Stellenbosch
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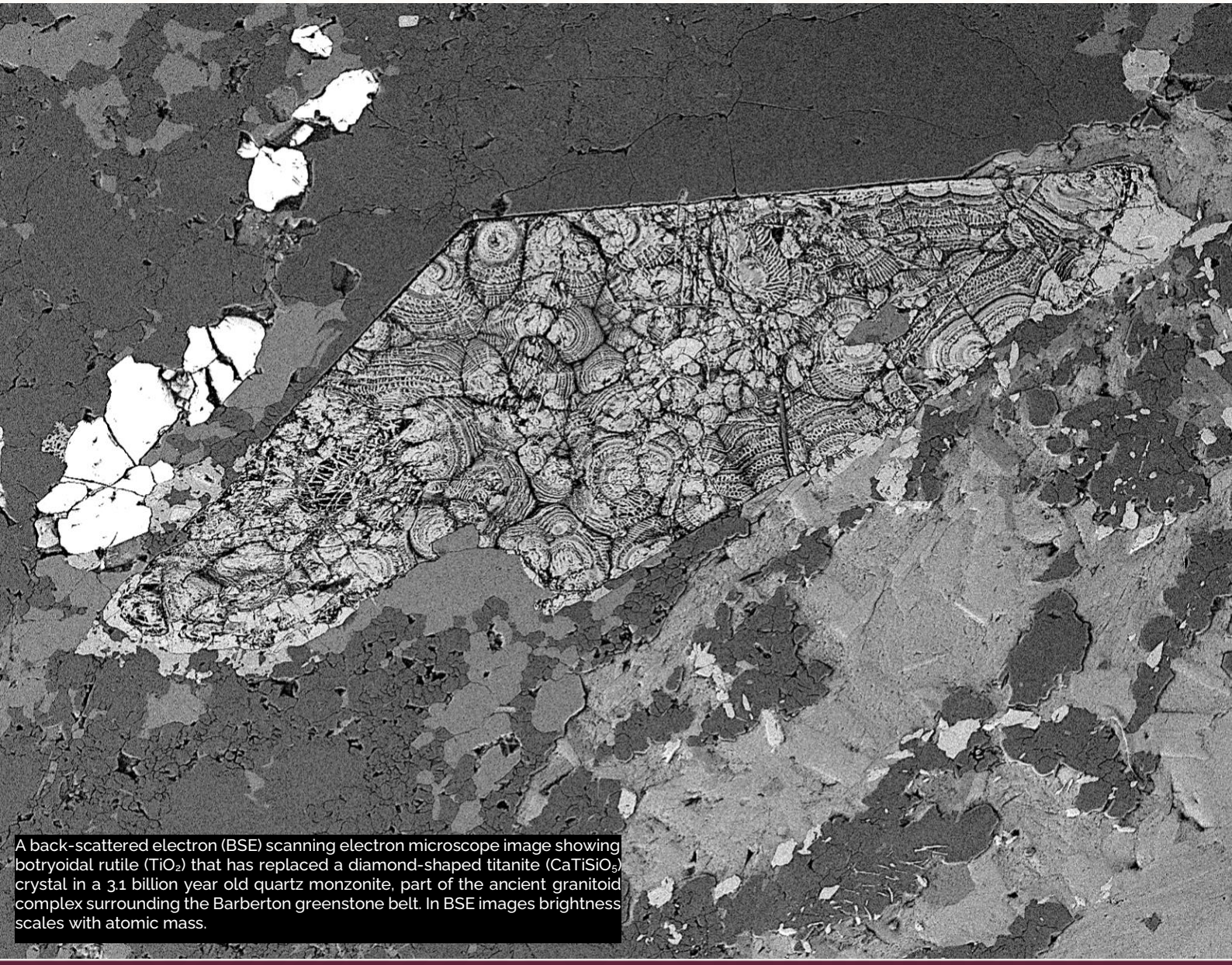
2022/2023 Annual Report



A back-scattered electron (BSE) scanning electron microscope image showing botryoidal rutile (TiO_2) that has replaced a diamond-shaped titanite ($CaTiSiO_5$) crystal in a 3.1 billion year old quartz monzonite, part of the ancient granitoid complex surrounding the Barberton greenstone belt. In BSE images brightness scales with atomic mass.

Central Analytical Facilities
Stellenbosch University

forward together
sonke siya phambili
saam vorentoe

CAF Central Analytical Facilities
STELLENBOSCH UNIVERSITY

CAF Committee

2023

DVC - Research and DRD

Prof Sibusiso Moyo
Dr Therina Theron
Ms Malene Fouché (Secretariat)

CAF Management

Prof Gary Stevens (Director)

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Prof Danie Brink (Dean Faculty of AgriScience)
Prof Gey van Pittius (Vice-Dean Research Faculty of Medicine and Health Sciences & Subcommittee C)
Prof Petrie Meyer (Vice-Dean Research Faculty of Engineering)
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Subcommittee B

Prof KJ Esler

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Prof Bert Klumperman
Dr Ben Loos
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Prof Nox Makunga
Prof Kathy Myburgh
Prof Marina Rautenbach
Prof Gerhard Walzl
Prof James Warwick
Prof André van der Merwe

Chair of the BIOGRIP Node steering committee

Dr Suzanne Grenfell

Invited CAF Unit Managers and DSI-funded Node Directors

Dr Marietjie Stander
Mr Carel van Heerden
Dr Janine Colling
Mrs Fransien Kamper
Dr Alex Doruyter

Contents

2022/2023 Annual Report

Overview

In 2023, CAF is projected to once again realise a small profit, building on the success of 2022. As illustrated by Figure 1, CAF lost a significant amount of money in 2019, principally due to changes in the way the NRF handled post-graduate bursaries. Following this, demand for services was heavily affected by the pandemic in 2020 and 2021, before recovery in 2022, which was largely achieved through cost reduction. The value of services delivered in 2023 is projected to be R 32.8 million, very slightly above the R32.5 million delivered in 2022. These figures do not include the financially ring-fenced DSI funded Node for Infection Imaging and the BIOGRIP Node for Water and Soil Analysis. If these are included, income from analytical services rises to R 46.9 million in 2023. From Figure 1 it is important to note that demand for CAF services is still some considerable way behind the projection of the pre-COVID trend.

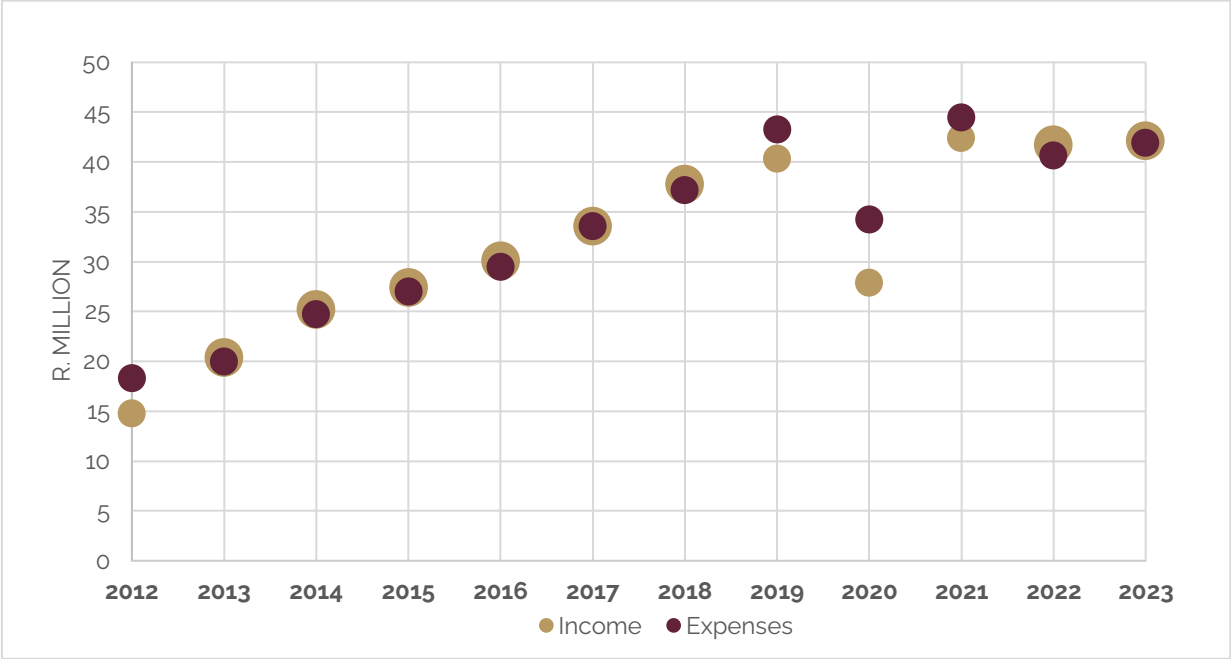


Figure 1: CAF income and costs for the period 2012 to 2023. A significant component of CAF cost is related to the purchase of expensive reagents. This component of cost scales with demand and explains the significant decrease in cost during 2020 when the COVID pandemic had the greatest impact on the volume of work flowing through CAF labs. It is important that CAF takes the steps during 2023 to further reduce costs and consolidate sustainability.

As indicated above, the DSI funded Research Infrastructure Platform Nodes hosted within CAF represent the main areas of recent growth within CAF. It is important to realise that the period of DSI funding is finite and we thus have an opportunity and a responsibility to grow sustainable services in support of research during the funded period. In the case of the BIOGRIP water and Soil Node funding includes salaries and equipment, and the funding period extends for another 10 years. This year, DSI funding to the Soil and Water Node will allow SU to purchase a Laser Ablation Multi Collector Inductively Coupled Plasma Mass Spectrometer (LA MC ICP MS). This is a huge step forward in high-level analytical capability for SU, allowing for the precise measurement of radiogenic and stable isotope ratios in solid materials (via laser ablation) and solutions. If we can fully exploit all the potential in this equipment, this will revolutionise research as SU in environmental geochemistry, hydrology, climate change studies, biogeochemistry and geology. In order to achieve this we will need to hire a scientist with experience of managing LA MC ICP MS equipment that serves a diverse range of research topics. A recruitment exercise to achieve this is under way.

In contrast to the BIOGRIP Node, the NuMeRI Node for Infection Imaging (NII) principally only received DSI funding for equipment. All operational costs need to be covered by income and it is extremely pleasing to see how income from combined research scans and private patient work has grown from approximately R1 million in 2020 to a projection of over R10 million in 2023. Thus, NII has matured to be a fully sustainable entity without the need for further DSI support. In order to further enhance the value of NII for SU research and the community to whom it provides health care services, CAF, with assistance from the Faculty of Medicine and Health Sciences, has launched an initiative to establish a cyclotron facility and a research radiopharmacy, on the Tygerberg Campus. The Cyclotron Initiative is covered in more detail later in this report. For the foreseeable future all CAF annual reports will present the fundamental user-base and financial information relevant to the previous and current year, as well as highlighting a single, strategic initiative, that is important to future research support.

Clearly with the national electricity crisis, declining post-graduate student numbers and decreasing government support for large equipment grants, we are sailing troubled waters at the moment. However, I believe that through the continued support of SU and the commitment and dedication of the CAF staff, we are doing an excellent job of remaining agile, finding the advantages that do exist, working around those problems that can't be overcome and continuing to deliver excellent analytical support to researchers at SU and indeed the entire national system of innovation.

Professor Gary Stevens
CAF Director

The need to address the aging equipment base of CAF

In the CAF report of 2020/2021 the growing need for an SU initiative to ensure the renewal of the CAF equipment base was highlighted. The outcome of the 2022 NEP competitive grants process confirmed this, with the majority of our applications highly rated, but not funded. As illustrated in Figure 2, CAF can no longer rely on NEP to fund equipment replacement. We have never been successful at securing an actual NEP equipment replacement grant, but the natural rapid technology evolution that is a feature of many advanced analytical technologies, has allowed us to successfully replace much of our older equipment in the period up to 2017 through new equipment grants. Subsequent to that, NEP calls have been less frequent and the established, research intensive universities have tended to receive fewer grants than was the case prior to 2017. The consequences of not renewing equipment are that we have higher repair costs, more equipment down-time and ultimately we will have to cease to offer some services because the equipment simply becomes too expensive to run.

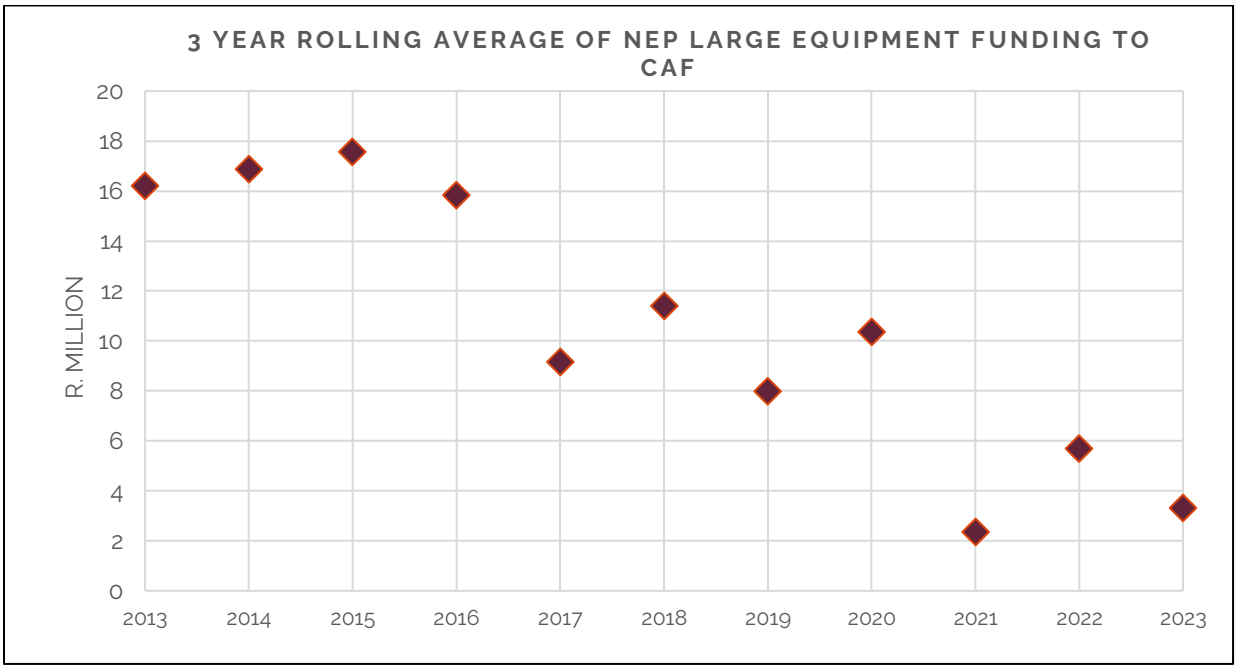


Figure 2: The 3-year rolling average of National Equipment Programme (NEP) large equipment funding to CAF highlights the steady year-on-year decline in NEP funding to CAF. The somewhat spiky data pattern from year 2016 relates to the fact that since then NEP calls generally happen only every 2nd year.

An analysis of the CAF equipment base in 2023 reveals that many of our foundational CAF units rely on large analytical equipment that is, on average, now approximately 10 years old (Figure 3). This applies to Mass Spectrometry (LC MS, GC MS and Proteomics MS), Microscopy (SEM and Fluorescent Microscopy), ICP Mass Spectrometry and X-ray CT. 10 years is beyond the expected lifetime of most large analytical equipment and many product lines become discontinued within this time frame, leading to difficulties with sourcing spare parts to repair older equipment. Thus, it can be concluded that almost all of our equipment will need to be replaced by 2028. In the interval 2023 to 2028 we need to spend, on average, R36.5 million per year to achieve this. If one factors in the 1/3 co-investment that institutions are required to make, as well as inflation, this is consistent with the combined support received through

NEP and SU in the period 2013 to 2016, inclusive. Assuming biannual NEP calls and the typical 20% success rate we have been achieving at NEP, SU needs to find a mechanism to allocate approximately R30 million per year to CAF equipment renewal. If we fail to do this the comprehensive core facility that CAF represents will slowly decline in scope and competitiveness, with very negative consequences for research and post-graduate throughput at the institution.

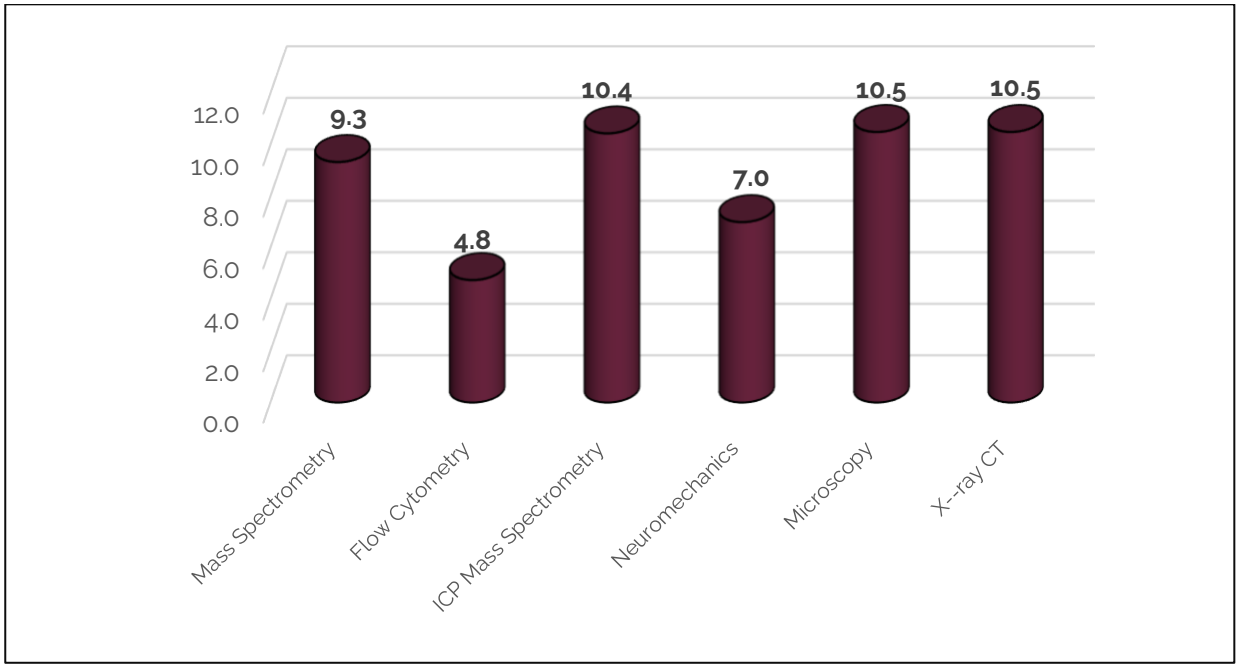


Figure 3: The average age of large analytical equipment, typically over R5 million in value, in CAF units established prior to 2019. The NMR Unit also falls into this category, but >R30 million was spent on renewing the two NMR spectrometers in the NMR unit in 2021. The funds came from the Faculty of Science, the SU Strategic Fund, and a smaller contribution for CAF.

Profile of the CAF client base

Since 2017, CAF has collected comprehensive information on the user base. This enables us to provide the NRF with a comprehensive summary of who uses CAF NEP-funded equipment; whether they are researchers or post graduate students; if the latter, their level of study; institution of origin, etc. Figures 4 - 7 below provide some information on the CAF client base in 2022 as well as on possible changes to the profile of CAF clients over time:

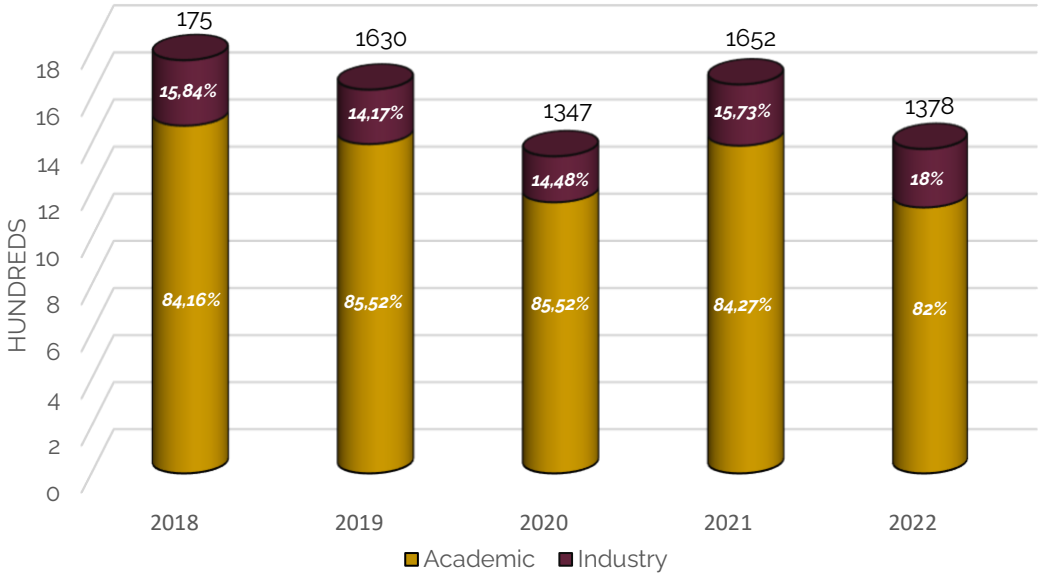


Figure 4: The number of active CAF clients from 2017 to 2022, including the percentage of industry and academic clients. Comparison with Figure 7 indicates that the decrease in client numbers in 2020 and 2022 is a function of fewer post-graduate student clients in these years.

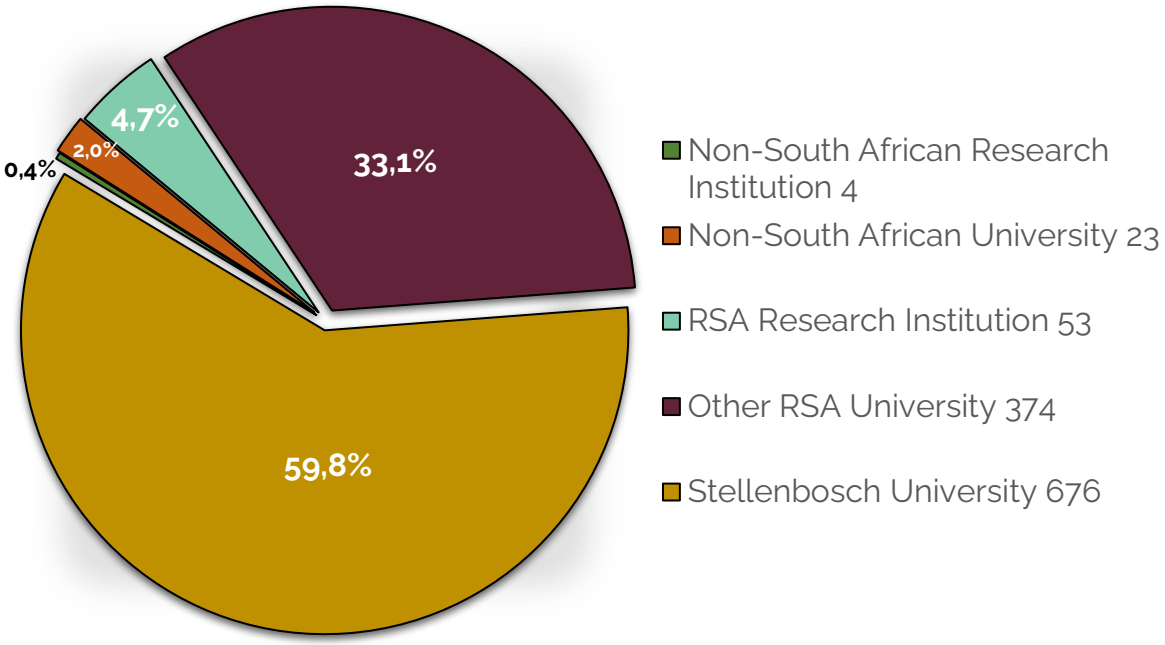


Figure 5: The subdivision of CAF academic clients (1130 clients – 82% of total CAF clients) according to type of institution for 2022.

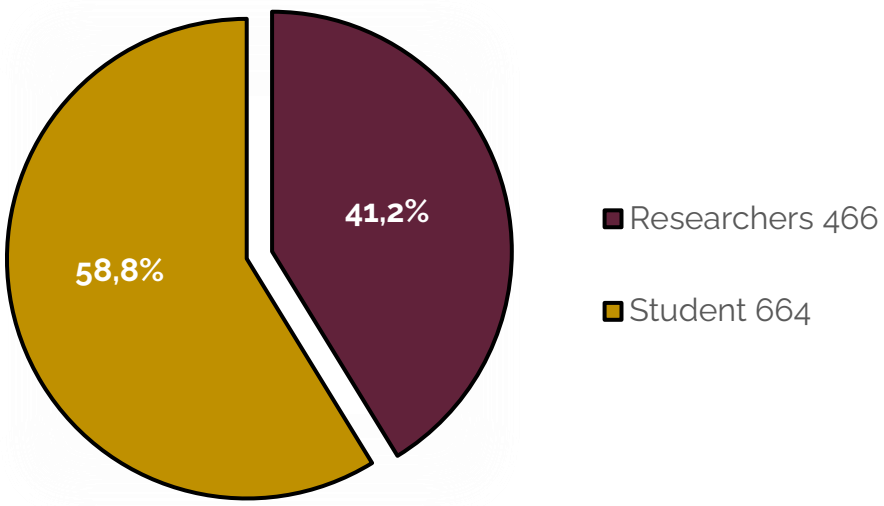


Figure 6: The proportion of different categories of academic clients (1130) for 2022.

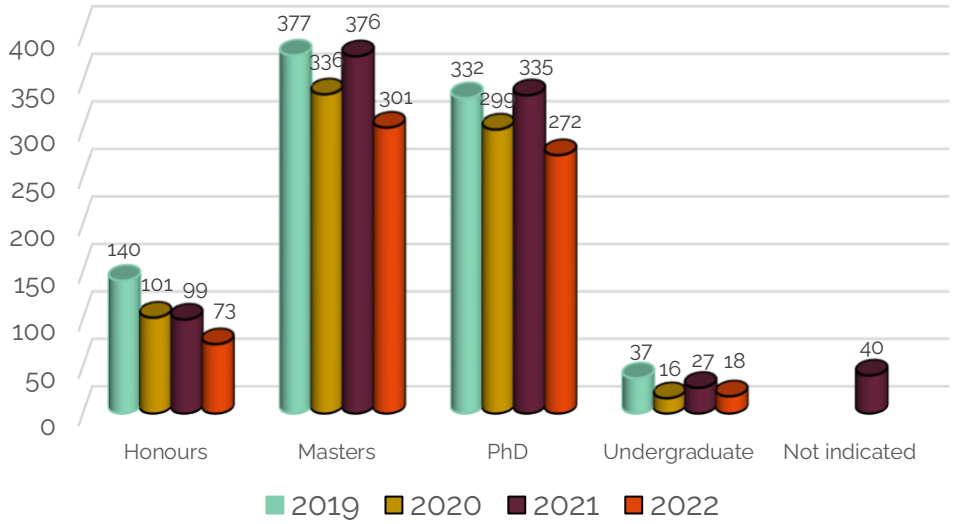


Figure 7: The subdivision according to level of study of the 664 (41.24%) student clients for 2022 compared with the same data for 2019 to 2021.

Historically disadvantaged universities in South Africa	Researchers	Students			Total
		Honours	Masters	PhD	
Cape Peninsula University of Technology	28		4	2	**34**
Central University of Technology Free State	2		2	3	**7**
Durban University of Technology	7	1		3	**11**
Tshwane University of Technology	4			1	**5**
University of Fort Hare			1	2	**3**
University of Limpopo	1		1	1	**3**
University of Mpumalanga	2				**2**
University of the Western Cape	27	3	19	12	**61**
University of Venda	3			3	**6**
Vaal University of Technology			1		**1**
Walter Sisulu University	4		1		**5**
Total	**78**	**4**	**29**	**27**	**138**

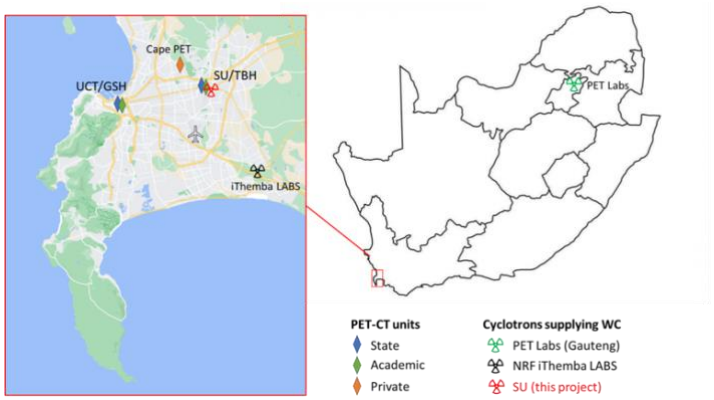
Table 1: Analysis of the number of users for 2022 from historically disadvantaged Universities in South Africa. Note that this is a minimum estimate of the students from these institutions who benefit from CAF services and expertise because several students may be accommodated under the identity of the supervisor.

The SU Academic Cyclotron Project: Revolutionizing Biomedical Research and Patient Care

Overview

On the back of successfully commissioning the NuMeRI Node for Infection Imaging (NII) – a research PET-CT unit at Tygerberg Hospital, CAF is taking a ground-breaking step forward in supporting biomedical research and patient care with its newest initiative – the **SU Academic Cyclotron Project**. This ~R160 million strategic endeavour aims to address critical challenges faced by Stellenbosch University (SU), the Western Cape (WC) healthcare system, and the country as a whole.

Dr Jannie Le Roux performs a radiopharmaceutical labelling in the Clean Room at SU's NII PET-CT Unit. Dr Le Roux is currently one of only two registered radiopharmacists in South Africa (the second, Prof Sietske Rubow, is an SU Emeritus Professor).



Local PET-CT landscape in the Western Cape (WC). There are 5 PET-CT units in the province (2 state, 2 academic, 1 private). All these units rely on commercial products supplied by two cyclotrons, one of which is based in Gauteng. Note that none of the WC PET-CT units currently have an on-site cyclotron necessary for work with short-lived radiopharmaceuticals and high specific activity precursor solutions.

Challenge 1: Ensuring Uninterrupted Supply of Radiopharmaceuticals

Currently, PET-CT imaging at SU and at other WC units is hindered by limited access to essential radiopharmaceuticals, leading to delays in patient care and stifling biomedical research. With unreliable supply of commercial radiopharmaceuticals and limited access to radionuclide precursor solutions to conduct labelling of research radiopharmaceuticals, the lack of an on-site cyclotron has been a major setback.

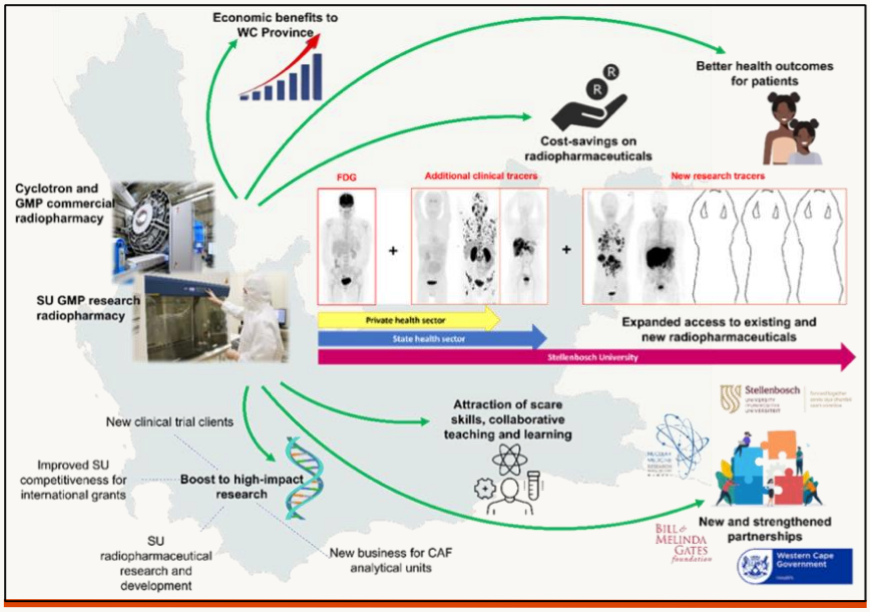
Challenge 2: National Shortage of Skilled Personnel

The scarcity of skilled professionals, including radiopharmacists and radiochemists, is a national concern, hampering advancements in the field of nuclear medicine and impeding progress in research fields that make use of nuclear medicine techniques.

The Game-Changing Solution

To combat these challenges and pave the way for progress, SU has partnered with PET Labs Pharmaceuticals in a endeavour to establish the SU Academic Cyclotron. This state-of-the-art facility will revolutionize PET-CT research and clinical practice and drive radiopharmaceutical research by ensuring a steady supply of radioisotopes and by providing access to sophisticated radiopharmacy equipment and facilities.

The Impact



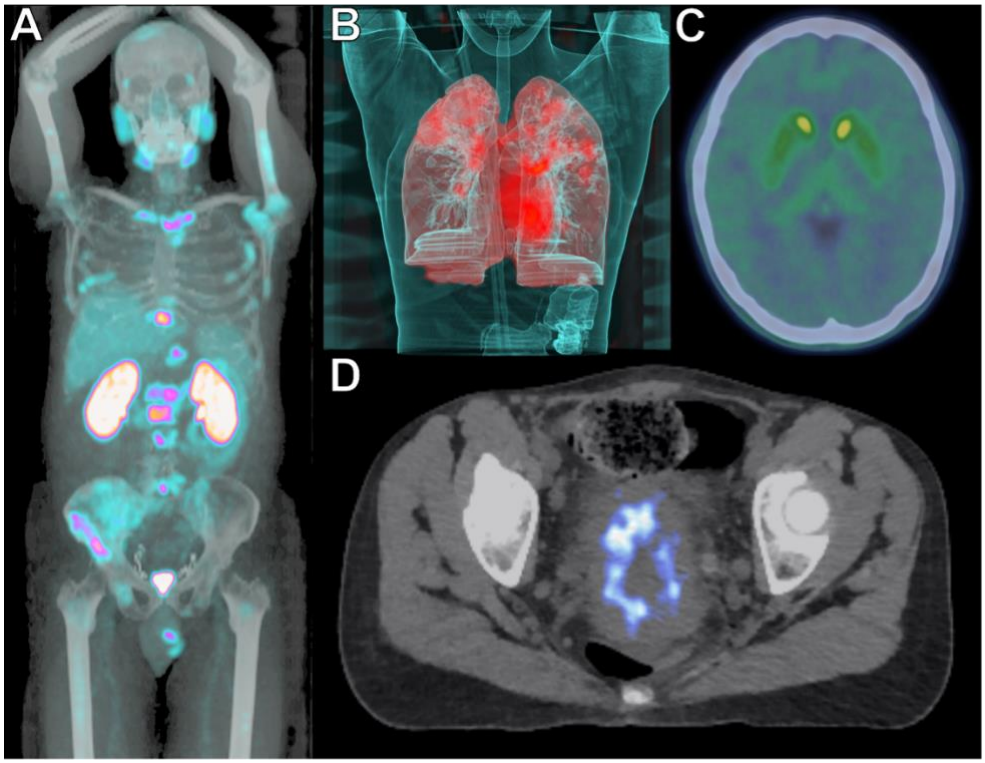
Anticipated outcomes from the CAF cyclotron project include benefits for SU, state and private healthcare, and the provincial economy.

Enhanced Biomedical Research: With direct access to an on-site cyclotron, SU will lead impactful research, becoming one of only two universities in the country equipped with this cutting-edge technology. This advancement will enable the synthesis and development of research radiopharmaceuticals targeted at high-priority diseases like tuberculosis and cancer, with potential commercial applications.

Improved Patient Care: The new cyclotron unit will put an end to PET radiopharmaceutical shortages in the WC, reducing the frequency of cancelled patient scans, and ensuring timely and efficient clinical services. The unit will also provide patients with access to new PET radiopharmaceuticals with novel clinical applications.

Fostering Talent: SU will offer unique teaching and learning opportunities for students in various fields, attracting top talent to the institution. The project will address skills shortages by nurturing skilled professionals in nuclear medicine, radiopharmacy, radiology, radiochemistry, and physics.

Strengthening Collaborations: The SU Academic Cyclotron Project will create and strengthen partnerships with research and healthcare institutions, driving progress and contributing to the provincial economy.



PET-CT imaging permits the in-vivo study of physiological and pathological processes and is an invaluable tool for biomedical research. Shown are studies performed at SU's NII PET-CT Unit, which is an EARL-accredited PET-CT Centre of Excellence: A) ^{68}Ga-PSMA uptake (targeting prostate-specific membrane antigen expression) in a patient with prostate cancer, spread to bone; B) ^{18}F-FDG uptake (targeting glucose metabolism) in a patient with active pulmonary tuberculosis; C) ^{18}F-FDOPA uptake (targeting dopaminergic function within the brain's basal ganglia) in a patient with Parkinson's disease; and D) ^{18}F-FMISO uptake (targeting tumour hypoxia) in a patient with cervix cancer.

Project Milestones

The groundwork for this ambitious project is firmly laid, with all necessary commitments secured:

Land

Suitable area of **land** identified by FMHS at the SU Tygerberg Campus.

~R60 mil

of funding from SU, partially backed by a generous grant from the Bill & Melinda Gates Foundation.

~R100 mil

PET Labs' commitment of **investment** in equipment, including the cyclotron. An MOU formalizing this collaboration has been concluded.

Looking Ahead

The project will be formally initiated in September 2023, and is expected to be completed within two years, with operations commencing in September 2025. SU is on the cusp of a remarkable transformation, spearheading advancements in research, patient care, and education with this ground-breaking initiative.

Financial Reports

By Fransien Kamper

		2019	2020	2021	2022	Projection 2023
MS Unit	Internal Invoicing	1,893,475	1,033,947	1,599,311	1,731,444	1,225,145
	External Invoicing	6,803,566	5,661,872	7,971,178	7,803,460	9,315,571
	Total logbook income	**8,697,041**	**6,695,819**	**9,570,489**	**9,534,904**	**10,540,716**
	Salaries	4,202,003	4,645,421	4,521,704	4,548,745	4,796,598
	ICR	1,360,713	1,132,374	1,618,314	1,542,253	1,863,114
	Running costs	1,171,430	849,691	1,083,715	1,133,629	1,288,670
	Maintenance	905,603	962,537	375,552	1,064,626	1,315,481
	Travel Costs	281				
	Small equipment & KKW	5,952	21,860	71,415	92,020	65,128
	Deferred Costs	255,800		399,996	439,992	821,928
	Total Expenses	**7,901,782**	**7,611,884**	**8,070,697**	**8,821,265**	**10,150,918**
FM Unit From 2022 Flow Cytometry Unit	Internal Invoicing	856,494	573,022	1,407,422	576,163	911,150
	External Invoicing	189,215	109,064	78,438	27,708	33,358
	Total logbook income	**1,045,709**	**682,086**	**1,485,860**	**603,871**	**944,508**
	Salaries	930,059	1,023,435	1,064,557	765,987	797,423
	ICR	37,843	21,813	15,688	5,542	6,672
	Running costs	425,804	92,688	118,138	112,328	103,803
	Maintenance	59,150	108,802	589,302	469,496	42,267
	Travel Costs	6,653	334			
	Small equipment & KKW	114,407				
	Deferred Costs	150,000		150,000	165,000	77,250
	Total Expenses	**1,723,916**	**1,247,071**	**1,937,684**	**1,518,353**	**1,027,414**
SEM Unit From 2022 Microscopy Unit	Internal Invoicing	918,242	687,982	1,184,639	1,588,073	1,476,507
	External Invoicing	732,351	757,935	1,097,588	1,120,729	804,630
	Total logbook income	**1,650,593**	**1,445,917**	**2,282,227**	**2,708,802**	**2,281,137**
	Salaries	1,684,505	1,389,647	1,566,323	2,453,032	2,140,702
	ICR	146,470	151,587	219,451	224,146	160,926
	Running costs	62,968	98,324	112,013	275,843	174,156
	Maintenance	93,673	23,065	93,509	189,828	299,383
	Travel Costs	5,491	3,473		21,179	36,888
	Small equipment & KKW	86,628	3,635	75,347	24,058	65,682
	Deferred Costs	120,000		120,000	132,000	221,280
	Total Expenses	**2,199,735**	**1,669,731**	**2,186,643**	**3,320,086**	**3,099,017**

		2019	2020	2021	2022	Projection 2023
ICP & XRF Unit	Internal Invoicing	1,005,564	549,250	881,442	1,258,680	1,007,269
	External Invoicing	2,366,846	1,957,142	3,470,563	3,733,736	4,028,174
	Total logbook income	**3,372,410**	**2,506,392**	**4,352,005**	**4,992,416**	**5,035,442**
	Salaries	2,709,331	2,026,864	2,191,359	2,273,082	2,368,740
	ICR	473,369	391,428	695,463	746,747	805,635
	Running costs	1,005,950	708,254	650,152	726,212	898,406
	Maintenance	1,156,984	400,981	343,292	825,264	463,332
	Travel Costs	62,089	9,182	60,768	52,933	7,397
	Small equipment & KKW	66,476		41,604	4,791	21,600
	Deferred Costs	354,613		399,997	439,992	600,000
	Total Expenses	**5,828,812**	**3,536,709**	**4,382,635**	**5,069,021**	**5,165,110**
DNA Unit	Internal Invoicing	3,774,647	2,925,162	4,199,985	3,525,681	3,409,077
	External Invoicing	5,752,054	4,158,801	5,499,622	6,885,051	8,310,242
	Total logbook income	**9,526,701**	**7,083,963**	**9,699,607**	**10,410,732**	**11,719,319**
	Salaries	3,089,240	3,400,922	4,169,205	3,485,899	3,755,741
	ICR	1,150,411	831,760	1,099,924	1,377,010	1,662,048
	Running costs	5,604,611	5,531,489	5,217,755	5,804,969	7,480,891
	Maintenance	175,405	143,324	131,906	66,303	155,065
	Travel Costs	831			962	4,276
	Small equipment & KKW	51,228	83,118	52,995	298,123	-20,838
	Deferred Costs	133,333		285,000	313,500	291,845
	Total Expenses	**10,205,059**	**9,990,613**	**10,956,786**	**11,346,767**	**13,329,028**
NMR Unit	Internal Invoicing	660,625	565,437	467,698	546,554	569,632
	External Invoicing	910,628	421,555	307,035	388,191	551,100
	Total logbook income	**1,571,254**	**986,992**	**774,734**	**934,745**	**1,120,732**
	Salaries	1,429,138	1,217,297	1,805,929	1,600,780	1,681,993
	ICR	182,126	84,311	61,407	77,638	110,220
	Running costs	517,358	563,174	465,393	598,477	337,632
	Maintenance	48,897	-1,236	75,053	5,753	-192
	Travel Costs	2,911	12			
	Small equipment & KKW		10,427			
	Deferred Costs					
	Total Expenses	**2,180,430**	**1,873,985**	**2,407,782**	**2,282,648**	**2,129,653**

		2019	2020	2021	2022	Projection 2023
CT Unit	Internal Invoicing	490,600	321,330	287,051	563,014	354,750
	External Invoicing	1,551,760	1,303,930	1,657,187	1,592,203	641,919
	Total logbook income	**2,042,360**	**1,625,260**	**1,944,237**	**2,155,216**	**996,669**
	Salaries	1,646,964	1,259,025	1,396,339	663,043	586,702
CT Scanner	ICR	310,352	260,786	263,351	319,254	128,384
	Running costs	277,121	309,351	149,628	176,635	216,780
	Maintenance	565,225	156,774	492,889	338,789	
	Travel Costs	58,676	327			
	Small equipment & KKW		25,243	60,912		
	Deferred Costs	341,108		350,003	385,007	411,600
	Total Expenses	**3,199,446**	**2,011,507**	**2,713,122**	**1,882,728**	**1,343,466**
Neuromechanics Unit	Internal Invoicing	323,158	203,044	271,713	174,250	134,325
	External Invoicing	1,069,544	954,667	1,123,225	827,884	
	Total logbook income	**1,392,703**	**1,157,711**	**1,394,938**	**1,002,134**	**134,325**
	Salaries	2,060,312	2,107,151	1,382,867	763,075	376,071
	ICR	213,909	190,933	224,645	165,577	
	Running costs	70,248	22,299	49,810	156,445	86,426
	Maintenance	43,315	23,802	18,501	4,550	15,000
	Travel Costs	72,581				
	Small equipment & KKW	48,070	49,449			41,098
	Deferred Costs	68,711		99,997	99,996	106,800
	Total Expenses	**2,577,146**	**2,393,635**	**1,775,819**	**1,189,643**	**625,395**
Vibration Spectroscopy Unit	Internal Invoicing	104,529	57,450	102,940	124,325	5,280
	External Invoicing	44,949	5,250	4,416	18,897	
	Total logbook income	**149,478**	**62,700**	**107,356**	**143,222**	**5,280**
	Salaries	595,708				
	ICR	8,990	1,050	883	3,779	
	Running costs	7,824	3,857	2,773	2,187	555
	Maintenance					
	Travel Costs					
	Small equipment & KKW					
	Deferred Costs	25,008			109,992	
	Total Expenses	**637,530**	**4,907**	**3,656**	**115,959**	**555**

		2019	2020	2021	2022	Projection 2023
TOTAL UNITS INCOME	Total Internal Income	10,027,336	6,916,624	10,402,199	10,088,184	9,093,135
	Total External Income	19,420,912	15,330,215	21,209,252	22,397,858	23,684,994
	Total Income: All Units	**29,448,248**	**22,246,839**	**31,611,451**	**32,486,042**	**32,778,128**
	Additional Income					
	Interest Received	1,511,454	353,657	849,006	1,386,828	2,171,867
	Funds Received VR(R)	750,000	750,000		1,000,000	1,000,000
	Salary Contribution VR(R)	4,203,342	4,355,720	4,346,081	5,213,114	5,062,594
	Infrastructure NII repayment	2,000,000				
	US Loan / ALT 2020 Funds: Detector CT	2,321,000				
	VAT refund on equipment					
	Faculty Contributions					
	NII LEVY		142,324	180,000	180,000	
	BIOGRIP LEVY			44,156	200,000	80,590
	VAT Refund on equipment	94,451		5,357,647	1,259,968	1,035,372
TOTAL ADDITIONAL INCOME		**10,880,247**	**5,601,701**	**10,776,890**	**9,239,911**	**9,350,423**
TOTAL INCOME		**40,328,495**	**27,848,540**	**42,388,341**	**41,725,953**	**42,128,552**
Expenditure	Total Expenditure					
	Salaries: Admin	2,184,381	2,355,196	2,482,196	2,514,161	2,553,755
	Salaries: Units	18,347,259	17,069,762	18,098,282	16,553,643	16,503,970
	17% 20% ICRR (Indirect Cost Recovery)	3,884,182	3,066,043	4,199,126	4,461,946	4,736,999
	Running costs (sum of units)	9,143,314	8,179,127	7,849,376	8,986,726	10,587,317
	Maintenance (sum of units)	3,048,251	1,818,049	2,120,005	2,964,608	2,290,336
	Travel Costs (sum of units)	209,513	13,328	60,768	75,074	48,561
	Small equipment & KKW (sum of units)	372,761	193,732	302,273	418,992	172,671
	Deferred Costs	1,448,573		1,804,993	2,085,480	2,530,703
	CAF General Running Costs	592,964	468,200	411,876	506,170	540,045
	Students	342,663	350,338	201,596	34,543	160,032
	Interest		17,224	21,382		
	Travel Costs-Courier	89,313	69,883	69,688	112,637	74,644
	Development New Labs	1,121,212				
	Infrastructure	115,217	11,804	589,394	9,995	
	Equipment	27,648	77,071	17,135	27,111	166,874
	NMR Purchase			698,031	126,369	
	HPCL			1,000,000		
	Maintenance		23,336			

		2019	2020	2021	2022	Projection 2023
	Equipment Repair: CT Scanner	2,344,334	519,207			
	Equipment Repair Fund			500,000	500,000	500,000
	CAF Vehicle Fund			45,000	45,000	45,000
	Equipment Replacement Fund			4,000,000	1,250,000	1,000,000
	Total normal operational costs	**43,271,587**	**34,232,299**	**44,471,122**	**40,672,455**	**41,910,907**
	Surplus per year before special income	**-2,943,092**	**-6,383,759**	**-2,082,781**	**1,053,498**	**217,645**
Special Additional Income	**COVID Interruption of Work Insurance Claim**		5,000,000			
Surplus/ Shortfall	**Surplus/Shortfall per year**	**-2,943,092**	**-1,383,759**	**-2,082,781**	**1,053,498**	**217,645**
Equipment Expenditure		**35,997,603**		**38,181,619**		**19,654,570**
	NRF-NEP Total grants	23,982,455		7,120,740		10,000,000
	ALT/US Funds	8,000,000		3,560,370		5,164,141
	2020 ALT	2,643,935				
	Contributions: Faculty of Science	500,000				1,000,000
	CAF Contribution	871,213		698,031		126,678
	ALT FUNDS: NMR Purchase			12,402,478		
	Science Faculty: Contribution NMR			10,000,000		
	Strategic Funds: NMR			4,400,000		
	Insurance Claim					3,363,750
Equipment Details		**35,997,601**		**38,181,619**		**19,654,570**
	Mass-Directed Auto Purification & QC system	9,431,805				
	Amnis Image StreamX Markil Imaging Flow Cytometer	12,673,106				
	Gemini 300FESEM with advanced system for automated 3D	13,892,690				
	Spectral Flow Cytometer			10,681,110		
	400MHZ AND 600MHZ NUCLEAR MAGNETIC RESONANCE			27,500,509		
	Cyclic IMS HDMS QT of mass spectrometer					19,654,570
Funds		**5,805,653**	**5,238,509**	**12,456,829**	**22,874,130**	**25,719,006**
	Emergency Equipment Repair Fund	1,688,915	1,078,605	1,618,027	2,172,494	
	Vehicle Replacement	239,363	248,948	302,546	360,092	391,695
	Reserve, Food Security Project	1,214,773	1,221,614	1,229,267	1,240,437	

		2019	2020	2021	2022	Projection 2023
	Maintenance Fund Equipment: BD FACS Jazz sorter (2013)	1,214,029	1,240,769	1,394,496	1,463,516	1,512,840
	Provision for Leave Payment			769,262	901,297	1,082,110
	Equipment Replacement			4,000,000	5,250,000	6,250,000
	LCMS Insurance				3,363,750	
	Deferred Costs	1,448,573	1,448,573	3,143,230	5,122,543	6,685,143
	Alt Funds 2022-2025 (CAF Running Costs)				3,000,000	2,000,000
	Cyclotron Project 2023					7,797,217

CAF UNITS: Financially ring-fenced DSI funded research infrastructure platform nodes						
	2017 - 2018	Jan 2019 - 31 Dec 2019	Jan 2020 – 31 Dec 2020	Jan 2021 – 31 Dec 2021	Jan 2022 – 31 Dec 2022	Budget 2023
NODE FOR INFECTION IMAGING (NII)						
NODE Funding	26315789.47	381,396	3,742,420	3,000,000		
Bridging Funding	19,000,000	-6,831,086				
VAT Refund on Equipment					3,084,593	
Interest Received	2,720,338	1,566,713	282,219	199,879	330,702	515,130
Income			869,559	1,211,787	3,085,219	2,753,211
Private Patients			939,909	4,112,235	6,454,310	10,250,029
TOTAL INCOME	**48,036,127**	**-4,882,977**	**5,834,107**	**8,523,900**	**12,954,823**	**13,518,370**
Salaries & Running costs	1,080	2,109,155	5,240,134	8,800,612	10,349,779	12,278,399
Building & Equipment		32,213,533	3,122,671	366,473	50,635	63,391
Equipment Replacement Fund						
TOTAL EXPENSES	**1,080**	**34,322,688**	**8,362,806**	**9,167,085**	**10,400,414**	**12,341,791**
YEAR END BALACE	**48035047,38**	**8,829,383**	**6,300,684**	**5,657,499**	**8,211,908**	**9,388,487**

	1 Apr 2019- 31 Mar 2020 Year 1	1 Apr 2020- 31 Mar 2021 Year 2	1 Apr 2021- 31 Mar 2022 Year 3	1 Apr 2022- 31 Mar 2023 Year 4	1 Apr 2023- 31 Mar 2024 Year 5
BIOGRIP NODE FOR SOIL AND WATER ANALYSIS					
NODE Funding	5,842,139	7,480,163	5,370,719	7,363,100	26,558,565
Interest Received	19,425	288,175	46,373	142,032	150,000
Income from services		263,207	583,095	479,803	1,150,000
TOTAL INCOME	**5,861,564**	**8,031,545**	**6,000,187**	**7,984,935**	**27,858,565**
Salaries & Running costs	827,288	2,788,448	2,523,050	4,895,367	5,319,330
ICR (Indirect Cost Recovery)	292,107	376,592	319,727	450,892	1,462,928
Equipment	4,726,110	4,034,752	1,777,493	1,519,030	19,911,306
TOTAL EXPENSES	**5,845,505**	**7,199,791**	**4,620,270**	**6,865,289**	**26,693,565**
BALANCE FOR EACH GRANT PERIOD	**16,060**	**831,754**	**1,379,917**	**1,119,646**	**1,165,000**

Graphs detailing aspects of CAF income during 2022

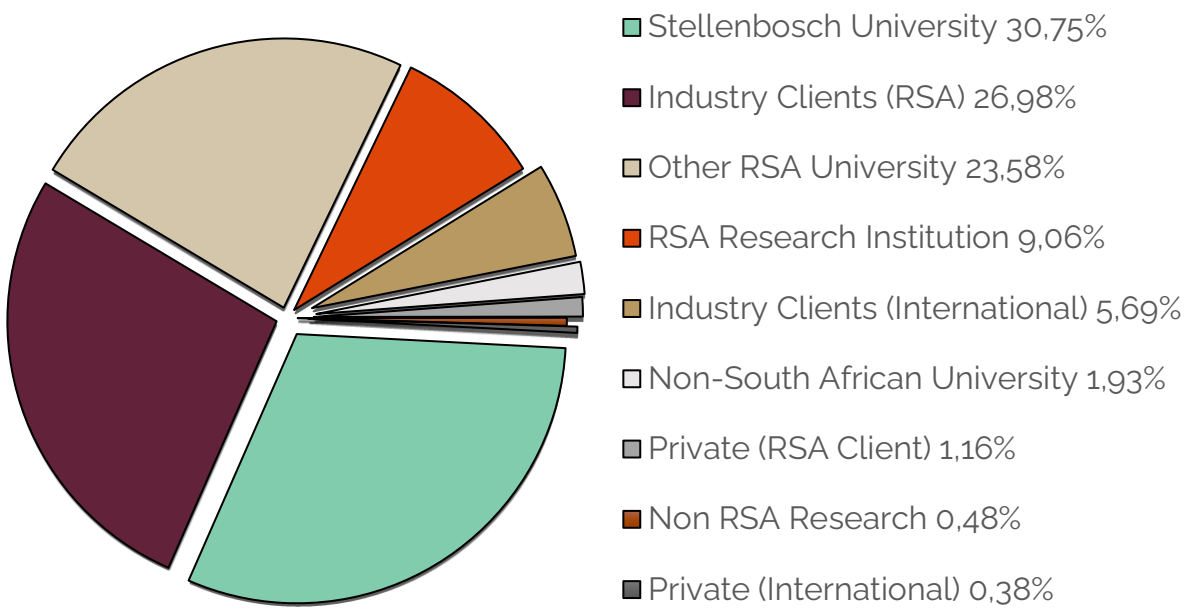


Figure 8: Percentage of income derived from the different categories of clients for 2022.

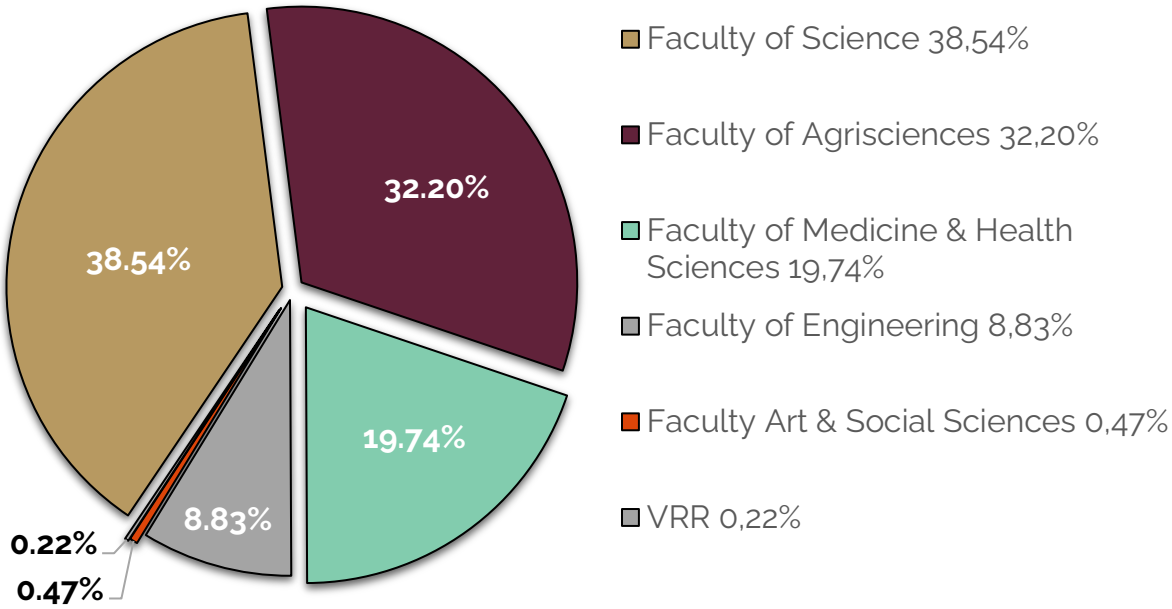


Figure 9: Analysis of the percentage of CAF income for 2022 from internal clients by faculty.

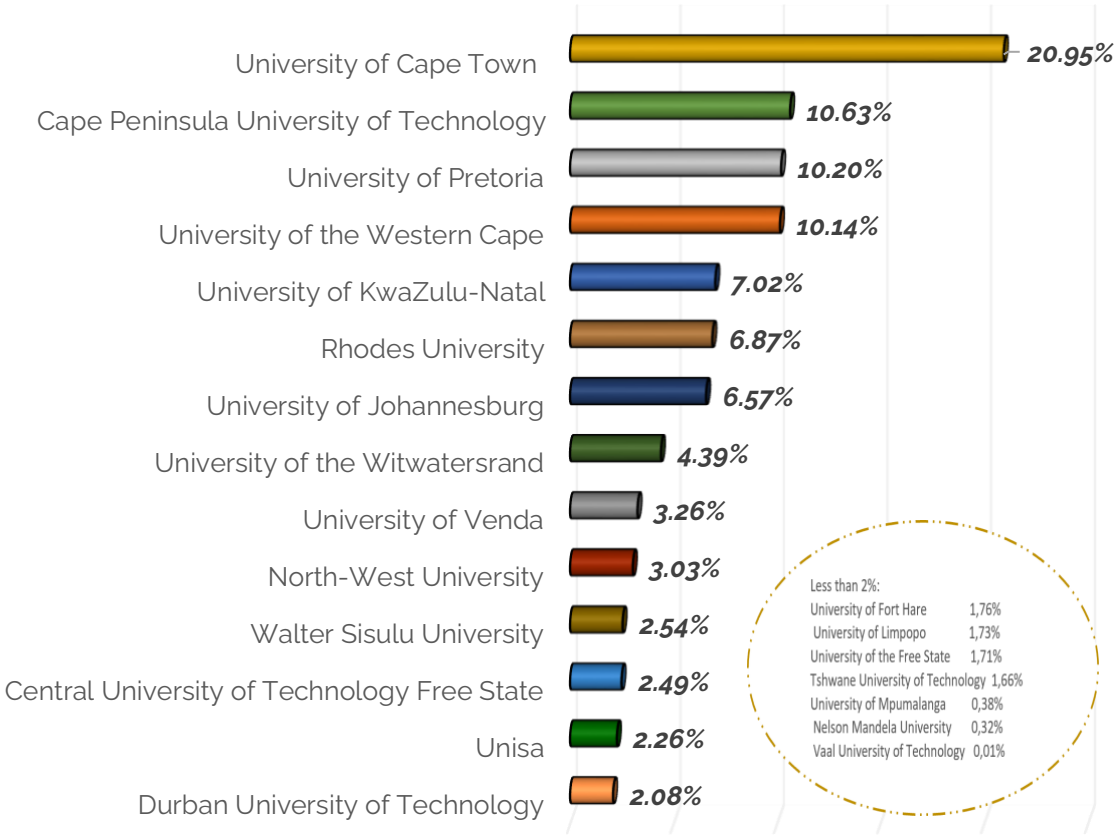


Figure 10: Analysis of the percentage of CAF income for 2022 from South African external academics by university.

CAF Structure 2023

Figure 11: CAF structure for 2023 showing management units and nodes.

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