutions for relativistic stars. Relativity Conference, 16-17 September 2006, UNISA, Pretoria.

Department of Construction Management and Quantity Surveying

1. Reddy, G. Construction Project Failures: Strategies for improving the Construction Delivery Process. CIDB 4th Post Graduate Conference, 08 -10 October 2006, Stellenbosch, South Africa.

2. Ramphal, K. Impact of Mortgage Lending Policies on home ownership in KwaZulu-Natal. CIDB 4th Post Graduate Conference, 08 -10 October 2006, Stellenbosch, South Africa.

3. Reddy, G. Developing the skills Base in Infrastructure and Capacity Development in South Africa through developing meaningful partnerships with SMEs. International Productivity Institute Conference, 08-10 June 2006, Johannesburg, South Africa.

Postdoctoral Appointments

Department of Biotechnology

1. Dr Manjinder Singh, Department of Microbiology, Guru Nanak Dev University, Amritsar, Punjab, India. Supervisor: Prof F Bux.
2. Dr Sankar Akula, Department of Biotechnology, College of Science and Technology, Andhra University, Waltair, 3. Visakhapatnam, Andhra Pradesh, India. Supervisor: Prof B Odhav.
3. Dr Manimaran Ayyachamy, Shri AMM Murugappa Chettiar Research Centre, Photosynthesis and Energy Division, 5. University of Madras, Tharamani, Chennai, India. Supervisor: Prof S Singh.

Visiting Scientists

Department of Biotechnology

1. Dr Peter Biely, Institute of Chemistry, Bratislava, Slovakia (October – December 2006 – hosted by Prof S Singh & Dr K Permaul).
2. Prof Bernard Prior, Department of Microbiology, University of Stellenbosch, Stellenbosch (April 2006 – hosted by Prof S Singh & Dr K Permaul).
3. Ms Sharmili Jagtap, National Chemical Laboratory, Pune, India (July – August 2006 – hosted by Prof S Singh & Dr K Permaul).
4. Prof Valter Tandoi, CNR Water Research Institute, Rome, Italy (August 2006 – hosted by Prof F Bux).

External Engagement

Within the Faculty, Community Engagement has found a variety of manifestations. These include free and/or subsidised services to others, both within and outside of the DUT community. Staff and learners implement services and activities either on a voluntary or compulsory basis, and such involvement is perceived to have benefits for learners, departments, staff, DUT and the wider community.

Activities

Activities undertaken include community service whereby learners are introduced to the work environment as an opportunity to implement theory, practise skills and provide a service. In some activities learners were not involved at all. Examples include the following:

Department of Town and Regional Planning

- The department is involved in a joint venture with the Provincial Department of Housing to roll out a capacity development programme for local government officials, councillors and Amakhosi in the Province.
- Some staff are also involved in community outreach programmes in the Isipingo Rail area, the Wentworth Housing Project and the Seaview Conservation Group.

Department of Mechanical Engineering

- The department still manages the Vision 2000 project which is a mobile outreach station that disseminates recruitment information for the Faculty to students in rural areas in the province.
- The Tshumisano Trust sponsored Technology Station (Reinforced and Moulded Plastics) is housed in the department. It provides cutting edge technology transfer to SMMEs and in 2006 assisted 103 SMEs and large companies in the greater Durban area.

Department of Chemistry

- Winter schools funded by ESKOM, offering tuition in Mathematics, Physical Science and Biology are conducted for 350 grade 12 learners drawn from rural areas in KZN and the Eastern Cape.
- Some staff from the department continue to provide developmental support and training in the conducting of Laboratory Practicals, to Physical Science teachers from under-developed schools throughout the Province.

Department of Horticulture

- Staff from the department developed material for the short course, Urban and Rural Greening Techniques, for the South African National Biodiversity Institute, as part of their programme, Greening the Nation, which is an outreach programme through which members of disadvantaged communities learn skills related to the greening of schools and municipal environments throughout the country.This involved the propogation of shaded trees, medicinal bulbs and herbs and the development of food gardens and other basic horticultural skills.
- Departments of Construction Management and Quantity Surveying staff and students from the department provide a consulting service to industry (including DUT). Students gain credit towards their Experiential Learning and staff retain links with Industry.

Departments of Civil Engineering and Surveying

- Staff and students from the department provide a consulting service to industry (including the DUT) through the Singakwenza Ndawona Training Unit. Students gain credit towards their Experiential Learning.

Department of Clothing Technology

- In partnership with the CTFL SETA, the Industry Training Unit in the department provided skills development training to numerous factory employees in the province.

Department of Architectural Technology

- Staff and students from the department provide a consulting service to industry (including the DUT) through the archIpod unit. Students gain credit towards their Experiential Learning and staff remain with professional practice.

Professor Darren Lortan
Executive Dean: Faculty of Engineering, Science and the Built Environment.