



ENTREPRENEUR

LICENSING

FUNDING

PATENT

ASSIGNMENT

SPIN-OFF COMPANY

INVENTION

INNOVATION

AT UCT
2014



15 years on the INFINITE JOURNEY OF INNOVATION

LATE 1998 SAW THE ESTABLISHMENT OF THE OFFICE OF INDUSTRY LIAISON (OIL), THE PURPOSE OF WHICH WAS 'TO PLAY A MAJOR FACILITATING ROLE IN THE STRATEGIC GOAL OF UCT TO DOUBLE ITS RESEARCH INCOME FROM EXTERNAL FUNDERS BY THE YEAR 2002 AND TO EXPLOIT THE UNIVERSITY'S INTELLECTUAL PROPERTY TO ENHANCE RESEARCH RELATED INCOME'. IT WAS ANTICIPATED THAT THE OFFICE WOULD, THROUGH ITS COMMERCIAL ACTIVITIES, BE SELF-FUNDED WITHIN 5 YEARS.

"A drug travels a long way before reaching the patient. It can take over a decade from the early stages of research until commercialisation..."

The income from research contracts had indeed more than doubled by 2002 - from less than R100 million in 1999, the income from external sources increased to over R200 million by 2002. Now 15 years down the road the income from external funders is touching the one Billion mark!

The objective of self-sufficiency within 5 years did not materialize. In fact, we are only about to reach the break-even stage now. UCT, as most universities, has realized that it takes a long time to establish a technology transfer programme and the technology transfer office is not a get rich quick office.

The first ingredient in establishing a technology transfer programme is a cultural change at an institution, since thinking commercially is not something that comes naturally to academia. Resources (time, expertise, knowledge and money) are another important factor. Most importantly though are the availability of viable technologies.

The journey from early stage business idea to commercial viability is difficult and commercial realities have proven that no innovation, no matter how profound its potential, is guaranteed success. Taking a new technology to market requires a rare blend of the right science, the right people and the right market. Even then, it does not happen overnight - a drug travels a long way before reaching the patient. It can take over a decade from the early stages of research until commercialization and on average only one out of 10,000 research projects become a marketed drug.

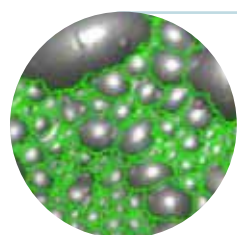
Since 2002 we have received 283 invention disclosures, filed 464 patent applications in numerous territories globally, have had 199 patents granted, entered into 101 license and/or assignment arrangement and have created 13 spin-off companies. We may not have had a blockbuster yet, but many of our inventions have already have contributed to the wellbeing of our society.

We will take you on the journey of the Office, now known as Research Contracts & IP Services (RCIPS), over the last 15 years, highlighting the different measures and interventions implemented to address the many hurdles on the road. We will also take you on the journeys of a number of UCT's inventions that are commercialised through spin-out companies and the people behind them. Enjoy the ride!

THE JOURNEY : RCIPS

1998 -1999 "The early days"

Dr Duncan Millar acts as the first director of OIL and Rosemary Wilson is appointed as Intellectual Property (IP) Manager. The Office receives 6 invention disclosures and files its first South African provisional patent for the SmartFroth® IP which was developed by a team spanning the Departments of Electrical and Chemical Engineering. It was the first of 5 SmartFroth® patents that followed.



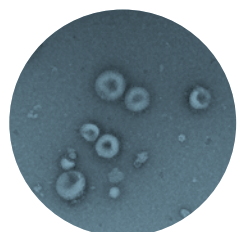
SmartFroth® stands out in the UCT IP portfolio, as having made the most extensive use of the different intellectual property protection tools available, with five patented intellectual property rights, a registered design and even a registered trademark! There are no fewer than 15 inventors associated with the patents. The patents stemmed from research that started in 1998 into the application of machine vision as a process control tool to optimise the performance of minerals flotation for the beneficiation of valuable metals from mining.

2000

Dr Duncan Miller resigns as Director in order to return to full-time research and Dr Tony Heher is appointed as his replacement. Dr Heher became instrumental in the formation of the South African Research and Innovation Managers Association (SARIMA) in 2002 and served as the first president of the association.

2001

The name of the office is changed to UCT Innovation as it was felt the term Industry Liaison had become synonymous with a communication-like function unrelated to the commercialisation activities and for the less "industrial" faculties, the name OIL is a cause of dissonance. First income from an assignment of a patent.



We also see the entrance of Prof Edward Rybicki and his group into the patenting arena through the first two filings on the production of Human Papillomavirus (HPV) vaccines in transgenic plants. Prof Rybicki has become one of UCT's most prolific inventors, with 16 Inventions and 62 granted patents behind his name.

Prof Cheryl De la Rey is appointed as Deputy Vice Chancellor Research.



Rybicki and his team were among the first – one of three groups publishing simultaneously in 2003 – to demonstrate the feasibility of making a Human Papillomavirus (HPV) vaccine in transgenic plants. They were the first to demonstrate both that a plant-derived HPV vaccine was protective in an animal model and that transient expression in plants was a very good system for the production of HPV vaccines.

2002

A company, Innovation@UCT, trading as UCT Innovation (Pty) Ltd is formed, with the mandate of a) exploiting the innovations emanating from UCT b) housing joint venture projects with strategic equity partners and c) housing UCT spin-off companies.

The first of a series of HIV vaccine patents emanating from the laboratories of Profs Anna-Lise and Caroline Williamson is filed.



The Williamson team and researchers from the IDM became the first from Africa, and one of only a few from the developing nations, to have successfully created an HIV vaccine that has gone forward to human clinical trials.



2003

For the first time a dedicated fund to cover patent expenditure is created. The University Research Committee approves an amount of R725,000 per annum.

The first of the Printed Silicon Electronics patent portfolio is filed.

Our first two spin-off companies are formed - Isiqu Orthopedics (Pty) Ltd and Cell-Life. Isiqu was a company that designed and manufactured bone and joint implants and Cell-Life is an e-Health/mobile technology development company that was established as a not-for-profit Section 21 company due to its work in the HIV/Aids arena.

2004



A question by a high school student led to the establishment of Cell-Life. The question posed to Prof Ulrike Rivett was: "What are engineers doing to address HIV and AIDS-related issues?". Bringing together technology experts in IT, health and engineering a Medical Management System was developed by merging cell phone technology with Internet and database systems, creating a "virtual" infrastructure to support HIV positive patients with the management of their antiretroviral treatment.

2005

The Department of Science & Technology through the Innovation Fund establishes a fund to co-contribute to the patent expenditure of HEIs.

Two new companies based on UCT technology are formed namely: Hot Platinum (Pty) Ltd and Cape Carotene (Pty) Ltd.

2006

Dr Tony Heher stands down as Director and Piet Barnard is appointed as the new Director.



Hot Platinum's first product was a compact induction spin centrifugal casting system for platinum jewelry production. Called the ICON3CS, the system was at that time one of the most versatile, compact and integrated solutions available internationally. Its patented technology allowed for significantly more detailed castings to be produced than in competing systems. The company has expanded its range of products now to high-power systems for mining and commercial heating applications, and specialised high temperature systems capable of reaching 2500°C in 60 seconds.



Cape Carotene was the first company in South Africa to pilot algal technologies to produce astaxanthin, a powerful antioxidant and dietary supplement used in aquaculture and as a nutraceutical for human consumption. The company, based in Uppington, was established through support from the Cape Biotech Trust. Unfortunately, the company was closed down.

2007

The technology transfer and commercialisation strategy is revisited. The core of the strategy is altered to a pro-active approach versus the previous strategy which could be described as a 'passive/re-active approach', with efforts confined to advocacy and information provision.

Nurture Restore Innovate, a not for profit company is formed.

Dr Andrew Bailey is appointed as IP Manager.

Prof. Danie Visser is appointed as DVC Research.

THE JOURNEY : RCIPS CONTINUED



Following diamond mining on South African West Coast the Namaqualand Restoration Initiative of Nurture, Restore, Innovate (NRI) focuses on the restoration of the succulent Karoo Biome, the world's only arid biodiversity hot spot. Since its establishment, by Dr Peter Carrick from the Plant Conservation Unit, more than 500 hectares have been restored, new skills been provided to 120 people and 30 permanent jobs created.

2008

Through support of the URC, a "PreSeed" fund is established. The purpose of this fund is to bridge the funding gap that exists in the innovation chain, before other commercialisation funding streams can be accessed or a rounded technology package can be licensed.

The Company Innovation@UCT is shelved

The IP Scout initiative is launched and piloted in the Departments of Electrical Engineering and Chemistry.



IP identification "scouts" or technology diffusion coordinators, are people within a department with sufficient scientific knowledge in the area of their assignment, so as to be able to gain the support and trust of the researchers and to assist with the identification of inventions, which researchers may overlook or consider to be insignificant.

An Inventor's Guide is introduced.



The Inventor's Guide provides detail around issues relating to the preparation and filing of a provisional patent application, as well as the stages of the patent application process through PCT to national phase and the decisions and participation that will be required. UCT's approach to commercialisation and the different modes in which this can occur are discussed.

Invention disclosures break the 30 mark and 27 provisional patents are filed.

Enter into more inter-institutional agreements (joint IP ownership), option agreements, assignment agreements and license agreements than all the previous years combined.

The Innovation Fund holds a 'Most Innovative Higher Education Institution competition. UCT receives a certificate of recognition for coming second overall, and wins the 'Best Case Study' category as well as the category for the 'Best Improvement in Technology Transfer Capacity'.

Two important pieces of legislation are approved by Parliament, i.e. the Technology Innovation Agency (TIA) Act and the Intellectual Property Rights from Publicly Funded Research and Development Act (IPR Act). The objective of the TIA Act is to address the fragmentation of the national funding instruments, one of the major causes of the innovation chasm. The objective of the IPR Act is, *inter alia*, to provide for effective utilisation of intellectual property from publicly funded research and development.



2009

The spin-off African Medical Imaging (Pty) Ltd is re-launched under the leadership of Prof Kit Vaughan and changes its name to CapeRay Medical (Pty) Ltd. It is the first spin-off company in which UCT holds equity.



CapeRay Medical (Pty) Ltd. CapeRay Medical (Pty) Ltd focuses on the development of an advanced mammography scanner that combines both ultrasound and low-dose x-ray technology to improve cancer detection.

2010

The Industrial Development Corporation invests in CapeRay in lieu of equity – another first for a UCT spin-off.

Southern Access Technologies Pty Ltd (SAT) is formed – the second company in which UCT holds equity.

First substantial licensing agreement with an international pharmaceutical company is entered into and licencing income for the year is R3,5 million.

Two new publications, along with the "Inventors Coffee Mug" are launched at an Innovation Evening where historical inventors were recognised. These included: A UCT Laboratory Notebook, and Innovation at UCT 2010 – the first written review and showcase of UCT's IP and Innovation achievements.

IP Rights from Publicly Funded Research and Development Act (IPR Act) is finally promulgated on 2 August 2010, an interim National Intellectual Property Office (NIPMO) was created and the Technology Innovation Agency (TIA) was officially launched.

A working group is established, with representation from each faculty, to review the UCT IP Policy.



Many of the changes in the IP Policy were necessary because of the IPR Act which influences the way in which UCT manages its IP. It was, however, also an opportunity to clarify some "grey" areas and also to bring it up to date in terms of new IP developments such as Open Source and Creative Commons.

A Working Group chaired by Prof Francis Petersen is established to investigate the "State of Innovation" at UCT as the basis for developing an "innovation strategy" for UCT.

Straight Access Technologies (Pty) Ltd. SAT was established to develop, manufacture and market cardiac-related medical devices that addresses the need of up to 75 million Rheumatic Heart Disease patients worldwide. Southern Access Technologies becomes Strait Access Technologies.

Three new spin-off companies are established namely: PST Sensors Pty Ltd, Antrum Biotech (Pty) Ltd and Seraptix CC.

New UCT IP Policy is approved by Senate and Council.

UCT Evergreen Fund is officially launched.

2011



THE JOURNEY : RCIPS CONTINUED



Antrum Biotech (Pty) Ltd. *Antrum Biotech (Pty) Ltd focuses on the commercialisation of an extrapulmonary TB diagnostic test based on IP that was created by Prof Keertan Dheda (Lung Infection and Immunity Unit). The TB Test Strip provides rapid testing for pleural TB or in other compartments; this test differs from normal lung TB/sputum diagnosis for which other diagnostics are available, or are under development. With the test being conducted at the patient bedside, the Doctor can immediately prescribe appropriate medication instead of waiting long periods for cultures in a pathology lab.*

Seraptix CC. *The medical device spin-out involving Prof Jonathan Blackburn (IDM), Seraptix CC, has entered into a License Agreement for the commercialisation of a biosensor. Seraptix is also involved in a UCT-led Grand Challenges Canada project that will pursue the development of the diagnostic.*

2012

As in 2011, thirty-six new disclosures are received, but the wonderful part is that this represents fourteen brand new UCT inventors. Similarly, nineteen new patent holders form part of the twenty six patents granted.

An IP Advisory Committee (IPAC), comprising the Registrar, DVC (Research) and Executive Director Finance, is established and the Director RCIPS and the IP Manager, various IP issues, allocation of royalty income and assess the participation of UCT in spin-off companies.

The "IP Savvy" on-line learning is introduced, which allows our researchers to improve their intellectual property knowledge through on-line modular presentations, and on successful completion of a quiz, researchers are awarded a certificate certifying them as "IP Savvy".

The Spin-off Tuluntulu (Pty) Ltd is formed to commercialise IP developed by a TIA-funded consortium led by the CSIR to which UCT contributed IP. Adaptive Real-Time Internet Streaming Technology (ARTIST) uses algorithms to adjust quality to available bandwidth to ensure viewing continuity.

UCT takes equity in the printed silicon electronics spin-off, PST Sensors (Pty) Ltd, in the process assigning 13 patent families (with 19 granted patents in that portfolio in 2012) to the company.

Southern Access Technologies, now re-named Strait Access Technologies Holdings (Pty) Ltd & Strait Access Technologies (Pty) Ltd, receives extensive support and investment from the Technology Innovation Agency (TIA) and Bidvest Ltd.

Cape Ray Medical (Pty) Ltd receives a second round of funding from IDC.

UCT's innovations feature strongly at the 2012 National Science & Technology Forum (NSTF) BHP Billiton awards, winning two of the three awards in the innovation category and filling six of nine finalist positions in this category. Our spin-off, Cape Ray Medical (Pty) Ltd wins the category for an outstanding contribution to SETI (Science, Engineering, Technology and Innovation) through research leading to innovation in a Small, Medium or Micro – Enterprise for their PantoScanner, which enhances clinicians' ability to diagnose breast cancer. Dr Peter Carrick, through NRI (Nurture Restore Innovate) wins the category for outstanding contribution to SETI through research leading to innovation in an NGO or CBO or NPO organisation.



2012



RCIPS receives funding from NIPMO to the amount of R 1,473,378. This is used to employ additional staff and using external experts to review "innovation hotspots" within UCT and develop appropriate strategies.

UCT's most successful Social Responsiveness Project, The Red Cross Children's Hospital Poison Information Centre, launches its re-developed 30-year old poison's information system on an internet-enabled platform with mobile device accessibility. The database, already in use at over thirty centres throughout South Africa as well as Botswana, Zimbabwe, Mozambique, Kenya and Nigeria, will through this new platform, "AfriTox™", become accessible to the broader medical practitioner community.

Tuluntulu (Pty) Ltd. *Adaptive Real-Time Internet Streaming Technology (ARTIST) uses algorithms to adjust quality to available bandwidth to ensure viewing continuity. Potential applications are diverse - from entertainment (sports events, community 'TV') to education (schooling, adult education, farming, health and rural community healthcare worker training). It fills a very specific niche though: one-to-many (users/viewers) live, internet-based, broadcasting that is available on mobile devices.*



PST Sensors (Pty) Ltd. *One of the most significant portfolios of IP developed at UCT. The IP developed by Profs Margit Harting and David Britton (Physics) spans an entire value chain, with novelty and inventiveness at every stage - basically standalone companies could be built around each stage in the future. It is all focused on the production of printed silicon electronics, which will become a disruptive new technology to enter the global electronics industry.*

The IDC invests in Antrum Biotech Pty Ltd and the licensing arrangement between UCT and Antrum is converted into an equity arrangement.

Elemental Technologies IP Holdings (Pty) Ltd is established to commercialise the Elemental software that has been developed by Assoc. Prof Arnaud Malan from the Department of Mechanical Engineering.

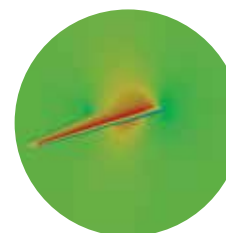
UCT inventors are part of a team that won an innovation award at the NSTF-BHP Billiton Awards 2013. The ARTIST (Adaptive Real-Time Internet Streaming Technology) team (a collaborative effort between CSIR, UCT and East Coast Access) won the category for "an Individual or a Team for an Outstanding Contribution to SETI through Research leading to Innovation: in a Corporate organization or Institution".

A second round of funding is awarded to RCIPS by NIPMO for a three-year project to support specific posts and continue activities started in the first project. The R 8,320,000 will greatly assist RCIPS in increasing the level of support provided to the UCT community.

The Café Scientifique concept is introduced to Cape Town.

In conjunction with Research Finance, RCIPS presents an "Induction" course to new academics and support staff, as well as those interested in a refresher. Three courses are presented and cover research contracts, intellectual property and the management of funds.

2013



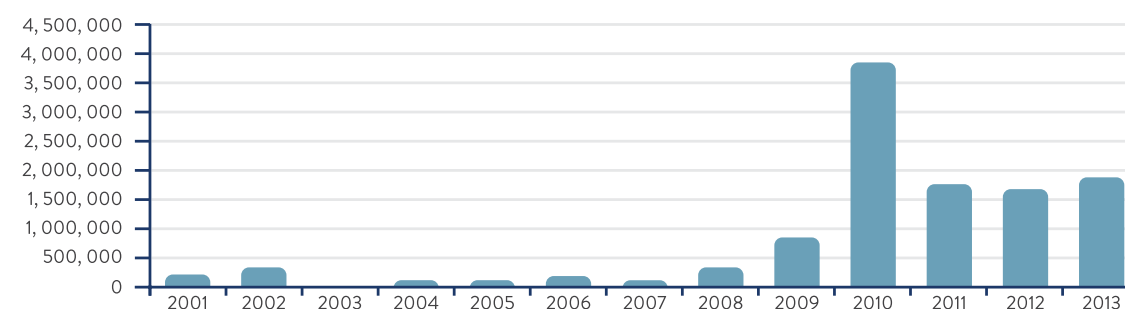
Elemental (Pty) Ltd *Elemental software is a giant leap for technology. It uses novel mathematical models and equations in the field of computational fluid dynamics (CFD) - enabling scientists to study the dynamics of fluid flow, offering accurate predictions and unprecedented insights. It is a sophisticated analysis technique offering multiple predictions with diverse applications from aircraft design to heart valves.*



2013 DASHBOARD

Research Contracts Signed 1719 { 2012: 1218 }	Research Contract Value R 978 m { 2012: R 682 m }	Total Research Income R 957m { 2012: R 887.78 m }
Value Foreign Research Contracts Signed R 644 m { 2012: R 431 m }	Value Local Research Contracts Signed R 334 m { 2012: R 251 m }	Publications 1390.89 { 2011: 1314.40 *2012 }
Invention Disclosures 38 { 2012: 36 }	Patent Applications Filed 25 { 2012: 56 }	Patents Granted 31 { 2012: 26 }
License Agreements (Outbound) 29 { 2012: 9 }	Materials Transfer Agreements (Outbound) 7 { 2012: 9 }	Spin-Off Companies 1 { 2012: 1 }
License Income R 1.758 m { 2012: R 0.989 m }	Profit UCT Incubated Companies R 0.127m { 2012: R 0.363 m }	Total Income from IP R 1.885m { 2012: R 1.742 m }

IP COMMERCIALISATION REVENUES



YEAR	Licensing (R)	Sale of IP (R)	Profit UCT Companies ¹ (R)	Total (R)
2001	0	87,143	0	87,143
2002	0	107,952	0	107,952
2003	0	0	0	0
2004	13,905	0	0	13,905
2005	1,728	0	0	1,728
2006	70,058	0	0	70,058
2007	49,815	0	0	49,815
2008	170,346	150,000	0	320,346
2009	77,310	59,184	693,630	830,124
2010	3,531,989	0	351,021	3,883,010
2011	558,545	0	1,165,597	1,724,142
2012 ²	997,829	382,003	362,513	1,742,345
2013	1,757,948	0	127,378	1,885,326
TOTAL	7,229,474	786,282	2,700,139	10,715,895

¹This company is ring-fenced within UCT and the amount is unaudited.

²Due to unpaid foreign invoices, the exact Rand amount was uncertain at the time of writing the 2013 report and figures have now been corrected for this report.







ANNUAL UCT PATENT PORTFOLIO STATISTICS

	2007	2008	2009	2010	2011	2012*	2013
Disclosures	9	31	25	31	36	36	38
Total Patent Applications Filed - all stages	50	64	46	57	68	56	25
National Phase Patents Granted (incl. European validation)	3	10	47	36	29	26	31
Application Details							
Provisional	5	27	9	15	14	13	14
PCT	3	3	20	8	9	8	8
National (including Divisionals, excluding Regional)	36	28	10	29	38	31	3
Regional	6	6	6	5	7	4	0

* A large portfolio was transferred to spin-off company PST Sensors in February 2012.

UCT granted PATENTS

-  Animal & Human Health
-  Electronics
-  Chemicals & Chemical Processing
-  Agriculture
-  Medical Devices
-  Mining & Metals

PATENT	Australia	Austria	Belgium	Britain	Bulgaria	Canada	China	Cyprus	Czech Rep.	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	India	Ireland	Israel
	6	1	2	7	1	2	4	1	1	4	1	1	7	8	1	1	1	4	1
		2	2	2			2	2				2	2	2					
																			
																			
				1															
	2						2							1					
TOTAL	8	3	4	10	1	2	8	1	3	4	1	3	9	11	1	1	1	4	1

Italy	Japan	Luxembourg	Madagascar	Monaco	Namibia	Netherlands	Nigeria	Norway	Poland	Portugal	Romania	Slovakia	Slovenia	South Africa	Spain	Sweden	Liechtenstein	Turkey	United States	Kazakhstan	Russia
4	1	2	1	2	3	4	1		1	1	1	1	2	25	4	2	4	1	17		
2	4					2		1		2				8	2	2	2	2	5		
														9					4		
														2							
						1	1							16					3		
1														12					1	1	1
7	5	2	1	2	3	7	2	1	1	3	1	1	2	72	6	4	6	3	30	1	1

New Provisional FILINGS



Method for diagnosing sexually transmitted infections and bacterial vaginosis in women.
Masson, L., Passmore, J.S.

Sexually transmitted infections (STIs) and bacterial vaginosis (BV) cause inflammation in the female genital tract. Currently, in resource-limited settings, BV and STIs are managed according to signs and symptoms as this approach is easily implemented, relatively inexpensive and patients are given immediate treatment.

However, in a recent study, the inventors have shown that STIs and BV are often asymptomatic (i.e. the disease is present without resulting in symptoms). In fact, they found that women who had asymptomatic infections had the same level of inflammation as women with symptomatic infections and may therefore be at increased risk of HIV infections and reproductive complications. As a result, many women may not be aware that they have an infection and hence do not seek healthcare or treatment.

The inventors have identified two molecules [interleukin (IL)-1 β and interferon- γ induced protein (IP)-10, both cytokines] that, when measured in samples collected from the inside of the vagina, are accurate predictors of the presence of an STI or BV. Additionally, IL-1 α , TNF- α , TNF- β , MDC, IL-7, IFN- γ and GRO were found to have predictive potential and any combinations of these cytokines may serve as useful biomarkers to identify women with STIs and/or BV.

The present invention describes a method and point-of-care test for accurately diagnosing symptomatic and asymptomatic STIs and BV.



Method for diagnosing tuberculosis in a urine sample.
Blackburn, J.M., Dheda, K.U.J., Young-Gqamana, B.L.

Inaccurate diagnosis of tuberculosis (TB) disease status continues to be a hidden variable in disease transmission, patient mortality, patient morbidity and time to treatment initiation. The lack of suitable biomarkers that can distinguish active-TB disease is a major bottleneck in the development of new and improved diagnostic tools.

This assay relies on several biomarkers, some related to human response and others related to *Mycobacterium tuberculosis* (the causative agent of TB disease), that are present in the urine to distinguish between patients with active TB and latent TB infection (the sleeping form of TB that may emerge when one's immune response is low) as well as patients without either form of the disease.

These biomarkers could inform the basis of new and improved point-of-care diagnostic tests for TB, which may have major ramifications for disease control.

New Provisional FILINGS



Plant Produced Human Papillomavirus Pseudovirion
 Hitzeroth, I.I., Rybicki, E.P.

Pseudovirions are used in neutralisation assays which are the assays that are used to test potential Human Papillomavirus vaccines. Human Papillomavirus (HPV) pseudovirions (PsVs) are able to be produced in plants using this technology. These in turn can be used for pseudo-infection of mammalian cells with a pseudo-genome carrying a mammalian reporter gene. Presently PsVs are only manufactured in mammalian cells, which makes them expensive and time-consuming.

A company could develop an HPV pseudovirus neutralisation kit based on this IP, which could be used to test potential HPV vaccines. Alternatively the method could be used to produce cheap PsVs which could be sold to companies or researchers to test their vaccines - PsV are currently not available commercially.

Another application of plant produced HPV PsVs could be as potential DNA vaccine delivery vehicles. In that application safety is of utmost importance and PsVs that are made in human cancer cells will not be allowed to be used in human therapy.



An Integrated Commensal Radar System
 Inggs, M.R., Mishra, A.K., Wilson-Langman, A.

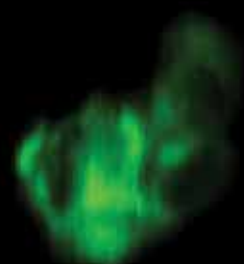
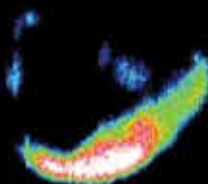
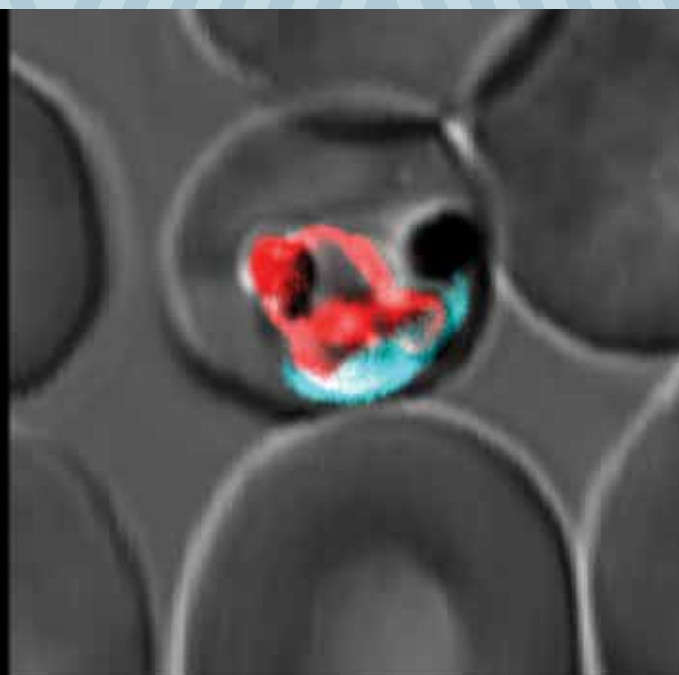
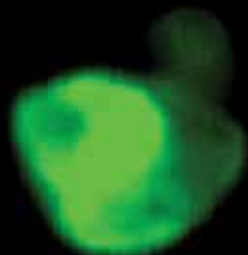
So-called whitespace communications are filling the spectrum between 50 to 850 MHz that used to be occupied by analogue TV broadcasts which have gone digital, to provide internet to users over long ranges. The Commensal Radar System utilises these broadcasts a various “receivers” that assess the reflection of the electromagnetic transmissions off objects enabling moving objects to be detected and tracked - aircraft, cars, ships, animals or humans! With a cost that is considerably lower than conventional radar, there is scope for increasing the areas that are monitored (e.g. borders, game farms) and applications in air space across Africa - where many countries do not monitor their airspace adequately due to cost.

The term “commensal” is borrowed from the natural sciences which describes a relationship between organisms where one organism benefits from a second but does not negatively affect the second and the Radar Remote Sensing Group in the Department of Electrical Engineering use the term to describe a sensor system that utilises the emissions of existing radiating systems to sense, but without affecting in any way the functioning of these systems.



Commensal Radar used to track planes arriving at Cape Town International Airport.

Haem fluorescence in red blood cells infected with Malaria parasites.



New Provisional FILINGS



Fluorescent Sensors for Haem
Egan, T.J., Hunter, R., Woodland, JG

Microbicide
Mall, A.H.S

Haem, also known as ferriprotoporphyrin IX or Fe(III) PPIX, is a prosthetic chemical compound that has been associated with the generation of reactive oxygen species and the oxidative degradation of lipids resulting in cell damage. The compound has been implicated in pathologies such as arteriosclerosis (thickening and hardening of arterial walls in the arteries), carcinogenesis, inflammation and renal (kidney) failure. Haem is also a key molecule in the metabolism of the malaria parasite and is the target of antimalarial agents such as chloroquine which inhibit its biocrystallisation to haemozoin.

This invention relates to a small-molecule fluorescent sensor or probe that is able to detect and localise free haem in a biological environment such as a cell. The inventors have successfully demonstrated that the sensor can be used to localise free haem within chloroquine-treated malaria parasites. The value of the invention lies in that it permits investigation into a variety of cells and tissues to determine the extent to which free haem plays a role in, amongst others, the pathologies described above. There may eventually be commercial interest in this sensor as a possible screening tool.

Mucins present in human saliva have been shown to inhibit HIV-1 subtypes C and D and further research indicated that MUC5B was the most important. Further research found that purified cervical mucin (which contain MUC5B, amongst other mucins) also inhibits HIV-1. As such mucins represent an opportunity for the development of a microbicide, but one would need a source.

Mucins from pig saliva were shown to have a similar effect to those from human saliva, with porcine MUC5B and MUC7 being found to be the most inhibitory. Importantly, the porcine gastric mucins have also shown anti-HIV activity, further confirming the significant similarities between pig and human mucins.

The efficacy of porcine gastric mucins represents a potentially viable supply of MUC5B and MUC7 that could be used as the basis for a cervical microbicide. A mucin-based microbicide may have far reaching potential in the inhibition of other pathogens that rely on sexual modes of transmission as well as anti-fungal and anti-bacterial activity. Such a product could potentially protect against viruses other than HIV.

Inventor John Woodland, a PhD student (Chemistry), excelled in South Africa's first Science Slam competition in Johannesburg. Science Slams - inspired by Poetry Slams in which poets compete against each other by reciting their poetry - were developed in Germany in 2006 and have since gained popularity around the world. Contestants have just 10 minutes to take science out of the lab and promote its everyday applications. Woodland was chosen to present his research (this time in only three minutes) at the Falling Walls Lab in Berlin. There he won third place in the Young innovator of the year competition.



New Provisional FILINGS



A clamp Assembly for a Fuel Cell and a Method of Assembling a Fuel Stack
Tanaka, S.

Fuel cells convert chemical energy from fuels such as hydrogen into electricity through a chemical reaction with an oxidizing agent. The cells are generally comprised of three adjacent parts, an anode, an electrolyte and a cathode and two chemical reactions occur at the interfaces of these parts. Generally, as a result of the chemical reactions, fuel is consumed and water and an electric current are created.

A number of fuel cells are stacked together to increase power output. However, in order to achieve optimal power output, fuel cell stacks are heavily compressed to reduce contact resistance between cell components, thereby reducing the amount of electricity dissipated as heat. In order

to fasten a fuel cell stack generally two end plates are used to maintain an optimal contact pressure between the interfaces of the fuel stack assembly. Proper contact pressure is required to both increase energy efficiency by reducing ohmic loss and prevent leakage of fluid. With regard to increasing energy efficiency, it is important to increase the surface area of the fuel cell as much as possible.

A fuel cell clamp structure has been invented that improves over traditional methods to fasten and fix the components by ensuring that uniform clamping pressure is applied, the clamp itself is compact and its design enables it to be assembled more rapidly, and that the unit. The current invention allows for a secure, tight stacking of the cells together.



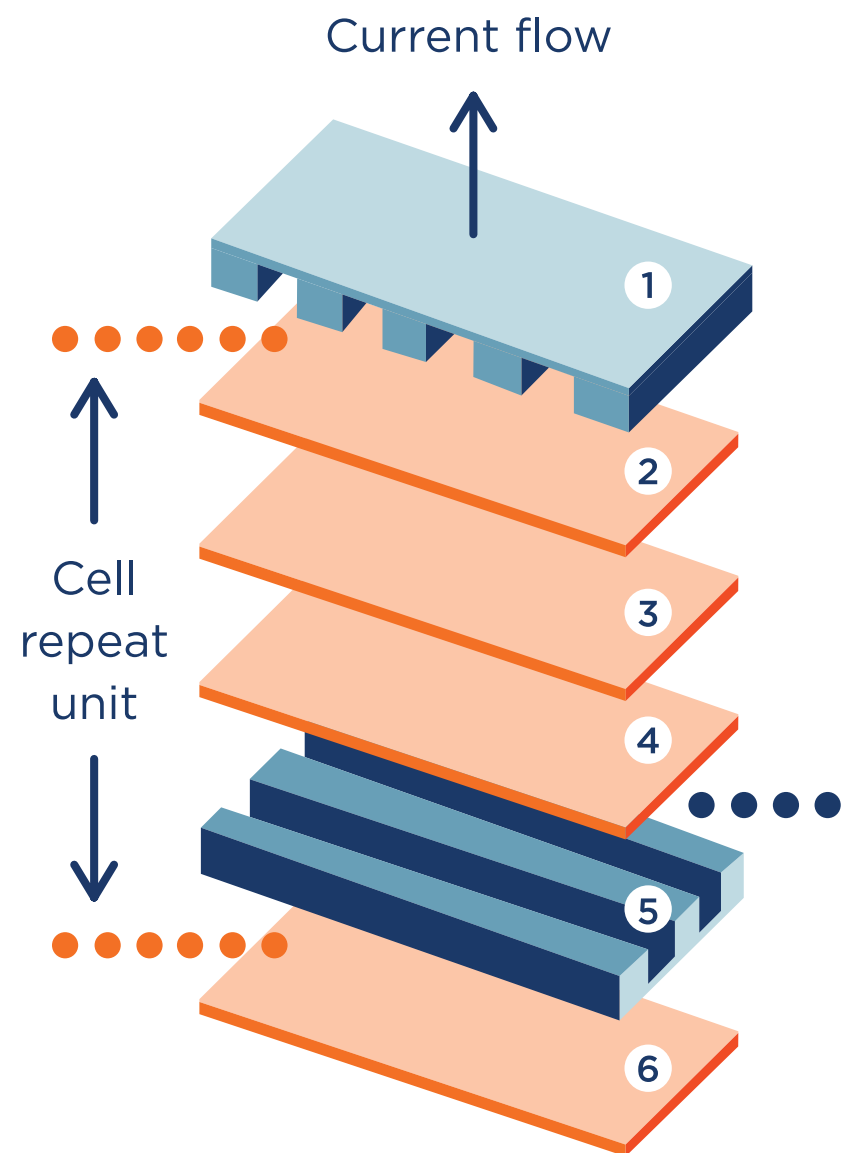
Knee meniscus prosthesis
Tiamiyu, A.O.J, Vaughan, C.L.

A natural knee meniscus is generally a C-shaped pad that serves to minimise friction and transfer load in the knee joint between the lower leg or tibia and the thigh or femur. There are two specific menisci of the knee, namely the lateral and the medial menisci. The medial meniscus and the lateral meniscus each consist of connective tissue with collagen fibres containing cartilage-like cells.

Meniscal injuries have been shown to be the most widespread of all injuries to the human musculoskeletal system and consequently meniscal surgeries are very common. Meniscal replacements

or prostheses that are presently in use are either made from natural tissues or from synthetic polymer materials. However, most of the meniscal prostheses have apparently failed to achieve acceptable results.

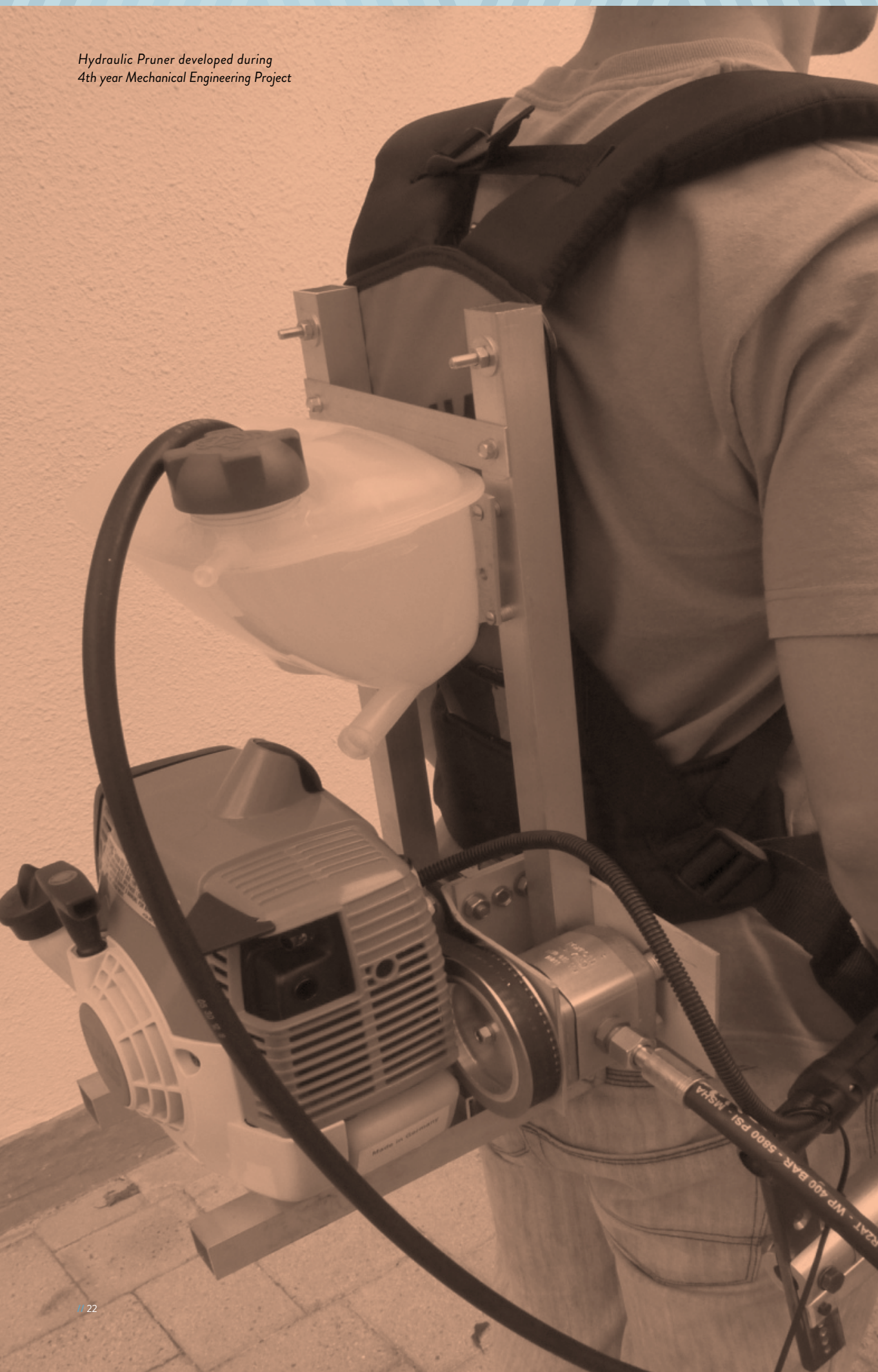
This invention relates to a knee meniscus prosthesis that can be used to replace the natural knee meniscus. It is made of a moulded fibre reinforced polymer composite in which the reinforcing fibres are arranged either circumferentially or radially and then enveloped in a surrounding polymer material.



- | | |
|-----------------|-----------------|
| 1. Interconnect | 4. Cathode |
| 2. Anode | 5. Interconnect |
| 3. Electrolyte | 6. Anode |
- Fuel
 - Air

Hydrogen Fuel Cell exploded view

Hydraulic Pruner developed during
4th year Mechanical Engineering Project



New Provisional FILINGS



Hydraulic Pruning Shears
Hill, J., Hoffmann, J., Shelley, M.S.A.J.

The Hydraulic Pruner, which is used to prune trees and shrubs was invented by a team of fourth-year Mechanical Engineering students and their advisors. Tree pruning is carried out regularly to promote healthier and desired growth of plants in gardening, arboriculture, farming, etc. Pruners available in the market include secateurs and loppers, but these pruners have limited capabilities because productive operation depends on human effort. Chainsaws and competitor hydraulic powered pruners are available but these tend to be heavy and the way in which their heads are designed damage the nearby branches when pruning the plants.

This pruner comprises a hydraulic pump and reservoir, a drive motor and hydraulically operated shears at the end of a pole. It is better than existing pruners because it is more portable and has a head that is designed to effectively sever fairly thick branches without damaging neighbouring branches. Overall, this enhances productivity.



MRI Head Stabilising Cushion
Howells, M.F

This cushion can be used to securely position the patient's head within the coil during MRI scan. The cushion provides a comfortable and stable support for the patient's head, preventing possible involuntary or voluntary movements which result in scan artefacts and the need for repeated scanning to obtain a good quality image.

The cushion currently comprises two layers of varying compression, which are glued together. The backing layer is thin and resistant to compression, whilst the inner layer is thick and compressible memory foam and cushions are designed for either adults or children. "Wedges" fit between the MRI coil and the cushion to hold the patients head firmly in place.

The challenge is finding materials that have the necessary physical properties, but that are not impacted by the MRI which can cause heating or in turn do not cause artefacts on the scan image. This is the focus of current prototype development.



Anatomical Support Facilitating Medical Imaging of the Hip, Leg and Knee
Patnaik, S., Sivasasu, S.

This medical device, the "Laxmeter", facilitates patient support when examining the hip, leg or knee (laxity or total knee arthroplasty) for injury or disease, using X-ray. Stress radiographs form part of the traditional diagnostic methods for knee diseases or injury, but generally stress is created by assistants, resulting in them undesirably being exposed to X-rays each time a patient is imaged. The Laxmeter comprises three different panels that are made of Perspex, which does not impact on the X-ray image. Thigh

and the pelvis restraints promote stability, facilitate more accurate application of stress to the joints, improving the diagnosis. The panels can be positioned at various angles between 0 and 90° to create the different stress positions in a consistent manner and the pelvis restraint prevents compensation by the patient that is found when the patient is manipulated manually. Importantly, the images can be collected in the absence of the assistant.

New Provisional FILINGS



Imaging an Internal Volume of a Subject Body
Montsi, T.S.

This invention relates to a method for imaging the interior of a body (e.g. the brain) using multiple electrodes applied to the external surface of the body. Electrical Impedance Tomography (EIT) is one method used for brain imaging. During the EIT procedure the internal tissue impedances of the brain are determined by spatially mapping the electrical resistance of body tissues associated with the brain and measuring the voltage across, and current in, various electrodes.

In order to increase the image resolution when compared to conventional systems, the inventors have designed a multielectrode system that relies on a switching mechanism whereby each electrode can be switched between applying a current source and measuring a voltage.



Optimal Currents for Power Injection or Extraction in a Power Network
Gaunt, C.T., Malengret, M.

New innovations in power electronics have provided new ways to optimise power systems by reducing power losses and there are also now opportunities for private customers to generate power from wind or solar energy and to inject power into the grid.

The most efficient way of transmitting power in a two wire single generator system is when the current is in phase with the generator voltage. In the case of multiple wires and generators, the way of transmitting currents with minimum losses becomes more complex to resolve, but is achieved by determining an equivalent Thévenin circuit that is representative of the whole network. An optimised method of injecting electric power into a single phase or multi-wire power network has been developed so that the power reaches its destination where it is consumed with minimal losses. It can also be applied for the extraction of power from the power network. Practically the algorithm is implemented through software installed on inverters and the efficiencies, increased capacity and importantly network stabilisation that result, will be of interest to utility providers who control power networks.

The National IP Management Office (NIPMO) provides UCT with a rebate of up to 50% of the costs incurred to support patenting activities of the university – greatly extending the university's capacity to protect IP emanating from UCT's research.



Funding INNOVATION

ONE OF THE ESSENTIAL REQUIREMENTS FOR SUCCESSFUL INNOVATION IS FUNDING THAT SPANS THE ENTIRE SPECTRUM FROM INVENTION TO IMPLEMENTATION.

A range of sources of funding and the spaces they support are shown in the figure. Up until recently, at face value funding appeared to be available across the spectrum, but actually there was a gap that lay in the quantum of funding that could be accessed – comparatively small amounts from tens of thousands up to a few hundred thousand Rand.

RESEARCH	DEVELOPMENT	START-UP	BUSINESS GROWTH
NRF			Private Equity
	UCT PreSeed Fund		IDC
	UCT Evergreen Fund		
	UCT TIA Seed Fund		
	TIA: Technology Development Fund		
		TIA: Industry Matching Fund	
		IDC Venture Capital	
			Venture Capital
		SPII	
	THRIP		Banks
	High Net Worth Individuals/ Consortia - "Angel Investors"		Stock Exch.

"It is encouraging to see the start of donations being made by Alumni to the fund, which has a current balance of R2,6m."

PreSeed and Seed funding is essential to mature research outputs within the university to the point that they can exit our front door, to either be picked up by a commercial partner, or to attract other forms of innovation funding.

The introduction of the PreSeed Fund, awarded to RCIPS by the University Research Committee (URC), in 2008 has been a successful initiative. But with a cap of R100,000 - a gap remained where larger amounts were needed for later-stage and larger-scale projects.

Through the UCT Evergreen Fund we wish to raise at least R10m to create a self-sustaining fund that will be able to fund innovation projects requiring R0.5m to R1.5m to transform them into more fundable prospects. It is encouraging to see the start of donations being made by Alumni, which has a current balance of R2,6m.

The introduction of new UCT TIA Seed Fund in 2014 will provide funding of up to R 500,000 per project, which made it likely that the Evergreen Fund will be reserved for larger investments.



UCT PreSeed Fund

UCT's PreSeed Fund (R 500,000 per annum awarded by the URC) supports projects in the early innovation space so that on completion, IP can either be licensed and commercialised or projects are better positioned to attract next-stage, external innovation funding.

During 2013, twelve PreSeed Fund "Explorer" projects were awarded with budgets of up to R20,000, which is much higher than the usual level of five projects per annum. Projects were directed at prototyping of medical devices, advertising of new mobile apps and a number towards techno-economic modelling (TEM) and evaluation of IP. The TEM studies proved invaluable in realising that certain projects were not viable, terminating larger "Concept" fund projects and causing IP to be abandoned to prevent further patenting costs being incurred.

Only three projects were funded from the larger "Concept" fund with budgets of up to R100,000.

A 'loan' initiative was also introduced. Examples of these include providing a larger inventory of platinum to increase progress on a hard platinum alloy project and supporting to pilot-scale production of Spirulina at a facility in Franschoek. The latter enabled commercial-scale production to be demonstrated and the spirulina produced during the trial was sold by the commercial partner.

Funding Larger Innovation Initiatives

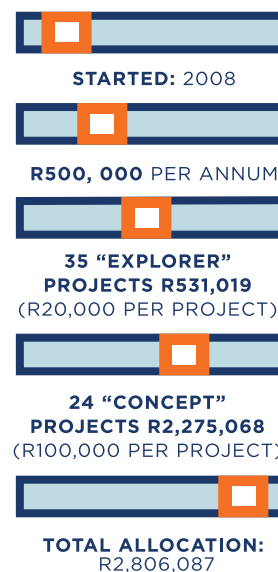
A new-comer to the innovation space is funding offered by the Strategic Health Innovation Partnerships (SHIP) at the Medical Research Council (MRC). SHIP is a partnership between the MRC and the Department of Science and Technology (DST). The MRC is expecting to spend about R250m through SHIP on innovation, technology and product development in the medical field over the next three years. The first allocation of around R100 million for the period 2013 -2015, is being made available to fund a number of drug and medical device product related programmes.

There has been increased application to the Technology Innovation Agency for innovation funding – especially in the animal health and biotechnology sectors where significant amounts are required to conduct trials at reasonable scale. A number of applications were made in conjunction with commercial partners. These projects normally start with more emphasis in the university domain, but later-stage milestones move onto the shoulders of the industry partners, drawing on their expertise as the product enters commercial production and the market. Commercial Partners bring the regulatory and market knowledge and keep an eye on the economics.

Funding UCT Spin-off Companies

CEO's of start-up companies become highly skilled at leveraging any source of government support. Our section on spin-off innovative journeys highlights the various types of funding that have been accessed by UCT start-up companies. Various dti initiatives such as Support Programme for Industrial Innovation (SPII) and the Technology and Human Resources for Industry Programme (THRIP) have been useful to start-offs.

The IDC Venture Capital Fund has invested in two UCT start-offs – CapeRay Medical (Pty) Ltd and more recently Antrum Biotech (Pty) Ltd. They are not your usual 'venture capital' partner due to the structure of their fund, with the result that they are more accommodating of university start-ups. They are able to invest for a longer-term than characteristic of a VC, so can fund companies where there is still a several-year development timeline before product will actually enter the market.



UCT PreSeed Fund Statistics

NIPMO FUNDED PROJECTS

THE NATIONAL IP MANAGEMENT OFFICE (NIPMO) HAS AWARDED FUNDING TO RCIPS TO SUPPORT ACTIVITIES DIRECTED AT THE IMPLEMENTATION OF THE INTELLECTUAL PROPERTY RIGHTS FROM PUBLICLY FINANCED RESEARCH AND DEVELOPMENT ACT (IPR ACT).



The basic premise of the IPR Act is to protect and importantly to commercialise IP emanating from research at HEIs. The first project, with close on R1.5m in funding, ran during 2013 and primarily provided support for additional staff and the use of external consultants to assist RCIPS and research teams with strategic reviews of innovation and/or IP hotspots as well as the entire UCT pharmaceutical portfolio. This has assisted the amount of support that the team has been able to offer UCT as well as with reporting requirements in terms of the IPR Act and has proven to be extremely beneficial.

Techno-economic modelling lends some sober reality to the wilder enthusiasms of University researchers. It grounds the researchers' enthusiastic predictions of worth on a base of hard economic facts - that allows potential investors and venture capitalists to correctly assess the prospects of a given invention or development. David Walwyn's assessments of the economics of production of recombinant horseradish peroxidase via transient expression in tobacco for our group was just such a reality check: it has allowed us to plan how we could exploit the potential of such production. It is also one of the first technoeconomic assessments for this technology (biofarming) for production of reagents, and definitely the first in the developing world.

Prof Edward Rybicki

Strategic Review of Rybicki Protein Production Technologies

This project focussed on a comprehensive review of Prof Edward Rybicki's group's protein production technologies and the development of a research and innovation strategy for the group – a first in terms of this type of initiative for RCIPS. The research group was selected as it has already achieved a number of significant commercialisation successes through the licensing of the IP that they have created, and it is clear that there is further potential both in the existing IP portfolio, as well as new patent applications. The group has expertise in the development of a number of human and animal vaccines, as well as enzymes, that are all able to be produced by using tobacco plants to manufacture these proteins.

Dr David Walwyn of Reseva was the primary external consultant appointed to assist with the project which aimed to: review the existing IP portfolio; understand the competencies of the group; identify market opportunities; and to develop new IP targets that could be pursued to meet the market needs. This effectively creates a 'pipeline' through the alignment of research, development and innovation activities.

The project started with an assessment and prioritisation of current projects and the identification of the strengths of the research group. In the second phase, detailed investigations were conducted by consultants on the priority areas and involved techno-economic evaluations, market research as well as IP landscape and freedom to operate analyses.



Techno-economic modelling (TEM) enabled the research group in Molecular and Cell Biology to identify products with commercial potential to focus their research efforts on. TEM also highlighted the key aspects of the process that could yield the greatest economic benefit if improved, again directing research activity to achieve innovation success. The research group appreciated the new perspective that this analysis of their work gave them.

The project had a number of useful outcomes:

- Market research identified exciting new product opportunities
- Interest of a number of commercial collaborators both locally and internationally
- A possible spin-off company to commercialise reagents using the plant-based protein expression system.
- IP landscaping supported three new patent applications in the Blue Tongue Virus (BTV) vaccine space and strengthened an application for innovation funding made to the Technology Innovation Agency in conjunction with the CSIR.



Dr David Walwyn (Reseva). Dr. Walwyn assisted several groups of researches with techno-economic analysis of their projects.

Chitosan - Based Technologies

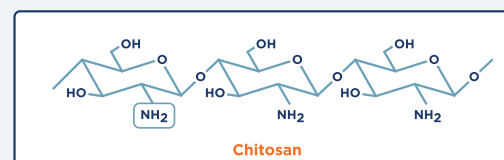
Dr Anwar Jardine and team have modified chitosan by converting the 6-hydroxy group in the polymer to a 6-amino-group, turning a sparingly soluble polymer into one that is now completely soluble in aqueous media – the basis of the primary patent granted in the USA. Solubility in aqueous solutions has broadened the scope of application, particularly in “green” technologies that seek to replace or minimise the use of organic solvents.

The team has recently immobilised platinum group metal catalysts on this novel backbone enabling efficient heterogeneously catalysed synthesis of fine chemicals in green solvent systems; the subject of a further patent.

Another successful application has seen the use of this modified chitosan as a solid support for the chromatographic

separation of fish oil. The fish oil is a by-product of the pelagic fishing and has a low commercial value due to competing vegetable oils.

This silver-based “argentation chromatography” allows saturated fatty acids to be separated from unsaturated fatty acids. Unsaturated fatty acids have great nutritional value (e.g. DHA and EPA / omega-3 and -6 fatty acids). Saturated fatty acids on the other hand have cosmetic value or serve better as feedstock for biodiesel.



Chitosan IP Portfolio Commercialisation Opportunities

A detailed analysis of the Dr Anwar Jardine’s (Chemistry) chitosan portfolio, with the aid of external consultants, assisted in understanding the amount of raw material available from lobster fishing waste, which has started to focus plans around ‘modified chitosan’ production. The opportunities will be pursued further in 2014 with a view to local job creation, potential for the creation of a spin-off company and the application of ‘green chemistry’ for waste beneficiation.

Review of the UCT Pharmaceutical Patent Portfolio

The review of the pharmaceutical portfolio has laid the foundations for the development of a ‘policy’ or approach to patenting in the area. A key conclusion, not surprisingly, was that, due to publication imperatives patents are filed too early. There is also a need to outsource key screening tests to assess the technical viability of pharmaceutical ‘hits’ (e.g. their directed toxicity). This will serve as an early go/no go decision on patenting and whether publication can proceed. A ‘go’ decision should preferably be enough motivation to delay the publication as late as possible and at least until a fast-tracked development programme in conjunction with suitable partners such as the centre for Drug Development and Discovery (H3-D), established by Prof Kelly Chibale be completed. These guidelines will be developed during 2014 with the goal of making UCT’s IP outputs in this important area have more impact.

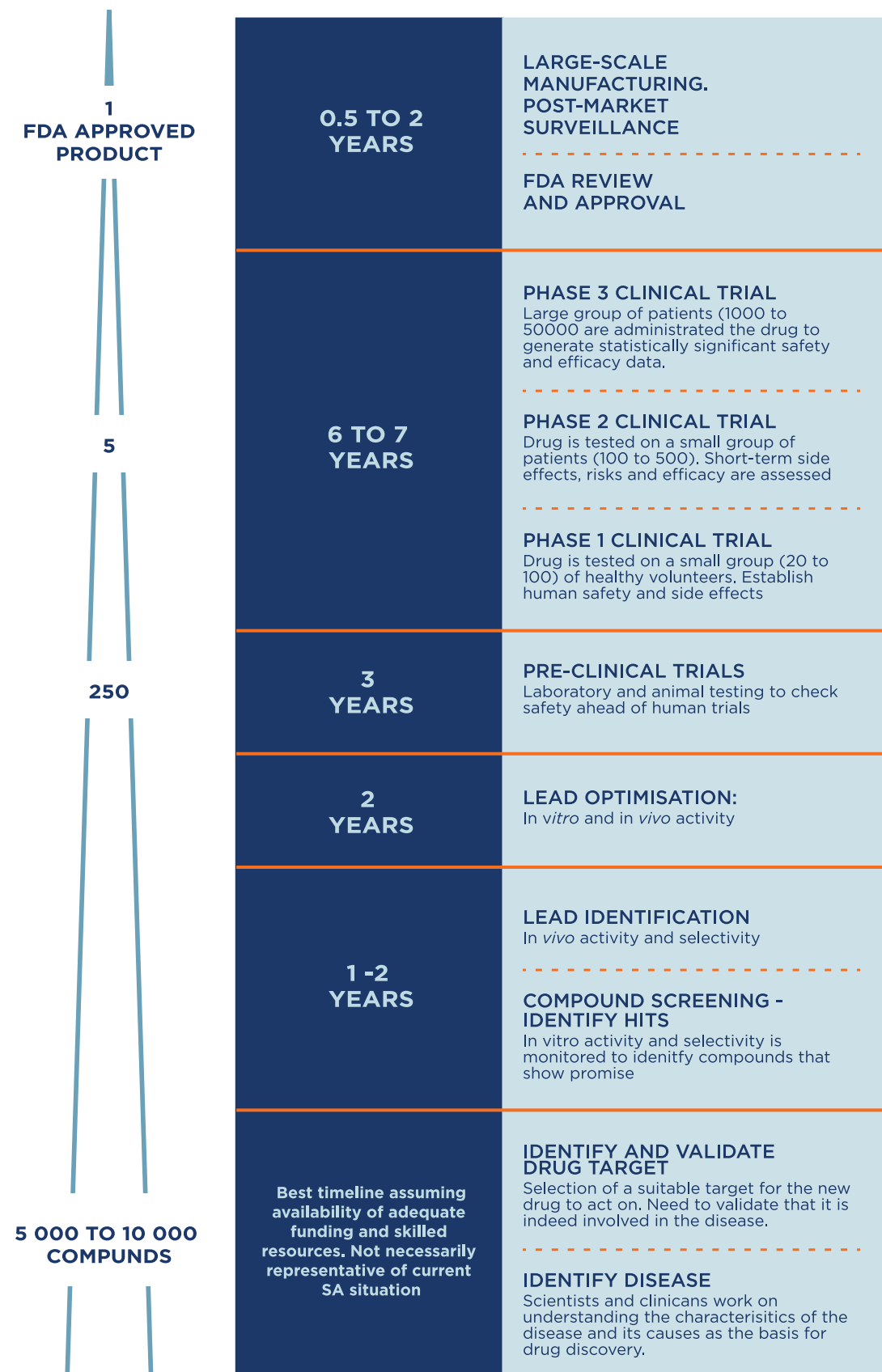
Dr Richard Gordon’s review of the Pharmaceutical Portfolio has proved extremely useful in initiating what it is felt will become a paradigm shift in terms of how UCT approaches

patenting in the pharmaceutical space. In his frank assessment of the projects he also identifies that not enough is done to gather the essential initial data required for successful drug discovery and the prerequisites of commercial partners:

- in vitro ADMET (absorption, distribution, metabolism, excretion, toxicity)
- in vivo pharmacology (PK)
- in vivo disease models

There are other aspects in Dr Gordon’s report that will assist UCT in unlocking the potential for pharmaceutical innovation and developing ‘policy’ or an approach in this area. This mindset is already present (H3-D) at UCT.

This has been a critical and extremely important first step in retaining and maximising the value of IP emanating from UCT research in this area, which has been made possible through this NIPMO funded initiative. Whilst this review represented a smaller component of the overall project budget, the impact has been significant.



More in 2014

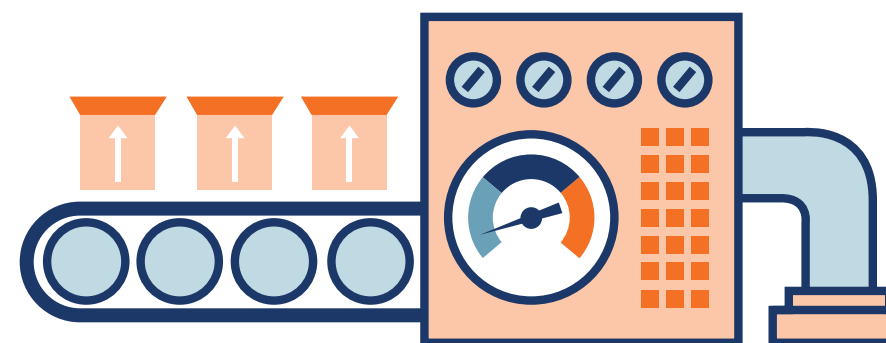
A second round of funding (R8.32m) has been awarded by NIPMO for a three-year project to support further posts that will focus more on increasing IP commercialisation capacity, as well as continue activities started in the first project.

Spin-off INNOVATION JOURNEYS

UCT HAS CREATED 11 SPIN-OFF COMPANIES OF WHICH 9 ARE STILL ACTIVE. UCT HOLDS EQUITY IN 5 OF THE COMPANIES. EXPLORE THE JOURNEYS OF THREE COMPANIES - KEY EVENTS, FUNDING, STAFFING AND PATENTING ON THE NEXT PAGES.



UCT SPIN-OFF COMPANIES



YEAR	BRAND	COMPANY	CORE FOCUS	UCT EQUITY	STATUS
2004	ISISQU ORTHOPEDICS	Isiqu Orthopedics (Pty) Ltd	Design & manufacture bone & joint implants	NO	✗
2004	Cell-Life	Cell-Life	e-Health technology development company	NO	✓
2006	CAPECAROTENE	Cape Carotene (Pty) Ltd	Feed additive for aquaculture (astaxanthin)	NO	✗
2006	HPT	Hot Platinum (Pty) Ltd	Induction furnace and casting equipment for jewellers / dentists	NO	✓
2009	CapeRay	CapeRay Medical (Pty) Ltd	Low dose x-ray coupled with ultrasound for breast cancer detection	YES	✓
2010	SAT	Strait Access Technologies (Pty) Ltd	Heart valve and deployment devices for their heart valve repair	YES	✓
2011	PST	PST Sensors (Pty) Ltd	Printed silicon electronics – e.g. thermistor temperature sensors	YES	✓
2011	SERAPTIX CC	Seraptix CC	Biosensor / diagnostic	NO	✓
2011	Antrum Biotech	Antrum Biotech (Pty) Ltd	Extrapulmonary TB diagnostic test - rapid, bedside testing	YES	✓
2012	tuluntulu	Tuluntulu (Pty) Ltd	One-to-many (users/viewers) live, continuous broadcast to mobile devices	NO	✓
2013	ELEMENTAL TECHNOLOGIES IP Holdings	Elemental Technologies IP Holdings (Pty) Ltd	Computational Fluid Dynamics software for advanced simulation	YES	✓

ANTRUM BIOTECH

ANTRUM BIOTECH (PTY) LTD WAS FOUNDED IN 2008 AS A SPIN-OFF COMPANY FROM THE UNIVERSITY OF CAPE TOWN TO SUPPORT THE NEED FOR FIELD-FRIENDLY RAPID TB DIAGNOSTIC TOOLS IN DEVELOPING COUNTRIES



Prof Keertan Dheda



Ms Khilona Radia

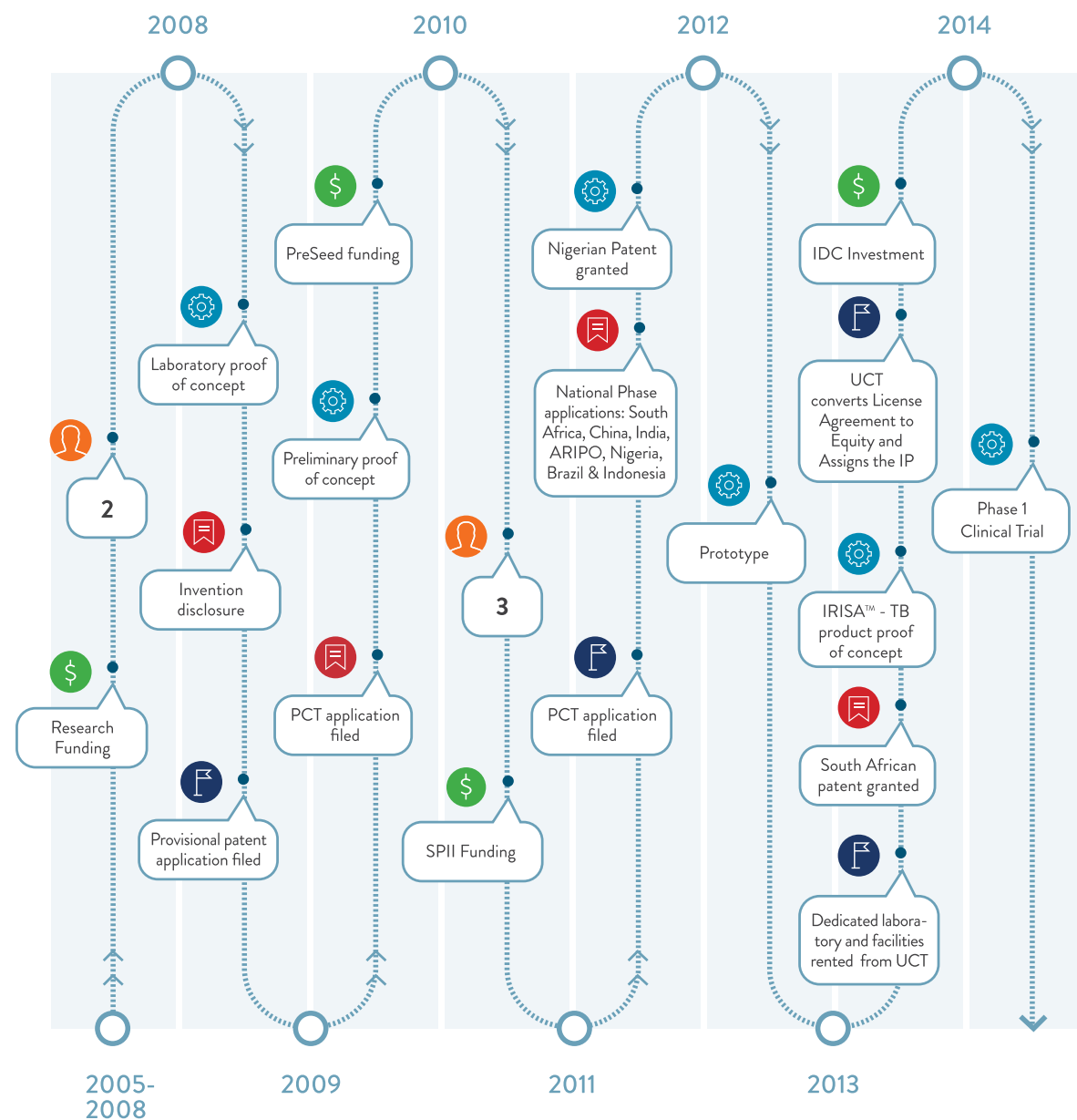
“Providing innovative health care solutions for poverty related diseases is extremely rewarding but a long and challenging road with far too many potholes. Resilience and single-focussed vision are quintessential ingredients for success” - Ms Khilona Radia, CEO

Antrum Biotech’s strategic areas of focus are:

- The identification and exploitation of novel diagnostic biomarkers relating to TB and other poverty-related diseases.
- The incorporation of these biomarkers into appropriate testing platforms.
- The marketing and distribution of these tests throughout Africa and, where relevant, to the rest of the world through international partners.

The founders are Prof Keertan Dheda, a leading pulmonologist and TB physician, and Khilona Radia, a globally experienced business manager, who currently manage the company.

Antrum’s first product, IRISA, a groundbreaking diagnostic tool for the detection of Extra-Pulmonary TB (EPTB), will enter the clinical trial phase during 2014. It is the first point-of-care test for EPTB that can be used at the patient bedside and deliver a rapid accurate result so treatment can begin immediately.



KEY

- 💰 FUNDING
- 👤 PEOPLE IN COMPANY
- ⚙️ TECHNICAL MILESTONE
- 📄 IP / PATENTING
- 🏢 MISC. EVENT

CAPE RAY MEDICAL

CAPERAY DESIGNS, DEVELOPS, MANUFACTURES AND SUPPLIES MEDICAL IMAGING EQUIPMENT FOR BREAST CANCER DIAGNOSIS. THROUGH EXPERTISE IN VARIOUS BRANCHES OF ENGINEERING - INCLUDING BIOMEDICAL, COMPUTER SOFTWARE, ELECTRONIC, MECHANICAL AND INDUSTRIAL - CAPERAY HAS DESIGNED AND DEVELOPED THE PANTOSCANNER.



Dr Kit Vaughan

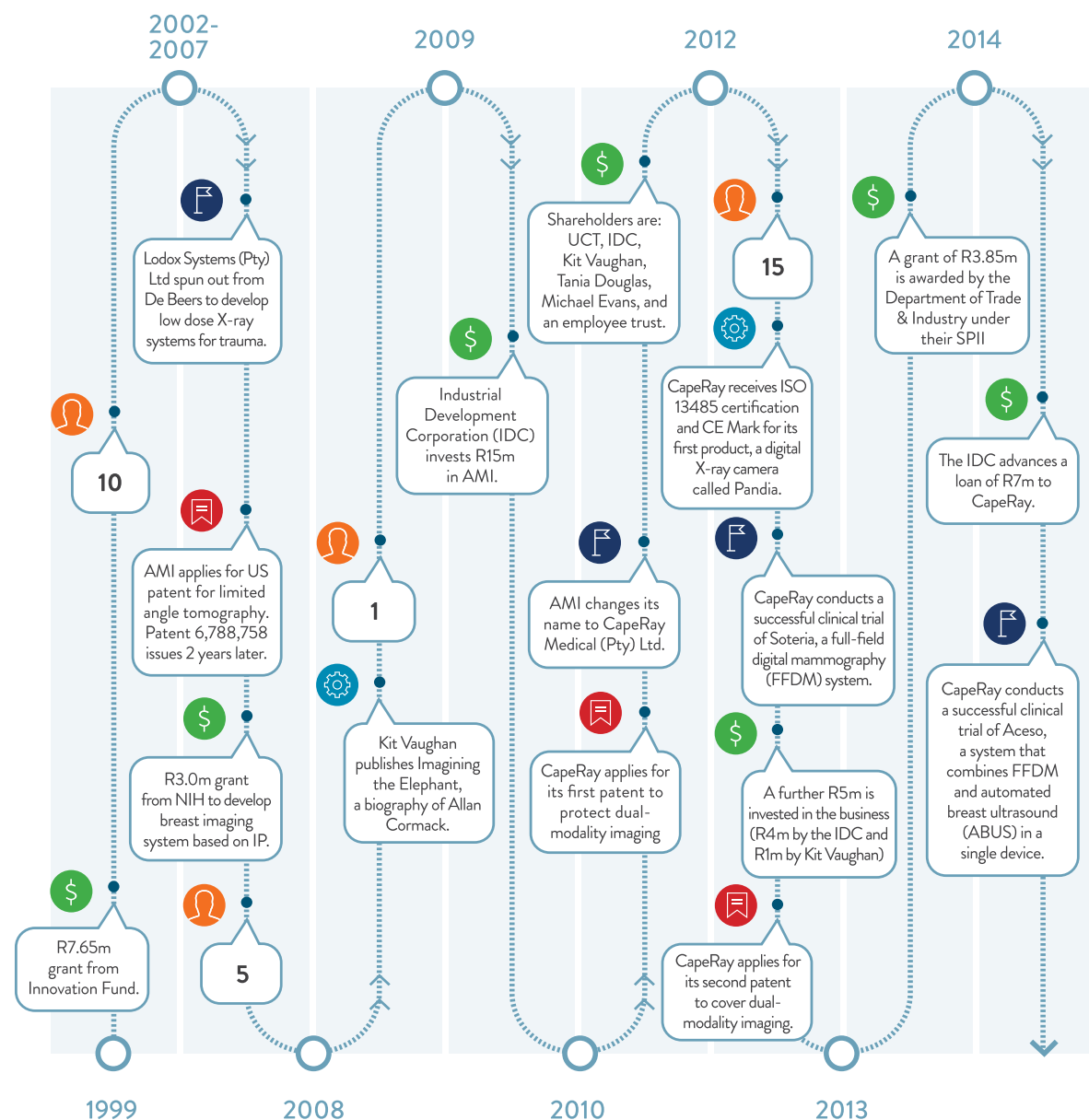
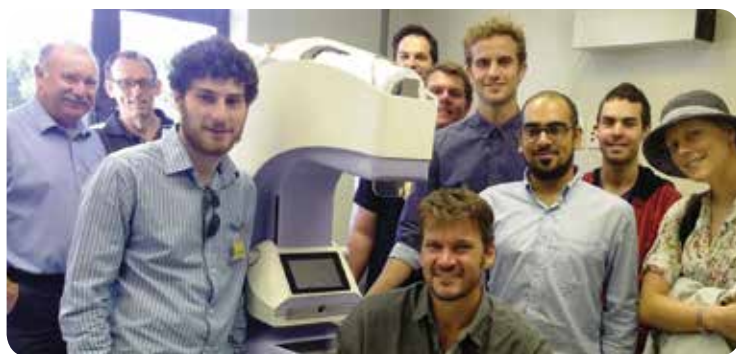
“The original idea to combine digital X-rays and 3D ultrasound in a single instrument was conceived in January 2010 so it has taken us four years to move from concept to reality. Along the way we have secured ISO 13485 certification for the company, a CE Mark for Pandia, our digital X-ray camera, and conducted a clinical trial of Soteria, our FFDM-only system. Integration of ABUS has proved to be a challenge but during the past year a dedicated and talented team has come together and brought Aceso to life”. - Dr Kit Vaughan, CEO

The prefix “panto-” comes from Greek and means “all”. The PantoScanner will be produced and sold in three variations:

- an entry-level system, known as Soteria (the Greek goddess of deliverance from harm), which is a full-field digital mammography (FFDM) system based on an X-ray scanner;
- a dual-modality system, known as Aceso (the Greek goddess who personifies the healing process), which combines an FFDM X-ray machine with automated breast ultrasound (ABUS) technology; and

- a top-of-the-range system, known as Aegle (the Greek goddess who personifies the glowing health of the human body), which combines FFDM, ABUS and digital breast tomosynthesis (DBT), thus enabling the simultaneous capture of 3D images of the breast using an X-ray machine and an ultrasound machine.

A clinical trial was done with Aceso model during April and May 2014. The founder of CapeRay is Prof Kit Vaughan, a tenured professorship at the University of Virginia, and 14 years as the Hyman Goldberg Chair in Biomedical Engineering at the UCT.



KEY

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STRAIT ACCESS TECHNOLOGIES

STRAIT ACCESS TECHNOLOGIES (SAT) HAS DESIGNED A DELIVERY DEVICE THAT CAN IMPLANT HEART VALVES WITHOUT THE NEED FOR COMPLICATED SURGERY OR HIGH-TECH OPERATING THEATRES WITH ADVANCED IMAGING SYSTEMS AND SURGICAL TEAMS.



Prof David Williams



Prof Peter Zilla



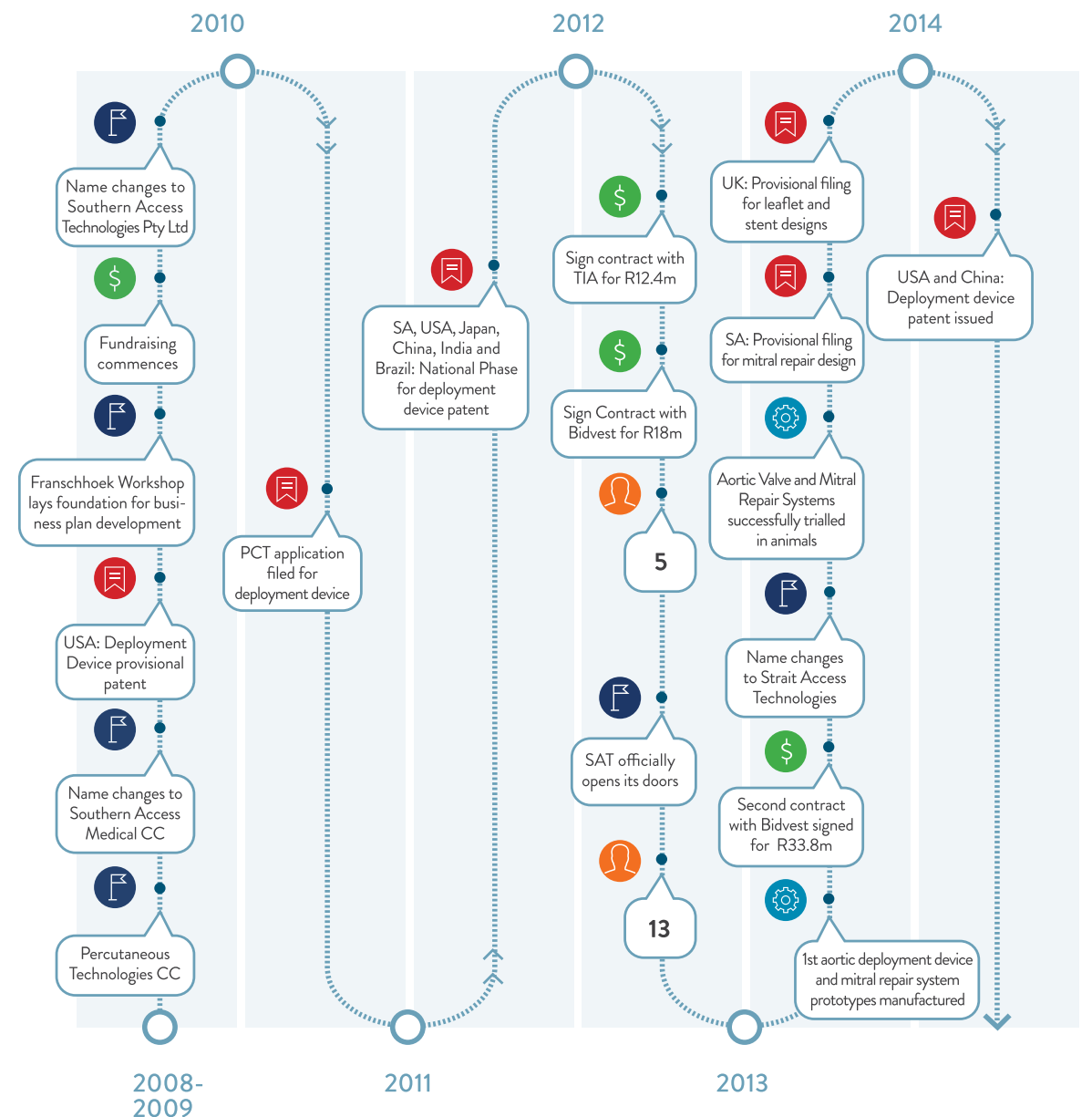
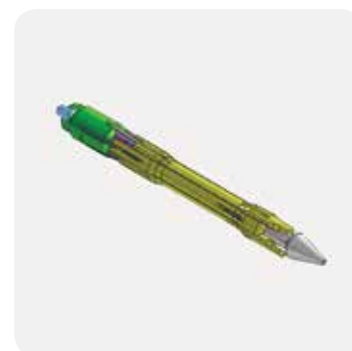
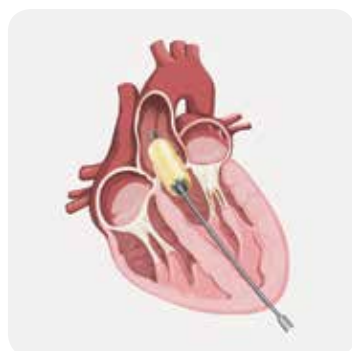
Assoc Prof Deon Bezuidenhout

“Involvement in this initiative allows the application of my specialisation in biomaterial sciences to devices that could save the lives of millions of people in developing and emerging nations who suffer from a fatal disease. This combination of academic research and practical implementation fulfils a personal goal and is extremely rewarding.” - (Assoc. Prof.) Deon Bezuidenhout, Technical Director, SATH.

This percutaneously-delivered heart valve can be implanted in the simpler operating theatres common in many African countries. The device is the subject of multiple patents and, whilst it is ideal for the developing world, it also has tremendous potential in the developed world where higher prices can be achieved.

In addition to the device discussed above, SAT has also developed a plastic heart valve which is ideally suited for young patients as it will last longer in their

bodies. It is also cheaper to manufacture than the currently available valves made from animal tissue. The key people behind SAT are all acknowledged world leaders in their fields. Prof Peter Zilla is head of the Department of Cardiothoracic Surgery at UCT. Assoc Prof Deon Bezuidenhout is a polymer scientist who specializes in biomaterials. The third founder of the company is Prof David Williams who is one of the world’s leading experts in biomaterials and implantable medical devices.



KEY

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- ⚙️ TECHNICAL MILESTONE
- 📖 IP / PATENTING
- 🚩 MISC. EVENT

Café SCIENTIFIQUE

THE AIM OF THE CAFÉ SCIENTIFIQUE CONCEPT IS TO STIMULATE MORE INFORMAL DISCUSSIONS AROUND SCIENCE, ENGINEERING AND INNOVATION AND ENCOURAGE BROADER INTERACTION WITH SOCIETY.



“Café Scientifique (noun); “..... a place where, along with a cup of coffee or a glass of wine, anyone can come to explore the latest ideas in science and technology. Meetings take place in cafes, bars, restaurants and even theatres, but always outside a traditional academic context.”

www.cafescientifique.org

These events, sometimes dubbed as “science for the sociable”, bring people together in a friendly, informal atmosphere in an after-work, happy-hour context. The Irma Stern Museum and Art Gallery creates an ideal atmosphere for these events and the art, which comprises a permanent collection as well as specific exhibitions, is an additional draw-card.

The evening starts with an informal talk, in laymen’s terms, on a pertinent topic given by a renowned researcher, who highlight key aspects of their research and the commercial potential thereof. This is followed by question and answer exchanges sparking debate and general discussion around the technology – it’s a chance for everyone to express an opinion, expert or otherwise.

The first two presentations in the series stimulated healthy debate and discussion from an interested and diverse audience.

Upcoming Café Scientifique 03 June, 6-8 PM “Modern Alchemy: Making value out of waste water” by Prof Alison Lewis http://www.rcips.uct.ac.za/rcips/licensing_investment/cafe_scientifique



Prof Edward Rybicki: Vaccine Rapid Response: Is South Africa Ready?

Prof Edward Rybicki (Molecular and Cellular Biology) spoke on Vaccine Rapid Response: Is South Africa Ready? The session looked at the complex array of issues such as how the nation would respond to an influenza pandemic, how to manage a possible spread of the new Middle East coronavirus to our country and how to make enough emergency response vaccines to protect all South Africans.



Prof Sue Harrison: Magnificent MicroAlgae: fuel, fine chemicals & feeds.

Prof Sue Harrison (Centre for Bioprocess Engineering (CeBER)) discussed microalgae and their potential for fuel, fine chemical production and as a means of fixing global warming. South Africa is uniquely positioned to take advantage of this technology. These amazing algae could provide an economic and sustainable answer to alternative energy and carbon dioxide (CO₂) mitigation. An algal bi-refinery could integrate production of a range of functional fine chemicals, organic pigments, algal oils, nutritional supplements, feeds and energy products.

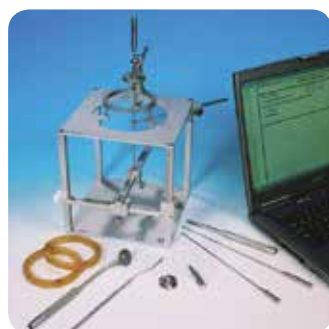


The Technology Innovation Agency (TIA) has provided sponsorship that has allowed us to host four events during the 2013-2014 season.

PROF LAURIE ADAMS

ESTEEMED PROF AND NOTED INVENTOR LAURIE ADAMS PASSED AWAY ON DECEMBER 2012 AT THE AGE OF 87.

“He left behind a legacy of ingenuity and is one of UCT’s earliest patent success stories.”



He left behind a legacy of ingenuity and is one of UCT’s earliest patent success stories. Originally designed and prototyped in 1997 by Prof Adams, the Cape Town Stereotactic Pointer (CTSP) has proven to be an enduring technology that is still being used by neurosurgeons around the world.

The device uses the principle that any 3-axis (x,y,z) co-ordinate system can be used to locate a unique point in space and it translates the measurements taken using computed tomography (CT) or magnetic resonance imaging (MRI) to allow brain tumours to be located during neurosurgery.



Prof Adams graduated from the University of Witwatersrand with a B.Sc.(Eng.) in Land Surveying in 1951, after which he joined the Survey of Kenya – participating in the days of the last ‘real’ land surveyors with month-long camps in the African bush. After a Postgraduate Diploma in Photogrammetry gained in 1964 from University College London, his academic career started, with posts in the UK and Kenya, before being appointed as Professor of Photogrammetry and Surveying at UCT in 1972. He served two periods as Head of Department and retired in 1990. He continued to work in retirement and was appointed Head of the Biostereometrics Unit in the Department of Biomedical Engineering at UCT. During this time, Prof Jonathan Peter and his registrars, Dr Graham Fieggen and Dr Allan Taylor, were looking to develop a stereotactic system to locate targets in the brain. Prof Adams saw this as a straightforward land surveying problem, entirely analogous to the “lost” boundary beacon situation. In mathematical terms, an X-ray picture represents the mapping of space in 2-D film, but comparing images from two slightly different points of view one can recreate a position in space. This led to the creation of the CTSP.



The device, which won the South African Bureau of Standards Design Institute Award in the year it was launched, was developed by a team headed by Prof Adams, of the Department of Biomedical Engineering, comprising collaborators from UCT’s then Department of Neurosurgery and the Medical Research Council (MRC). Fibertek Developments, under license, has been marketing the CTSP and it is used in hospitals across Africa, as well as in South America and India, where most of the current sales are occurring. Peter Mundell, head of Fibertek, also elected to retire in 2013 and a deal is being negotiated for a new manufacturer and distributor to take up the Fibertek mantle.

PROF GARY MARSDEN

WE WERE ALSO SADDENED BY THE LOSS OF PROF GARY MARSDEN (COMPUTER SCIENCE) ON 27 DECEMBER 2013.

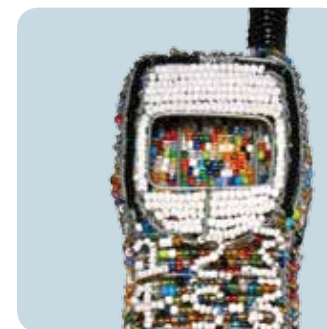
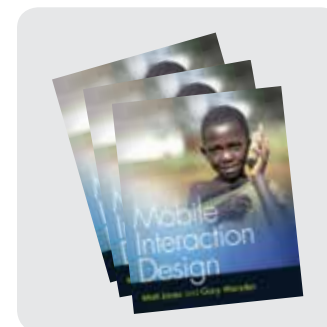


He was an active innovator, supporter and facilitator of innovation and had enthusiastically agreed to participate as a member of the Steering Committee of the UCT TIA Seed Fund that launched in 2014.

His research interests were in Mobile Interaction Design and ICT for Development and believed that mobile technology is the way forward for South Africa. He was the director of the UCT ICT4D research centre, which develops technology solutions specifically aimed at addressing barriers to growth in the developing world, and the UCT-Hasso Plattner Research School.

He has co-authored a book, with Matt Jones titled “Mobile Interaction Design” which was published in 2006. In 2007 he won the ACM SIGCHI Social Responsiveness award for his research in using mobile technology in the developing world.

In 2012, Prof Marsden was one of only five academics in South Africa to receive a National Excellence in Teaching and Learning Award from the Council on Higher Education and the Higher Education Learning & Teaching Association of Southern Africa. In 2014 he has posthumously received a major international award - election to the CHI Academy. The CHI Academy is an honorary group of individuals who have made substantial contributions to the field of human-computer interaction. The award was made by SIGCHI - the premier international society for professionals, academics and students involved in human-technology and human-computer interaction. (HCI)





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