ELECTRON MICROSCOPE UNIT

ANNUAL REPORT

2013

Permanent Staff

Director	**Prof B.T. Sewell**
Principal Technical Officer (Part Time)	**J. Duncan**
Principal Technical Officer	**M. A. Jaffer**
Principal Scientific Officer	**B.W. Weber**
Chief Scientific Officer	**Vacant**
Principal Scientific Officer	**M.E. Waldron**
Technical Assistant/ Technical Officer	**S. Karriem**

Highlights of 2013:

Dr Innocent Shuro employed.
After the resignation of Dr Cummings in January 2013, Dr Shuro was appointed and took office on 1 April 2014. Dr Shuro will be in charge of Materials Science electron microscopy and will liaise closely with the Centre for Materials Engineering. Unfortunately his arrival was delayed due to visa problems.

Dismissal of Mr James Duncan.
Mr Duncan was dismissed towards the end of the year, he decided to take UCT to the CCMA, the case was reviewed in January 2014 and was withdrawn but he reserved the right to claim a leave payout.

Mr Michael Woodward employed.
Mr Woodward was hired to replace Mr Duncan and began his appointment in January 2014

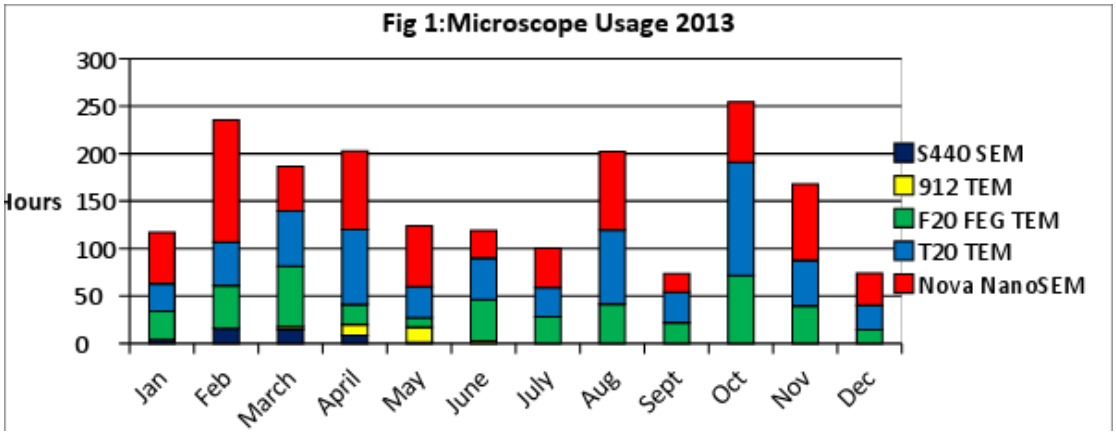
Job Regrade
Mr Sean Karriem's job was re-graded to Technical Officer.
This re-grade has taken several years to accomplish and puts Mr Karriem onto a Technical Officers career path.

QEMSCAN installed in new facility.
The FEI QEMSCAN 650F was acquired by the Centre for Minerals Processing to replace an old Zeiss instrument. The QEMSCAN was installed in the new facility in December 2013

Zeiss 1450 installed in new facility.
This instrument was originally a QEMSCAN but needed an expensive upgrade in order to continue with QEMSCAN operation. The machine was moved to the new facility in December 2013 and is now operating as a tungsten filament SEM

Instrument use in 2013

192 people made use of the microscopy services of the Electron Microscope Unit in 2013, for a combined total of 1926.5 hours. Fig 1 shows the number of hours per month on each instrument.



FEI Tecnai F20 FEGTEM

200kV field emission gun (FEG) high resolution TEM,
Cryo facilities,
Electron Tomography
Gatan digital camera

During 2012, problems with the TF20 Compustage and its attempted repair had plagued its optimal functioning for most of the year.

In April 2013, after the director had highlighted the inadequacy of local service engineers, Brian Collett of FEI serviced the compustage, executed a root cause analysis of the drift on the TF20 and brought this this within its specifications. Furthermore, the vacuum leak that we had been experiencing on inserting the camera into the path of the beam, was tolerable and did not require immediate intervention. For the rest of 2013 the TF20 functioned well with minimal downtime.

This instrument was used for a total of 430.5 hours in 2013 by 62 people.

FEI Tecnai 20 TEM

200 kV LaB6 electron source
Cryo Facilities
Electron Tomography
An Energy Filtered TEM (EFTEM)
Gatan digital camera

The T20 also had minimal downtime during 2013. There were random pneumatic issues especially after a cryo-cycle run causing the microscope to shutdown. Other issues involved the lesser sensitivity of the post-column energy filter as compared to the in-column filter on the LEO 912. Considerable input into this was given by FEI but the status quo remains.

Used for a total of 622.5 hours in 2013 by 79 people.

Leo912 TEM

An Energy Filtered TEM (EFTEM)
Electron Energy Loss Spectroscopy (EELS)
Teitz digital camera

The Leo 912, worked well for a short period of time. However, there was considerable downtime caused by gun electronics malfunctioning, water leaks due to perished pipes, trackerball not functioning and a leaking projector lens. Most of these were fixed by Mr. J. Duncan. However currently the focussing functions are not working and Mr M. Woodward has undertaken to look into this.

From an operations point, there are two issues we have to address;

1. For cryo microscopy, the implementation of an automatic data collection strategy. This hopefully will be attended to during the latter part of 2014.
2. Moving the instruments to NEB during the latter part of 2014.

Used for a total of 33 hours in 2013 by 10 people.

FEI Nova NanoSEM

Field Emission Gun (FEG) high resolution SEM,
Backscatter detector,
EDS detector
EBSD system
STEM detector
Low vac capabilities

There had been an on-going problem with flagging (jiggles across the screen) at high magnifications which was finally solved by two Apollo engineers in January. The cause of the flagging turned out to be poor adjustment of the suspension system, causing the frame supporting the column to touch the frame anchored on the floor, thus transferring vibrations from the floor to the column. Once the flagging problem was solved, the tip was replaced in March. Unfortunately the ultra-high resolution alignments could not be finished in March, so the engineer had to return in April to complete the job. The

secondary detector board had to be replaced in September and a pole piece protector was bought to prevent damage to the pole piece (which had to be replaced in 2012 due to damage incurred by samples touching the pole piece).
The Nova NanoSEM was used for a total of 727 hours in 2013 by 120 people.

Leo S440 SEM

LaB6 electron source
Backscatter detector
EDS system
Cryo facilities

The S440 is showing signs of age and obsolescence but UCT have had 19 productive years of use of this instrument. It was the first modern, fully digital SEM in South Africa and has proved to be an extraordinarily robust, reliable and popular design. The instrument was used for a total of 44 hours in 2013 by 18 people, but in May, despite a good vacuum, the EHT would not turn on. Mr Duncan spent months trying to assess the cause of the fault, but the problem was not resolved and the SEM was down for the rest of the year.

Light microscopes:

These were all well used. Structural Biology. MCB and Physics were the main users.

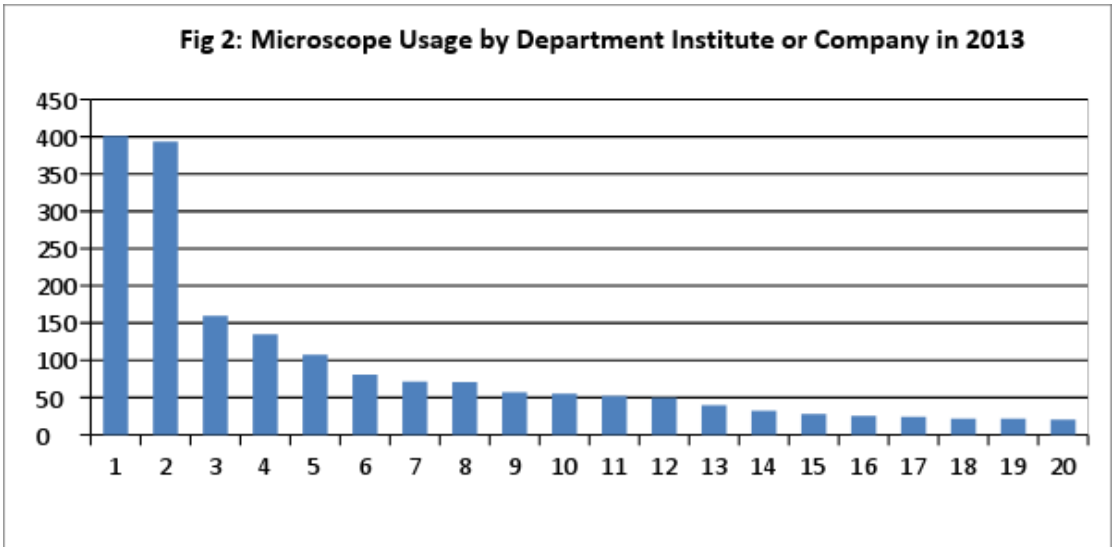
Preparative equipment:

These are all well used in the preparation of samples for TEM and SEM.

High Pressure Freezer
Vitrobot
Ultra-microtomes with cryo attachments
Critical Point Dryer
Coaters

<u>Users of the Unit</u>

A total of 192 people used the Unit in 2013, from 56 different departments, institutes or companies. Fig 2 and table 1, show the top 20 departments, institutes and companies who used the electron microscopes during 2013.The names of users, the hours on each instrument and a list of UCT projects are shown in appendix 1.



Names of top 20 Departments or Companies:

	Name	Hours		Name	Hours
1	Chemical Engineering	401	**11**	EM Unit	52
2	Centre for Materials Engineering	393.5	**12**	Dept Environmental Affairs	50
3	WITS (various departments)	160	**13**	CPUT (Various Departments)	39.5
4	University of Ilorin, Nigeria	135	**14**	Chemistry	32
5	Physics	107.5	**15**	iThemba Labs	28
6	MCB	80.5	**16**	Medical Biochemistry	25.5
7	Structural Biology	71.5	**17**	Roediger Agencies	24.5
8	UWC (various departments)	71	**18**	University of the Free State	21.5
9	180 Degrees Engineering Solutions	57	**19**	Stellenbosch Nanofiber Company	21.5
10	Polymer Science (University of Stellenbosch)	55.5	**20**	CVRU	20.5

Publications by users of the Unit in 2013

Aliwaini, S., Swarts, A. J., Blanckenberg, A., Mapolie, S. and Prince, S. 2013. A novel binuclear palladacycle complex inhibits melanoma growth in vitro and in vivo through apoptosis and autophagy. Biochem. Pharmacol., Elsevier Inc. 86, 1650–1662.

Ambele, M., Sewell, B.T., Cummings, F., Smith, P. and Egan, T. 2013. Synthetic hemozoin (β/-hematin) crystals nucleate at the surface of neutral lipid droplets that control their sizes. Crystal Growth & Design, 13:4442-4452.

Botha, L and van Reenen, A.J. 2013. The effect of in-process ethylene incorporation on the evolution of particle morphology and molecular characteristics of commercial

heterophasic ethylene propylene copolymers (HEPCs). European Polymer Journal, 49:2201-2213.

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

Combrinck, J., Mabotha, T., Ncokazi, K., Ambele, M., Taylor, D., Smith, P., Hoppe, H. and Egan, Timothy. 2013. Insights into the role of heme in the mechanism of action of antimalarials. ACS Chemical Biology, 8:133-137.

Farkas, K., Pang, L., Lin, S., Williamson, W., Easingwood, R., Fredericks, R., Jaffer, M.A., Varsani, A. 2013. A gel filtration-based method for the purification of infectious rotavirus particles for environmental research applications. Food and Environmental Virology 5 (4): 231-235.

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

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

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

Hobbhahn, N, Johnson, S.D., Bytebier, B., Yeung, E.C. and Harder, L.D. 2013. The evolution of floral nectaries in *Disa* (Orchidaceae: Disinae): recapitulation or diversifying innovation? Annals of Botany , on line publication.

Huddy, S., Meyers, A. and Coyne, V. 2013. Protoplast isolation optimization and regeneration of cell wall in Gracilaria gracilis(Gracilariales,Rhodophyta). Journal of Applied Phycology. 25:433-443.

Jones, G.C., van Hille, R and Harrison, S. 2013. Reactive oxygen species generated in the presence of fine pyrite particles and its implication in thermophilic mineral bioleaching. Applied Microbiology and Biotechnology. 97: 2735-2742.

Jones, S. and Harting, M. 2013. A new correlation based alignment technique for use in electron tomography. Ultramicroscopy, 135:56-63.

Kuppuswamy, R., Bower, D. and March, P. 2013 Blend of sharpness and strength on a ball nose endmill geometry for high speed machining of Ti6A14V. International Journal of Advanced Manufacturing Technology, 1:1-8.

McFadzean, B., Mhlanga, S. and O'Connor, C. 2013. The effect of thiol collector mixtures on the flotation of pyrite and galena. Minerals Engineering, 50-51: 121-129.

Offerman K, Carulei,O., Gous T.A., Douglass, N. and Williamson,A-L. 2013,Phylogenetic and histological variation in avipoxviruses isolated in South Africa, Journal of General Virology , 94, 2338–2351

Olaofe, O., Fenner, C., Gudiminchi, R., Smit, M. and Harrison, S. 2013. The influence of microbial physiology on biocatalyst activity and efficiency in the terminal hydroxylation of n-octane using Escherichia coli expressing the alkane hydroxylase, CYP153A6. Microbial Cell Factories, 12:1-12.

Onwudiwe, D. C., Strydom, C.A., Oluwafemi O. S. (2013): Effect of some nitrogen donor ligands on the optical and structural properties of CdS nanoparticles: New Journal of Chemistry 37: 834 – 842

Leslie P., Missengue, R.,Fatoba, O., Tuffin, M. and Sachs, J. 2013. Silver/Zeolite nano composite-based clay filters for water disinfection. Water Research Commission, Report KV 297/12

Pineo, C., Hitzeroth, I. and Rybicki, Edward. 2013. Immunogenic assessment of plant-produced human papillomavirus type 16 L1/L2 chimaeras. Plant Biotechnology,11:964-975.

Sievers, C. 2013. What's the rush? Scanning electron micrographs of *Juncus* (Juncaceae) seeds. South African Humanities 25:201-16.

Stirton, C., Muasya, M. and Curtis. 2013. A conservation and floristic assessment of poorly known species rich quartz-silcrete oputcrops within Ruens Shale Renosterveld (Overberg, Western Cape), with taxonomic descriptions of five new species. South African Journal of Botany,87:99-111.

van Hille, R., Van Wyk, N. and Harrison, S. 2013. Dynamic evolution of the microbial community in BIOX leaching tanks. Selected, peer reviewed papers from the 20th International Biohydrometallurgy Symposium (IBS 2013). 825.

Vilane, V. and Knutsen, R. 2013. Grain refinement in cast T-i6Al-4V by hydrogenation, deformation and recrystallization. Materials Science Forum, 753: 271-274.

Weber, B.W., Kimani, S.W., Varsani, A., Cowon, D.A., Hunter, R., Venter, G.A., Gumbart, J.C., Sewell, B.T. 2013. The mechanism of the amidases: Mutating the glutamate adjacent to the catalytic triad inactivates the enzyme due to substrate mispositioning. The Journal of Biological Chemistry. 288 (40): 28514-28523.

Students graduating in 2013 who have used the Unit in the course of their studies:

Name	Degree	University	Department	Race	Gender
Allies, Soraya	MSc	UCT	CME	C	F
Broadley, Simon	MSc	UCT	MCB	W	M
Clinning, Nicholas	MSc	UCT	CME	W	M
Erasmus, Nicholas	PhD	US	Physics	C	M

Eze, Peter	PhD	UCT	EGS	C	M
Frederick, Joni	PhD	UCT	MCB	W	F
Haupt, Kerstin	PhD	US	Physics	W	F
Inyang, Adijat	PhD	UCT	Biomedical Engineering	C	F
Kaminuza, Irenee	MSc	UCT	CME	B	M
Kennedy, Paul	MSc	UCT	MCB	W	M
Mabunda, Khanyisa	MSc	UCT	CME	B	M
Mainganye, Dakalo	MSc	CPUT	Chemical Engineering	B	M
Morrison, Graham	MSc	UCT	CME	W	M
Moskovitz, Kyle	MSc	UCT	Chemical Engineering	W	M
Mulelu, Andani	MSc	UCT	MCB	C	M
Vilane, Velile	MSc	UCT	CME	C	F

Teaching and training in 2013:

For 2013, the following users were trained to use the instruments.

FEI Tecnai F20 FEGTEM and/or FEI Tecnai 20
Chem Eng:
T. Gangen
L. Mechali
A. Petersen
L. Weber
CME
M. Shangazi
Med Biochem
N Hendricks
Physics
U. Manni
S. Jones
MCB
A Van Zyl
A Chabeda
G. Regnard
P. Kennedy
Medical Virology
K. Offerman
T. Jongwe
Dermatology and Human Biology
K. Mkentane
NHLS
Sibusizo Senzani
Structural Biology

Andani Mulelo

Leo912 TEM
IMBM, UWC
Lonnie van Zyl

FEI Nova NanoSEM
Civil Engineering:
Olukayope
CME:
Teboho Molokwane
Tapiwa Tevera
Rabelani Masindi
CVRU:
JoelDu Toit
Jason Voorneveldt
iThemba Labs:
Zakhele Khumalo
Mechanical Engineering:
Kerry-Anne Airey
Physics:
Uli Mannl
Dereje Woldermarion
UWC:
OlusholaSunday

Leo S440 SEM
CME:
Teboho Molokwane
Department of Fisheries and Forestry:
Lisa Mansfield
Zoology:
Nina Lester

School visits
Bishops: 8 Post Matric – Feb 2013
Chesterhouse College Gr11 – March 2013¶

Microscopy for Biologists
The Microscopy for Biologists course was held in March and attended by 22 MCB honours students. At the request of MCB, the course is becoming increasingly hands-on with fewer lectures. This year, the students were still required to attend one or two lectures each day, but were more involved with the lab work.

EM Unit finances 2013

Purpose of each account:

Operating:

This is the annual departmental operating budget received from the University

External Services:

This is income from users outside UCT (mainly from University of Stellenbosch, CPUT, UWC and industry). Expenditure from this account includes specific maintenance items for the microscopes such as new HT boards.

Consumables:

Items such as chemicals and lab consumables are bought from this account and sold to users

Maintenance:

This is internal income from UCT users. Expenditure from this account includes general microscope repair and maintenance such as liquid nitrogen and nitrogen gases.

	Operating	Ext Services	Consumables	Maintenance
	000516	001258	000933	000995
Opening Balance	2 051	985 309	42 111	397 484
Income	58 991	359 134	38 560	449 635
Expenditure	-50 085	-452 747	-57 713	-512 875
Closing balance	**10 957**	**891 696**	**22 958**	**334 244**
Income				
Grant transfers				
Operating grant	58 991			
Sales Revenue		359 134	38 560	449 635
Total	**58 991**	**359134**	**38 560**	**449 635**
Expenditure				
Staffing		34 920		
Bank Charges (P Card)	260	2 193		
computer cons	15 000	7 046		3 326
Entertainment/ conference		4 411		3 330
General operating		81 020	24 905	-8 141
Space & Facilities		1 700	30 464	
Periodicals		11 661		193
Post Tele Fax Courier	34 825	24 218		621
Printing/Photocopy		9 234		60
Stationery		4 634		
Equipment		4 780		
Equipement rental		4 907		-56 720
Repair & maint		83 880		461 321
Safety related expenses		83 896		500
Utilities		1 512		27 703
Travel		40 805	2 344	2 503
Assets		51 930		78 179
Total	**50 085**	**452 747**	**57 713**	**512 875**

Notes on expenditure:

General operating: This covers consumables for the microscopes e.g. new filaments, lab consumables, pump consumables
Space and Facilities: Acquisition of liquid nitrogen
Repair and maintenance: From the external services fund this expense was the new HT board for the nanoSEM. From the maintenance fund, these expenses covered the service contract with Apollo and cables for the TEM rooms in the new department.
Safety related expenses: This expense was for the security system in the new department
Assets: From the external services fund, this expense included a new motor for the evaporation coater and the EMU contribution towards the Mosquito equipment. From the maintenance fund, the asset acquired was a pole piece protector for the nanoSEM.

Appendix 1.
Actual use by hour/ students name, University or company, department.

The table below gives a list of people who used the various instruments in the Electron Microscope Unit in 2013. The users are listed by name, University or Company and department and the hours logged by each individual on each electron microscope are noted.

Name	Department	S440	NNS	F20	T20	912
Higgins, S	180		57			
Bandama, F	Archaeology	2	9.5			
Chirikure, S	Archaeology	1.5	2			12.5
Swan, P	Aswan Consulting		0.5			
Klak, C	Biological Science		1			
Chinsamy-Turan, A	Biological Science		0.5			
Muyasa, M	Biological Science		1.5			
Wilding, N	Biological Science	1.5	0.5			
Brosius, R	Chem Eng		2		3	
Ceylon, C	Chem Eng			1.5	2	
Crymble, G	Chem Eng		2			
De Beer, M	Chem Eng		0.5		2.5	
Fortune, A	Chem Eng			2		
Gangen, T	Chem Eng		1.5	0.5	2	
Hendricks, U	Chem Eng		1.5	71.5	2	
Huddy, R	Chem Eng		5			
Jackson, C	Chem Eng		2.5	2.5	3	
Jacobs, P	Chem Eng			1.5		
Kekana, L	Chem Eng			0.5	5	
Khasu, M	Chem Eng			2.5	1.5	
Khoza, T	Chem Eng		6.5	4	6	
Kunene, A	Chem Eng		0.5	5	5	
Letaba, G	Chem Eng				48.5	
Leveque, P	Chem Eng			1.5	9	
Lubhelwana, S	Chem Eng		3	5	13	
Luchters, N	Chem Eng				1	
Macheli, L	Chem Eng		4	6.5	9	
Malatji, P	Chem Eng		1			
Mandaeha, N	Chem Eng		1			
Maphutma, M	Chem Eng		1.5	1.5	4.5	
Matsutsu, M	Chem Eng			1.5	5.5	
Meyer, N	Chem Eng		2			
Mohamed, R	Chem Eng		1		1	
Molefi, M	Chem Eng				4	
Moruth, N	Chem Eng		21	3.5		
Moskovitz, K	Chem Eng		2.5			7
Munsami, N	Chem Eng		0.5	12		

Naaido, Q-L	Chem Eng		1.5		2	
Name	Department	S440	NNS	F20	T20	912
Nabaho, D	Chem Eng				3.5	
Nzonke	Chem Eng				1	9
Olaofe, F	Chem Eng		1.5			
Petersen, A	Chem Eng			7	5	1
Rice, N	Chem Eng		1			
Sewsunker, S	Chem Eng			6	7.5	
Siyanda	Chem Eng				4	
Taylor, S	Chem Eng			4.5	0.5	
Thomson, K	Chem Eng		0.5	1.5		
Weber, L	Chem Eng			18.5		
Wiese, J	Chem Eng		2			
Zhou, Yi	Chem Eng		1		1	4.5
Norton, S	Chem Invest		3			
Ambele, M	Chemistry			27.5	2	
Driver, C	Chemistry				1	
Zacharius, S	Chemistry		1			
Egan, T	Chemistry				0.5	
Kiliswa, M	Civ Eng		2			
Olukayode	Civ Eng		4			
Leukes, N	Clinical Lab Sci				5	
Allies, S	CME		4	2		
Finkelstien, L	CME	3.5			6	
Hanief, N	CME		18.5			
Masindi, R	CME	2	74			
Matthews, R	CME		2			
Molokwane, T	CME	2.5	22.5			
Morrison, G	CME				3.5	
Mshumi, C	CME			19.5		
Shangazi, M	CME			17.5		
Tevera, T	CME	4	15			
Van Der Meer, P	CME		197			
Chowdhury, F	CPUT				4	
Fraser, I	CPUT		0.5			
Milo, P	CPUT		1.5			
Strydom, R	CPUT		1.5			
Ohlhoff, C	CPUT Biocat		9			
Ogheneochuko, O	CPUT Chem		2	6.5		
Arensiola, E	CPUT chem Eng		0.5			
Isa, Y	CPUT chem Eng		7			
Kriedeman, B	CPUT Chem Eng				1	
Greyling, C	CPUT Textiles	1	5			
Masindi, V	CSIR		1.5			
Du Toit, J	CVRU		12			
Omar, R	CVRU	0.5	0.5	2		

Jansen, L	DEA			44				
Name	Department	S440		NNS	F20		T20	912
Mansfield, M	DEA			6				
Jore	EGS			1				
Varsani, A	EMU						1	
Various staff	EMU						51	
Muller, B	Frika Wigs		5	1				
Iwain, S	Human Biology				2.5		9	
Wang, Y	ICGEB				1		2	
Hsu, J	IIDMM			2.5			4.5	
Krishnan, S	IIDMM		0.5	2	2		1	
Alafara, S	Illorin Uni			5.5				
Nwosu, F	Illorin Uni			2.5			5.5	
Bala	Ithemba			1				
Khumalo, Z	Ithemba			6				
Maaza, M	Ithemba			2	2			
Mongwaketsi, P	Ithemba/ poly Sci			8	3		6	
Peters, D	J&J			3				
Pillay, S	J&J			0.5				
Treblanche, T	J&J			1				
Jackson, m	J&J			0.5				
Treast, N	Kite			1.5				
Chabelo, A	MCB				3		18.5	
Cooper, K	MCB							
Everest, G	MCB			3				
Franscisco P	MCB						1	
Galvao, B	MCB				2		11	
Giovirette, C	MCB				2			
Hatting, A	MCB				1.5			
Huddy, S	MCB						4	
Kennedy P	MCB				5.5		1.5	
Lunn, J	MCB				2			
Rybicki, E	MCB				15		2	
van Zyl, A	MCB				8.5			
Airey, K	Mech Eng		6					
Foot, R	Mech Eng			2				
Swartz, J	Mech Eng			2				
Kupswammy, R	Mech Eng			1				
Ntuni, N	Mech Eng			2				
Hendricks, N	Med Biochem			1	7.5		15.5	
Yabing	Med Biochem						1.5	
Offerman, K	Med Virol				3.5		4	
Tait, B	Mountain Club			1				
Onwadiwe, D	NWU				5		1.5	
Du Plessis, G	Oceanography			3.5				
van Rensburg, B	OHE			1				

du Plessis, L	Ondesterpoort			5	0.5	5
Name	Department	S440	NNS	F20	T20	912
Hammond, D	Origen		2.5			
Woodman, S	Origen		0.5			
Wickens, J	Patterson		2.5			
Zengeni, B	Patterson	2.5	7.5			
Jonah, E	Physics					
Unugibe, D	Physics					
van der Berg, C	Physics					
Florence	Physics					
Blumenthal, M	Physics		2.5			
Jones, S	Physics			14.5	7	
Various	Physics nano	12.5	37.5	15	18.5	
Volscheck, M	Polymer Sci				2.5	
Begum, N	Polymer Sci				2	
Etmimi, H	Polymer Sci				4.5	
Gute, N	Polymer Sci			1.5		
Le Grange, M	Polymer Sci				7.5	
Moodley, K	Polymer Sci				4.5	
Etmimi, K	Polymer Sci		14.5		6.5	
Murina, D	Polymer Sci			3.5		
Neppali, R	Polymer Sci				1.5	
Shelack, K	Polymer Sci			3	2	
van Heerden, A	Polymer Sci		2			
Zoblocki, O	Pretoria Uni			2		
Thorpe, J	Propet		0.5			
Bergh, I	Roediger Agencies		24.5			
Fulufhelo, S	SA Navy		2			
Manning, J	SANBI		0.5			
van Jarsveld, E	SANBI		0.5			
Botha, L	SASOL/Poly Sci		4.5			
Conradie, D	SAT		0.5			
Mulelu, A	SBIO			41	2.5	
Banjeree, M	SBIO				1	
Various	SBIO			13.5	13.5	
Mekethani, K	SKON centre				3.5	
Coates, M	SNC		7			
Kriel, H	SNC		6.5			
van Staden, D	SNC	4	3			
Halimer, G	TFD		6			
Luyt, A	UFS			8.5	13	
Mpambi, G	US Bio Sci		7			
Mavengere, A	US Bot & Zoo		0.5			
Archer, E	US Bot & Zoo				2.5	
Bredell, H	US Micro			1.5		1

Neveling, D	US Micro		2.5	2		
van Floyour, A	US Physics			4.5		
Name	Department	S440	NNS	F20	T20	912
Amah, E	UWC		4		1.5	
Kirby, B	UWC		3			
Zimasa	UWC			3		
Alegbe, J	UWC Chemistry		1		3	
Barron, O	UWC Chemistry		2.5			
Felix, C	UWC Chemistry		2.5			
Gilbert, C	UWC Chemistry		3	8.5	4.5	
Motsoeng, K	UWC Chemistry				5	
Oko Gcinsha	UWC Chemistry		0.5			0.5
Olushola, O	UWC Chemistry		14.5			
Wilcox, D	UWC Chemistry		1.5			
Fadipe, O	UWC Geo Sci		6			
Adeniyi, O	UWC Physics		1.5	3	2	
Jongwe, T	Vaccine Research				16	
Gitari, M	Venda Uni		1			
Chown, L	WITS		4.5			
Ealand, C	WITS		93		56.5	
Freemantle, C	WITS		6			
Lester, N	Zoology	1				

The table below gives a list of UCT users projects in 2013:

Student	PI	Project	Technique
Archaeology			
Bandama F	Chirikure, S	Indigenous metal production in South Africa: evidence from Rhenosterkloof.	SEM
Biological Science			
	Klak, C	Visualization of Cleretum leaf surfaces	SEM
	Chinsamy-Turan, A	Details on enantiomithines skull	SEM
	Muyasa, M	Seeds of *Dracoscirpoides* species	SEM
Wilding, N	Dr Hedderson	Revision of African Entosthodon	SEM
Cardiovascular Research			
Du Toit, J	Bezuidenhout, D	Electro spun vascular grafts	SEM
Omar, R	Dr Franz	Optimization of degradable scaffolds for tissue regeneration	SEM
Chemical Engineering			
	Brosius, R	Pt (Pd) TiO2	SEM
Ceylon, C	Prof Claeys	Sintering of Co/Al_2O_3 Catalysts	TEM
Crymble, G			
De Beer, M	Prof Van Steen	Deposition of Pt/Au/Co on SiO_2 for Fischer-Tropsch synthesis	TEM
Fortune, A	Prof Conrad	Continuous Pt surface catalyst for PEFC	TEM
Gangen, T,	Prof van Steen	Preparation of Pt/Pd core shell catalyst	TEM/SEM
Hendricks, U	Prof Lewis	Measurement and modelling pf Pd salt precipitation with the objective of developing techniques to model crystallization kinetics in sparingly soluble systems	TEM/SEM

Jackson, C	Prof Conrad	Preparation of and characterization of PtRu/C catalysts for DMFC	TEM/SEM
Jacobs, C	Dr Levecque	Continuous Pt surface catalyst for PEFC	TEM
Kekana, L	Prof M Claeys	Synthesis of cobalt nanoparticles from organometallic precausers as model catalyst for Fischer Tropsch	TEM/SEM
Khasu, M	Prof Conrad	Synthesis of water gas shift reaction catalysts	SEM/TEM
Khoza, T	Dr Blair	Evaluation of metal nitrides and borides as an alternative electrocatalyst support material for ORR	TEM/SEM
Kunene, A	Prof van Steen	Pt/Au as a promoter for supported cobalt catalysts	TEM
Legodi, P	Dr Levecque	Preparation of a Pt-alloy catalyst for fuel cells using organo-metallic vapour deposition	TEM
Letaba, G		Catalytic properties of pt-based bimetallic catalysts	TEM
Lubhelwana, S	Prof M Claeys	Controlled size synthesis of Co allotropes	TEM
Luchters, N		Primary screening of bimetallic catalysts for steam methane reforming using high throughput technology	TEM
Macheli, L	Prof van Steen	Surface modification of Co with tetraethyl orthosilicate	TEM
Malatji, P	Prof Conrad	Catalysts for steam reforming	TEM
Malebeol, M	Prof Claeys	Hydrogeneration of Co over Ni catalysts	TEM
Meyer, N	Dr Becker	A kinetic investigation into the dissolution of pyroxene	SEM
Molefi, M	Dr Levecque	Effect of metal support-interaction on activity, durability and segregation pattern of niobium doped TiO2 supported nano-particles	TEM
Moyo, T	Prof Petersen	A Comparative electrochemical and leach study of the dissolution of chalcopyrite in ammoniacal solutions	SEM
Munsami, N	Prof Claeys	Support addition to Co nanoparticles for use as Fischer-Tropsch catalysts	SEM/TEM
Muziki, S	Dr Levecque	Evaluation of robotic tools for catalyst preparation of Pt/C	TEM
Petersen, A	Prof Van Steen	Cobalt support interaction	TEM
Sewsunker, C	Prof Claeys	Synthesis of Rh and Fe model catalysts	SEM/TEM
Taylor, S	Dr Levecque	Continuous Pt surface based electrocatalysts	TEM
Thompson, K	Dr Luchters	High throughput screening for the development of stable water-gas shift catalysts	TEM/SEM
Weber, L	Prof Claeys	In-situ preparation and Fischer-Tropsch testing of Co nanoparticles	TEM
Wiese, J		Effects of different grinding media on particle shape	SEM
Zhou, Y	Prof Fletcher	PGM catophenyl methane steam performing via micro channels	SEM/TEM
Chemistry			
Ambele, M	Prof T Egan	Synthetic Hemozoin (β-Hematin) Crystals	TEM
Zacharius, S	Dr Bourne	Supramolecular Gels	TEM
Civil Engineering			
Kiliswa, M	Prof Alexander	The influence of sewer parameters on the deterioration of concrete sewer pipes	SEM
Olukayode, O	Prof Alexander	SEM analysis of concrete core samples	SEM
CME			
Allies, S, Finkelstein, L,	Prof C Lang	Novel ordering of alloys	TEM/SEM

Hanief, N	Dr Topic	Phase transformations in the Pt/Cr coated system	SEM
Matthews, R	Prof Knutsen	Primary water stress corrosion cracking studies of structural materials in pressurised water nuclear reactors	SEM
Molokwane, T	Prof Knutsen	Quantification of creep damage on aged 12CrMoV121	SEM
Morrison, G	Prof Knutsen	The Kinetics and Influence of Dispersoid Precipitation in AA5182 Aluminium Alloy during Stabilization Treatments	SEM/TEM
Shamgazi, M	Dr Chumani	High Resolution microstructural investigation on Nb-bearing ferritic stainless steel	TEM
Tevera, T	Prof Knutsen	Evaluation of corrosion behaviour on Zinc and Zinc-aluminium coatings	SEM
Van de Meer, P	Prof Knutsen	Microstructural characterization of 1CrMoV material in the high stress areas of a High Pressure Turbine	SEM
Environmental and Geographic Sciences			
Holt, J	Dr Eckardt	Why is the Kuiseb river the dustiest river in South Africa?	SEM
Geological Science			
Cawthra, H	Prof Compton	The marine Geology of Mossel Bay	SEM
Molecular and Cell Biology			
K Cooper,	Prof Farrant	Biochemical, genetic, physiological and cellular research in desiccation plants.	SEM/TEM
Galvao, B	Prof Abratt	Identification of protein components of Bacteroides fragilis fimbriae	TEM
Giovirette, C			
Hattingh, A	Dr Meyer	Creation of plant expressed bluetongue virus	TEM
Huddy, S		Production of horseradish peroxidase in *Nicotiana benthamiana.*	TEM
Kennedy,P		HPV Pseudovirion production in plants	TEM
Lunn, J			
Van Zyl, A			
Mechanical Engineering			
Airey, K-A	Prof Kuppuswamy	Resharpening of PCD/PCBN tool/ insert supplied by Ford SA with a development of force controlled grinding technology.	SEM
Foot, R	Prof Kuppuswamy	Investigation into drilling parameter influence with regards to surface roughness and burr height	SEM
Swartz, J	Prof Kuppuswamy	Minimum quantity lubrication	SEM
Ntuli, N	Prof Kuppuswamy	Characterization of high productivity machining on Inconel 718 using PCBN bull nose end mills	SEM
Medical Biochemistry			
Hendricks, N	Prof Blackburn	Hand held biosensor for detecting pathogens via surface enhanced RAMAN scattering	SEM/TEM
Yabing, W	Prof Parker	Exosomes identification by electron microscopy	TEM
Medical Virology			
Offerman, K	N Douglass	Characterization of novel avipoxviruses	TEM
Omar, R	Dr Williamson	Generation of a recombinant lumpy skin disease virus expressing rift valley fever virus immunogenic genes	TEM
Oceanography			
Du Plessis, G		Capsivector project	SEM

Physics			
V.d. Berg, C, Jonah, E, Minani, E, Jones, S	Prof D. Britton, Prof M. Harting	Application of Ni-Si semiconductor material.	SEM/TEM
Unugibe, D	Prof D. Britton, Prof M. Harting	TEM of titanium dioxide nanoparticles produced by flame spray pyrolysis	SEM/TEM
Structural Biology			
Broadley, S	Prof B.T.Sewell	Purification and co-crystallisation of Plasmodium falciparum HGXPRT with a chalcone inhibitor	TEM
Kianja, J	Prof BT Sewell		TEM
Mulelu, A	Prof BT Sewell	Factors involved in the oligomerization of the cyanide dihydratase from *Bacillus Pumulus.*	TEM
Thuku, N	Prof B.T.Sewell	Structure of the nitrilase *Rhodococcus rhodochrous* J1: Homology modelling and three-dimensional reconstruction.	TEM