



INNOVATION AT UCT 2024

Always
something
new out
of Africa



RESEARCH CONTRACTS
& INNOVATION





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KEY HIGHLIGHTS OF 2023

3 NEW SPIN-OFF COMPANIES WERE RECOGNISED

Sleep Science (Pty) Ltd,
Vas MedTech (Pty) Ltd
and PeeCycling (Pty) Ltd

bringing the total to
34
since 2004

INNOVATION BUILDER FUND

6 NEW PROJECTS were awarded funding (with an **additional 4 awards pending**)

21 
LICENCES ISSUED

33 NEW INVENTION DISCLOSURES WERE RECEIVED

30 Patents were granted in different countries, predominantly



9 USA



7 SOUTH AFRICA

The value of equity held by UCT in spin-off companies is estimated at

R243.3m

R186.2m from Evergreen Fund investments

R57.1m from equity associated with IP transactions)

35

NEW PATENT APPLICATIONS WERE FILED

7 priority filings

7 at PCT stage

21 at national phase

National phase applications were primarily in South Africa, the USA and Europe

LICENSING INCOME TOTALLED

R1.3m

Over the past 10 years

R24.7m

has been received from the commercialisation of IP (excluding profits from incubated companies)

although the bulk of the returns to UCT are ultimately expected to come through cashed-in equity

R3m

which was leveraged by a further investment of

R9.75m

was invested by the **UCT Evergreen Fund** in Series investments in UCT spin-off companies in 2023

by the **University Technology Fund**



Pliny the Elder, a Roman author and natural philosopher, famously remarked, *“There is always something new out of Africa.”*

This statement reflects the ancient fascination with the continent’s rich biodiversity and cultural diversity. Africa, with its vast landscapes and myriad ecosystems, continuously revealed unfamiliar species, minerals, and cultural practices to explorers and scholars of the time. Pliny’s observation underscores the idea that Africa was a source of endless wonder and discovery, offering insights and novelties that captivated the Roman world. This sentiment still holds today, as Africa remains a treasure trove of natural and anthropological marvels, contributing significantly to global knowledge and biodiversity.



**One of the world’s
6 floral kingdoms**



**Over 9,000
species of plants,
70% of which are endemic**

The Cape Floral Kingdom is one of the world’s six floral kingdoms and is renowned for its incredible biodiversity. Despite being the smallest in area, it boasts the highest concentration of plant species, with over 9,000 species of plants, 70% of which are endemic. Fynbos honey created by bees gathering pollen from this zone is increasingly sought after. Read the article about verifying that the honey is authentic and not mislabelled. Geographical indicators (GIs) play a crucial role in protecting the unique qualities of products linked to specific regions and are something new that RC&I has explored this past year.



Drought resistant maize



African innovation is thriving, driven by a blend of traditional knowledge and modern technology. Entrepreneurs across the continent are tackling local challenges with creative solutions in various sectors, including agriculture, healthcare, and fintech. Mobile banking services like M-Pesa have revolutionised financial inclusion, while agricultural innovations, such as drought-resistant crops (UCT is trialling drought-resistant maize) are enhancing food security. Tech hubs in cities like Nairobi, Lagos, and Cape Town are fostering a vibrant start-up culture. Additionally, renewable energy projects are addressing power shortages and promoting sustainability. This wave of innovation is not only transforming lives but also positioning Africa as a significant player in the global economy.

Africa's potential is vast, encompassing rich natural resources, a burgeoning youth population, and diverse cultures. With over 1.2 billion people, it is the world's fastest-growing continent, offering a significant market for global businesses. The continent's abundant resources, including minerals, oil, and arable land, present opportunities for sustainable economic growth. Additionally, Africa's young and dynamic workforce can drive innovation and development. Investments in education, infrastructure, and technology are crucial to harnessing this potential. As political stability and governance improve, Africa's economies can flourish, transforming the continent into a powerhouse of economic and social progress on the global stage.



Over 1.2 billion people



Fostering innovation in SHAPE

Delegates from the University of Cape Town (UCT), the British Council, Entrepreneurship Development in Higher Education, global technology commercialisation consultancy Oxentia, the University of the Western Cape (UWC), and 18 other South African universities attended a day-long workshop aimed at boosting the commercialisation of Social Sciences, Humanities, Arts for People and the Economy (SHAPE) research.

The event was hosted by UCT's Research Contracts and Innovation (RC&I) at the university's All Africa House. It forms part of the SHAPE project led by RC&I in collaboration with UWC's technology transfer office (TTO) and Oxentia and funded by the British Council. The SHAPE project is an initiative that forms part of the British Council's initiatives aimed at fortifying the innovation framework within South African universities, particularly in SHAPE.

"A culture of fostering innovation is crucial in institutions of higher learning," RC&I Director Piet Barnard said. "As part of their mandate to lead research activities, universities have a responsibility to drive the journey of commercialisation. It is to this end that universities have technology transfer offices (TTOs). Traditionally, the focus in innovation has been on STEM (Science, Technology, Engineering, and Mathematics) research, but South Africa is currently observing a shift towards the inclusion of Social Sciences, Humanities, Arts for People and the Economy (SHAPE) research."

Barnard added that the aim of the workshop was to execute comprehensive training and disseminate materials to equip TTO professionals with the necessary tools and knowledge to effectively commercialise SHAPE research.

Meaningful partnerships

Dr Andrew Bailey, Senior Innovation Manager at UCT RC&I, said, "SHAPE research is not new in South Africa. However, translating it into SHAPE innovation and impact is a new area of focus globally, and it is great that we are there close to the outset and are able to broaden and adapt the application to the South African environment. One is needing to change researchers' thinking about the impact that their research makes, and to enable TTOs to support SHAPE innovation, which has some aspects that are different to STEM innovation, which is well known and has up until now been their primary focus. With South Africa's rich cultural heritage, I feel



Delegates from the University of Cape Town, the British Council, Entrepreneurship Development in Higher Education, Oxentia, the University of the Western Cape and 18 other South African universities.



that there may well be opportunities for rural universities to translate research into tourism experiences in their immediate environment, creating jobs and stimulating the local economy.”

Bailey added that partnerships with various stakeholders are critical to providing researchers with the support they need to navigate the commercialisation journey.

Mapping the way forward

While the event was a success and strides were made in the right direction, the project is far from concluded.

Attendees made it clear that the UCT- and UWC-led SHAPE project looks forward to cultivating a UK-SA partnership for enriched knowledge and skills-sharing, as well as designing a clear route to market for SHAPE research, addressing local challenges.

“The UK is acknowledged as the lead in SHAPE innovation, and the British Council funding is enabling skills to be transferred via engagement with Oxentia and opportunities to be identified, whilst, importantly, translating and adapting practices to the South African environment,” Niall Naidoo, Leader of the Consortium’s Project said. “Through the SARIMA (Southern African Research and Innovation Management Association) Community of Practice on SHAPE, we hope that TTOs will be able to share case

studies and learning on an ongoing basis. We need case studies to share to highlight the possibilities, and the more that we can make available and distribute, the better.”

The project has been able to customise and develop SHAPE commercialisation guidelines for the South African context and equip TTOs and academics with a comprehensive toolkit for research commercialisation.

Naidoo said, “At UCT and UWC we will be running awareness-raising workshops with researchers in the Humanities, Arts and Social Science (HASS) space. Based on learnings from these workshops, guides that are being developed will be tweaked and finalised. We need to take care that we are equipped to support researchers who come to the TTO, and hopefully the tools developed will help them to assess their opportunities. We are identifying and defining some larger ‘systemic’ projects to run in certain departments and faculties that will provide innovation support to them.” He added that some of these approaches “will be new and able to be showcased internationally”.



Building global citizens

RC&I was proud to welcome numerous valued guests over the past year.

Lien Verbauwhede Koglin, Counsellor at the World Intellectual Property Office (WIPO), visited for a year, during which she took part in a series of insightful discussions and ongoing knowledge exchange. Verbauwhede Koglin, a leading figure in the field of intellectual property and technology transfer, shared her expertise with researchers and stakeholders, fostering a vibrant exchange of ideas and sparking a wave of inspiration among RC&I's team. She also benefitted from participating in the practical experience of working "on the ground" with a technology transfer office. During her visit she also finalised the WIPO guide on incentives for researchers, which she presented at a Southern African Research and Innovation Management Association (SARIMA) workshop.

The visit was a prelude to the On-the-Job (OTJ) Training Programme initiated by the WIPO, SARIMA and the Japanese Patent Office, which saw 12 people from Southern African Development Community (SADC) countries spending time at different technology transfer offices.

Scan here to watch
a video about the
On-the-Job (OTJ)
Training Programme



RC&I team members and fellows from Malawi, Chrispin Kaphaika, Technology Transfer Officer: Lilongwe University of Agriculture and Natural Resources and Livison Msonthe, Acting Technology Transfer Manager and Lecturer: Malawi University of Business and Applied Sciences



As part of the programme, RC&I hosted two fellows from Malawi for eight weeks: **Chrispin Kaphaika**, Technology Transfer Officer at LUANAR-Lilongwe University of Agriculture and Natural Resources, and **Livison Msonthe**, acting Technology Transfer Manager and Lecturer at the Malawi University of Business and Applied Sciences.

RC&I was enriched by hosting these visitors and is committed to ongoing strengthening of our international network.



Lien Verbauwheide Koglin
Counsellor at the World Intellectual Property Office (WIPO)



Livison Msonthe
Acting Technology Transfer Manager and Lecturer at the Malawi University of Business and Applied Sciences



Chrispin Kaphaika
Technology Transfer Officer at LUANAR-Lilongwe University of Agriculture and Natural Resources



A resounding success in innovation funding

The University of Cape Town has a range of funding instruments – from its very early Pre-Seed Fund right through to early-stage venture capital funding – to support innovation and the commercialisation of research outputs.

Figure 1: Innovation funding range

Funding amount	Development (Post Research)	Start-up	Business Growth (Post Revenue)
< R100k	UCT PreSeed Fund		
< R500k	UCT Innovation Builder Fund UTF* PreSeed		
< R1.5m	UTF* Seed UCT Evergreen Seed Fund		
< R6m	UCT Evergreen Seed Fund		
< R17.5m		UTF* Series Seed	UTF* Series A

*University Technology Fund (UTF)

The Pre-Seed and Innovation Builder Funds both award and allocate grant money to be spent on university research outputs, which can be converted into later-stage commercial opportunities. These funds typically provide money to support the development of research prototypes, perform research or experiments to demonstrate idea potential, and promote further market research and competitor analysis.

The Evergreen Funds, by contrast, are typically used to provide first-round equity capital into university spin-out companies to accelerate the identified commercialising strategy. The funds are a unique offering in the innovation funding range, providing gap funding to prepare early-stage “deep” technologies for follow-on investment from commercial Seed and Series funders.



UCT is a special partner of the (external) University Technology Fund (UTF), and invests alongside the UTF from our Evergreen Fund. The UTF has invested in nine UCT spin-off companies, including investments of R9.75 million during 2023, leveraging the R3 million invested by the university.

Partnering for impact

On 31 May 2024, the Development and Alumni Department hosted an event for alumni, donors and friends of UCT, at which the groundbreaking initiatives and projects developed by our students, faculty and researchers



were showcased. This half-day event served as a platform to recognise innovation, excellence and social impact in the fields of research, social projects and teaching and learning initiatives. **Khumo Mokone, Innovation Investment Manager** at RC&I, spoke at the event about the Evergreen Fund and its impact, and how the fund represents excellence at UCT.

“Our Evergreen Fund has a strong track record of creating spin-off companies, which have employed over 100 UCT graduates,” Mokone said. “This demonstrates the significant impact of our funding initiatives. The demand for entrepreneurial funding opportunities like the Evergreen Fund from our students and staff is not only encouraging but also ensures a sustained pipeline of technologies with commercial applications in the future.”

The event was attended by a wide array of guests, including Heads of Missions, alumni, donors and media.

UCT invites companies and donors to contribute to growing the Evergreen Seed Fund. Donors can take pride in the difference their contribution will make, and be assured that all returns from investments made will be retained by the fund to invest in further projects. By supporting this initiative contributors can become an integral part of innovation and help create start-up companies and employment opportunities for UCT staff and students.

Any donor who supports the Evergreen Fund would also be provided with a tax-deductible donation certificate.

If you would like to participate in the Alumni and Friends Innovation Network or be kept informed of developments, please email khumo.mokone@uct.ac.za



To hear more about the Evergreen Fund, watch here:





Honey characterisation tool could protect local honey industry

Researchers at UCT have developed a honey characterisation tool based on melissopalynology, the study of the pollen and spores trapped in honey. This method is recognised as one of the most precise for classifying honey according to its floral composition and geographical origin. By verifying the origin of honey through this scientific approach, complementary analyses can be conducted to assess its physical and chemical properties. This comprehensive evaluation is crucial for establishing routine honey verification processes locally.



The South African honey industry faces numerous challenges, two of the most significant being the growing local demand for honey – which is overwhelmingly being met through imported products – and a dearth of legislation to protect the industry against opportunistic, faux products.

The latter is a major threat looming over the international honey industry, due to the ease with which inexpensive counterfeit products can outcompete authentic honey. Most counterfeit honey has either been adulterated with cheaper syrups, which alter the quality of the honey, or in other cases such ‘honey’ – or sometimes pure syrup – is purposefully mislabelled to pass off as legitimate high-value products.

Currently, South Africa’s honey consumption vastly exceeds its production, necessitating a reliance on imports to fill the gap. Although local honey exports are gradually increasing, South African producers struggle to compete globally without proper benchmarks. To thrive in the international market, South African honey must be verified to validate its origin and authenticity. This further demonstrates how counterfeit honeys are harmful to the country’s economy.

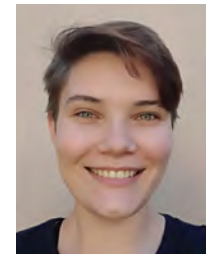
Studies show that consumers prefer locally produced honey once they understand the dangers of consuming counterfeit honey, including the associated health risks from consuming unknown, unregulated substances. Educated consumers are also willing to pay a premium for genuine, safe-to-consume local honey. Therefore, scientific communication is crucial to inform the public about the differences between authentic and counterfeit honey. As public awareness grows, support for local honey producers will increase.

Implementing the routine verification enabled by this new honey characterisation tool would significantly bolster consumer confidence in the authenticity of South African honey. With verified and authentic products, local honey producers would be well-positioned to compete in international markets. It would also provide an enforcement tool to be used by policymakers to eliminate counterfeit products in the local market.

The honey characterisation tool allows for Greater Cape Floristic Region honeys to be classified by geographical region, using pollen and other chemical markers. This makes it possible to then protect honeys with geographical indicators (GIs). The purpose of GIs is to ensure that only products genuinely originating from a particular place can use its name, preserving the reputation and traditional knowledge associated with that area.

GIs support local economies by adding value to regional products, promoting rural development, and encouraging sustainable practices. They also help consumers make informed choices by guaranteeing authenticity and quality. South African examples of GIs include Rooibos tea and Karoo Lamb. International GIs include Champagne (France), Cologne (Germany), and Tequila (Mexico). GIs are essential for preserving the identity and uniqueness of regional products.

It is not uncommon to have honey protected by GIs – as evidenced by the global success of Manuka (*Leptospermum scoparium*) honey. The honey characterisation tool offers protection to honey produced in South Africa, by authenticating it and allowing consumers to be informed of the region the honey comes from. This puts the power back in consumers’ hands, enabling them to know with certainty the product they are purchasing and consuming is authentic. The tool could also influence policy-making, as it is an effective way to identify counterfeit honey in South Africa.



Dr Janais Delpoit
PhD graduate:
Biological Sciences



HSR Lab develops new keloid treatment using combination therapy

Researchers in the UCT Hair and Skin Research Laboratory (HSR) have developed a promising new method to treat keloid disease (KD), a challenging skin scarring condition resulting from dermal (skin) injuries in keloid-prone individuals.

KD scars are non-cancerous ill-defined dermal skin tumours with poorly defined treatment. Unlike typical scars, keloids do not naturally fade, and grow beyond the margin of the original wound, encroaching into nearby healthy skin. They are itchy and painful, particularly when inflamed, and can lead to physical impairment.

Keloids affect 16-20% of the darkly pigmented populations (of African, Asian and Hispanic descent), with lower incidence in less pigmented populations. In 2023, the global keloid market reached \$3.8 billion (R69.7 billion), yet keloid treatment remains unsatisfactory. Thus, innovative medical interventions are needed for better patient outcomes.

Commonly affected areas include the sternum, earlobes, shoulders, upper arms and upper back. They are cosmetically unsightly, leading to psychosocial stress in patients. Current treatments for keloids, such as steroid injections, cryotherapy and surgical removal, often fall short – resulting in high recurrences (45 – 100%) – after surgery alone. The primary challenge in developing effective therapies has been the absence of a suitable/validated study model (animal models), as keloids occur only in human skin, complicating research efforts.

The innovative approach taken by the HSR Lab involves using a targeted combination therapy designed to address uniquely identified keloid biomarkers. The treatment involves administering active compounds which are known for their role in inhibiting certain cellular processes.

This keloid technology is being protected by patents which are only a subset of the true value of the technology. Using



Dr Relebohile Matobole
*Postdoctoral Research Fellow:
Dermatology Department*

In 2023, the global keloid market reached \$3.8 billion (R69.7 billion), yet keloid treatment remains unsatisfactory.

their know-how and other keloid-specific reagents such as the immortalised keloid cell lines, the technology offers hope for more effective and reliable keloid treatments. This will address the limitations of current therapies and improve the quality of life for those affected by keloid disease.

Keloids affect 16-20% of the darkly pigmented populations



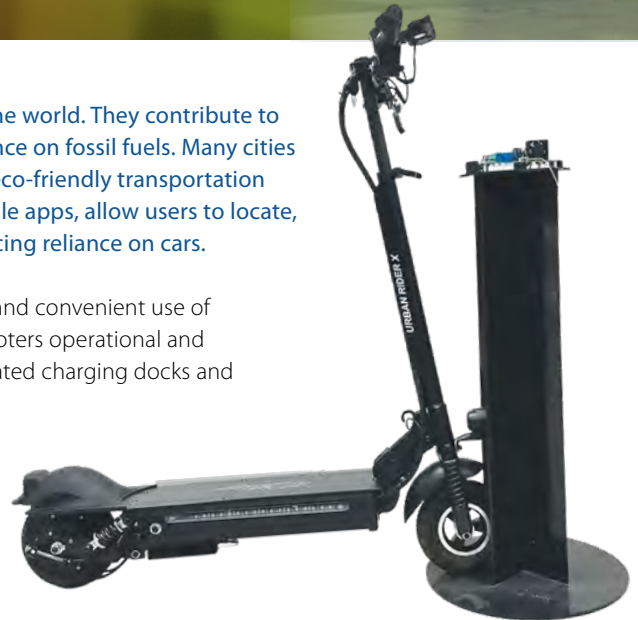


Contributing to a cleaner environment

Electric vehicles (EVs) are becoming increasingly ubiquitous around the world. They contribute to a cleaner environment by reducing air pollution and minimising reliance on fossil fuels. Many cities provide e-scooter services, offering a convenient, cost-effective, and eco-friendly transportation option for short trips. These services, typically operated through mobile apps, allow users to locate, unlock and ride e-scooters for a fee, enhancing accessibility and reducing reliance on cars.

E-scooter charging infrastructure is crucial for the widespread adoption and convenient use of e-scooters, providing a reliable network of charging stations to keep scooters operational and accessible. Existing infrastructure for charging e-scooters includes dedicated charging docks and swappable battery stations.

Although swappable battery stations have been adopted widely, wireless public charging of e-scooters still holds substantial promise, as drivers can simply park their e-scooters over or in a charging station and the vehicle starts charging without any manual intervention. A wireless system uses electromagnetic fields to





transfer energy between a charging pad on the ground and a receiver on the vehicle, allowing for seamless and automatic charging. Magnetic flux is converted to electricity through magnetic flux coupling.

Most wireless charging stations for e-scooters employ planar (i.e. flat) transmitter and receiver coils for charging e-scooters. The only place to mount planar coils is on the chassis of the e-scooter, which introduces several operating and performance challenges, such as:

- Inability to facilitate charging of multiple e-scooters efficiently;
- Non-optimal e-scooter docking during charging, thus necessitating a larger space for charging infrastructure;
- Risk of operating at a sub-optimal point due to foreign objects between the transmitter and receiver coils;
- A drop in charging efficiency due to a higher risk of misalignments in the receiver and transmitter coils; and
- Increased system cost as the charger needs to include foreign-object detection mechanisms and complex control to mitigate the impact of misalignments.

Non-planar flux couplers hold great promise for solving the above issues. However, existing designs of non-planar receivers and transmitters are sub-optimal and are not ideal for all applications, often resulting in large “losses” during charge cycles. **Dr Sampath Jayalath**, a lecturer in UCT’s Department of Electrical Engineering, and **Nikhil Bejrajh**, PhD candidate in the same department, have developed a wireless charger with non-planar coils to overcome many of the shortcomings associated with existing planar and non-planar wireless charging solutions. The design is particularly applicable to e-scooters but holds promise for utilisation in other EV applications, such as drones.

UCT’s Innovation Builder Fund will be used to demonstrate the system in an e-scooter. The non-planar receiver coil will be fitted to the front pole of the e-scooter, which will allow vertical docking in specifically designed

A UCT lecturer and PhD student have developed a wireless charger that could make charging multiple electric scooters (e-scooters) – and other electric vehicles (EVs) – a lot easier.



Dr Sampath Jayalath

*Lecturer: Department of
Electrical Engineering*

Nikhil Bejrajh

*PhD candidate:
Department of Electrical
Engineering*

charging stations. This will reduce the footprint of the charging infrastructure, which is critical in an urban environment. This is only possible due to the proposed non-planar coil structures.

Additionally, an efficient multi-vehicle docking station is being developed. The team also secured uYilo Kickstarter funding that will be utilised to develop this multi-vehicle charging station.

Demonstration trials are planned on campus.



Combination therapies for cancer

Various cancers are becoming resistant or insensitive to conventional chemotherapy, and increasingly higher dosages are required to remain effective. Unfortunately, many chemotherapeutic treatments cause undesirable systemic effects such as cardiac or renal toxicity, alopecia (hair loss), marrow aplasia (low production of blood cells), nausea and vomiting, and increasing dosages exacerbates the side effects. New therapies with superior anti-cancer effects and fewer side effects are urgently needed. Several small molecules are in advanced stages of clinical trials worldwide.

Prof Virna Leaner and **Dr Pauline van der Watt** of UCT's Division of Medical Biochemistry and Structural Biology, in partnership with researchers at the University of Louisville in Kentucky, USA, have identified small molecules for treating gynaecological cancers. These molecules have been shown to have lower toxicity (in vivo) and superior anti-cancer efficacy compared to the gold standard Cisplatin, and RC&I has filed patent applications to protect these molecules. The compounds are inhibitors of cellular nuclear transport (import) processes that have been found by the researchers to be responsible for cancel cell growth in several cancer types.

Another strategy to overcome the challenges posed by existing chemotherapeutic regimes is to identify combinations of new and known chemotherapeutic drugs that act synergistically in killing cancer cells, whilst lowering overall toxicity and reducing patient side effects. More recent research

efforts in Prof Leaner's lab focused on doing just that. UCT's previously patented inhibitors are being tested in combination with existing therapies known for their adverse side effects (such as Selinexor, Cisplatin, Carboplatin, Oxaliplatin, Nedaplatin and others). Some of these drugs, such as Selinexor, are only prescribed as second- or third-line treatments because of their adverse side effects (i.e. only when first-line treatment fails are they prescribed). Combining these known drugs with drugs with lower toxicities presents the opportunity to lower the dosages of the known drug, which could accelerate their adoption as first-line treatment. RC&I has therefore filed patent applications to cover promising combination therapies.

The patenting strategy relating to combination therapies is interesting. Generally, patenting pharmaceuticals is critical to ensure that the companies who invest in the R&D and clinical trials can recover costs and make a profit. This provides the incentive for those companies to research and develop new pharmaceuticals. Without patents, there is little incentive for companies to spend billions on R&D when the generic company "down the road" can simply wait for the completion of R&D and then produce the same pharmaceutical at a much lower price. The originator company would then never be able to recover its cost and make a profit.

Although the original patents would prevent third parties from commercialising the combinations, filing additional patents to cover the combinations provides specific protection for the combinations even after the original patents have expired. This effectively "extends" the patent lifetime of the original patents, covering the individual compounds. This strategy is known in pharmaceutical circles as 'evergreening'. To be patentable, the combination must be new (not known anywhere in the world) and inventive when compared to the prior art.

Showing synergy helps with the inventiveness argument, but such claims need adequate proof. There is a negative perception of evergreening, because often pharmaceutical companies file patents for supposedly synergistic combinations without evidence for synergism, simply to extend the monopoly beyond the 20 years of the original

patent. However, from a university's perspective, ethical evergreening is a very useful commercial strategy for pharmaceuticals. It radically increases the chances of getting to market because of the longer protection that can be achieved, buying more time to finish preclinical work and seeking partners, and because combining novel molecules with compounds already on the market presents the opportunity to partner with the producers of those molecules to produce and commercialise the new combination therapy.

Patenting combination therapies is, however, challenging for a variety of reasons:

- First, some of the drugs in the combination may be under patent protection by others, which will require a license from the patentee if the patentee is not the entity commercialising the combination. A freedom-to-operate (FTO) assessment is therefore required. Some of the drugs may be off-label (generic), or not protected in a particular country, which will not require licensing.
- Second, the patent claims must be drafted in a way that does not require both active ingredients to be present in a single pharmaceutical composition, as often combination therapies can be administered separately. For example, one supplier could provide one drug and another supplier another drug, which is then administered to the patient simultaneously but separately (e.g. through intravenous administration via separate IV bags). The patent claims must therefore make provision for a variety of scenarios covering different administration regimes, or else it can be easily circumvented.
- Third, careful selection of the country of protection is necessary because some countries do not allow patents to be enforced against entities that are not performing all the steps in the patent claims. This is known as contributory or indirect patent infringement. It is particularly important for combination therapies that do not require administration through a single pharmaceutical composition (see previous point). A patent for such combination therapy should therefore only be filed in countries that allow for contributory infringement, so that the patentee can institute legal action against a supplier of the individual pharmaceuticals covered by the combination patent. Different countries have different rules, some more restrictive than others and, in practice, contributory infringement may be difficult to enforce due to these restrictions. In Australia, for example, contributory infringement can only be instituted if (i) the supplied product is only capable of one reasonable use; (ii) the product is not a "staple commercial product" and the supplier had "reason to believe" that the end user would use it in an infringing way; and/or (iii) the product is supplied with explicit instructions to use it in an infringing way. Actions for contributory infringement can also be instigated in countries like Korea, USA, Canada and possibly China and Japan, with similar requirements. Combination therapy patents are not recommended for India. Patents for combination therapies are routinely filed in South Africa.



Prof Virna Leaner
*Head: Division
of Medical
Biochemistry and
Structural Biology*



Dr Pauline van der Watt
*Research Officer: Division
of Medical Biochemistry
and Structural Biology*

In summary, filing combination patents could be very advantageous for universities. It could present clear and compelling opportunities for licensing the patents to the producers of the individual compounds – particularly where the combinations improve the efficacy of those individual compounds and reduce the potential side effects. If the combinations are based on individual compounds patented earlier by the same university, it could extend the length of effective protection, which will buy more time for the university to complete preclinical work in relation to the original compounds and seek specific partners to commercialise it for specific applications where benefits have been shown. When the original patents lapse, the combination patents may still have useful life left for commercialisation.



The impact of this technology extends beyond Africa

UCT's groundbreaking DNA vaccine platform

Animal diseases significantly impact livestock health and productivity, with far-reaching consequences for food security and economic stability.

This is why a team led by **Prof Anna-Lise Williamson**, former Chair of Vaccinology in the South African National Research Foundation SARCHI programme and professor at the University of Cape Town's (UCT) Institute of Infectious Disease and Molecular Medicine, is pioneering a revolutionary platform technology. Prof Williamson and her team, including **Dr Ros Chapman** and **Dr Nicola Douglass**, are working on a recombinant lumpy skin disease virus (LSDV) DNA vector,

which promises to transform veterinary medicine by enabling the development of multiple vaccines tailored for cattle and other animals in a single product.

Harnessing this proprietary vector also enabled the team to develop a portfolio of dual vaccines targeting several critical diseases, including bovine ephemeral fever, rabies, East Coast Fever and foot-and-mouth disease. These dual vaccines not only protect against multiple diseases simultaneously but also promise to improve animal health and well-being, thereby reducing the transmission of these diseases among key production animals.



Prof Anna-Lise Williamson
*Director of Vaccine Research
Group: Institute of Infectious
Disease and Molecular
Medicine*



Dr Ros Chapman
*Research Officer:
Division of Medical
Virology*



Dr Nicola Douglass
*Research Officer:
Division of Medical
Virology*

The potential benefit of this platform is that it will enable the development of cost-effective vaccines because it enables multiple therapeutic disease targets, making them more accessible to farmers in resource-limited settings.

The development of the technology was funded with the support of the Technology Innovation Agency (TIA). The RC&I team is also actively engaging with key South African and international vaccine manufacturers to navigate the commercialisation and regulatory hurdles that often accompany new biotechnologies. By working closely with industry leaders, RC&I is laying the groundwork for the widespread adoption of these vaccines, and potentially establishing its own manufacturing company to ensure consistent and efficient production.

The impact of this technology extends beyond Africa. By providing a scalable and effective solution to some of the most pressing animal health challenges, UCT's LSDV DNA vector platform exemplifies how African innovation can contribute to global advancements in science and technology. This pioneering work not only enhances animal health but also underscores the vital role that African research institutions play in addressing worldwide issues through cutting-edge innovation.



By providing a scalable and effective solution to some of the most pressing animal health challenges, UCT's LSDV DNA vector platform exemplifies how African innovation can contribute to global advancements in science and technology.



A breakthrough in sustainable agriculture

A long-standing collaboration between University of Cape Town (UCT) researchers in the Molecular and Cell Biology and Chemistry Departments has led to a breakthrough in sustainable agriculture, one that represents a significant stride in green chemistry and sustainable agriculture, showcasing African excellence that holds global promise and addresses key Sustainable Development Goals (SDGs).

UCT has always been at the forefront of groundbreaking research and innovation. One of the ways in which the university encourages research and innovation is through fostering a culture of collaboration and multidisciplinary partnerships.

This spirit of pioneering and transdisciplinary research brought together **Assoc Prof Anwar Jardine**, Head of the Department of Chemistry; **Assoc Prof Suhail Rafudeen**, Head of the Department of Molecular and Cell Biology; and **Dr Naadirah Moola**, who conducted the breakthrough research as part of her joint PhD programme with UCT and Belgium's Ghent University.

Prof Jardine, a leader in the field of complex organic carbon polymer chemistry, developed a novel green chemistry process to improve the solubility of chitosan, a natural biopolymer derived from chitin, which is abundantly found in the exoskeletons of crustaceans and insects, particularly in black soldier fly larvae. The abundance of chitosan and its source from a renewable and sustainable supply chain aligns perfectly with the principles of the circular economy. This innovative process not only enhances the solubility of chitosan but also paves the way for its broader application in various industries, notably agriculture.

Dr Moola, under the joint supervision of Prof Jardine and Prof Rafudeen, demonstrated the antifungal, antimicrobial and plant bio-stimulation properties of a simple formulation of the diamino chitosan. Her research data confirmed the potential of this formulation to revolutionise agricultural practices. By reducing reliance on chemical pesticides through its use as a foliar spray, this innovation



**Assoc Prof
Anwar Jardine**

*Head: Department
of Chemistry*



**Assoc Prof
Suhail Rafudeen**

*Head: Molecular
and Cell Biology*



Dr Naadirah Moola

*Postdoctoral Fellow:
Molecular and Cell
Biology*

addresses key SDGs, including 'Responsible Consumption and Production' and 'Life on Land'.

The team's work exemplifies how African-led research can contribute to global challenges, offering sustainable solutions that can be adopted worldwide. The formulation not only promises to enhance food production by stimulating plant growth but also ensures a safer and more sustainable approach to crop protection.

The journey from lab to field was supported by RC&I, which provided the team with small grants and facilitated industry engagements to explore the commercialisation potential of their work. The research results underscore the value of academic-industry partnerships in translating research into practical applications. Profs Jardine and Rafudeen led engagements with industry players along the agrichemical value chain, from black soldier fly producers to potential end-users such as multinational chemical companies, farmers, specialised packaging companies, and post-harvest processing companies.

This research showcases how homegrown solutions can address global issues, reinforcing UCT's commitment to fostering research that transcends borders and benefits the world.



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Contributing to South Africa's development challenges is one of UCT's strategic goals and the aim is to share knowledge that will benefit society.

New and exciting inventions have materialised from the UCT ecosystem in 2023.

Here are the names of the inventors behind the newly patented technologies.

Adebukola Daramola	Nikhil Bejrajh
Alia Sadiq	Nonhlanhla Khumalo
Amir Patel	Olusiji Akinrinmade
Ardeshir Bayat	Philippa Randall
Edward Rybicki	Relebohile Matobole
Frederick Nicolls	Sampath Jayalath
Inga Hitzeroth	Shivan Chetty
Keertan Dheda	Sinkala Musalula
Khilona Radia	Stefan Barth
Krupa Naran	Stephen Paine
Kukhokuhle Tsengwa	Sudesh Sivarasu
Marc Henry	Tertius De Villiers
Matthys Potgieter	Thomas Scriba
Munyaradzi Musvosvi	Yumna Albertus
Nicholas Kruger	

New inventions

Diagnostic for Extrapulmonary
Tuberculosis (TB) Detection

Cervical Traction Device

Immunotoxins to Attack
Cancer Cells

Immortalised Human Keloid Cell Line

Repurposed Drugs and
Timed Treatment Regime to
Prevent Keloid Formation

Radar-based Contactless
Muscle Monitoring

Non-Planar / Curved Wireless Charger

Dual Vaccine Against
Human Papillomavirus (HPV)
and Gonorrhoeae

mRNA anti-TB Vaccines

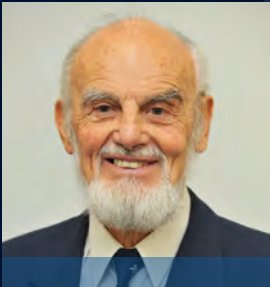


Great inventors of the past



Professor Deon Bezuidenhout

It is with great sadness that we had to come to terms with the untimely and sudden death of an inventor and colleague, Prof Bezuidenhout on April 16, 2023. Prof Bezuidenhout was a kind-hearted soul with great empathy for all and a true desire to encourage and facilitate research, collaboration, and, above all, furtherment of his students and staff. He co-founded the UCT spin-off company, Strait Access Technology, where he was the technical director for developing low-cost polymer transcatheter heart valves specifically aimed at treating patients with rheumatic heart disease in the developing world.



Emeritus Professor Peter Beighton

We were saddened by the loss of Emeritus Prof Beighton in 2023. A remarkable leader and innovator who helped introduce and transform the field of Human Genetics in South Africa (SA).

In 1972 he joined the University of Cape Town (UCT) and Groote Schuur Hospital as the first Professor of Human Genetics. Under the guidance of Prof Stuart Saunders (head of the Department of Medicine at that time, and subsequently the vice-chancellor of UCT), he established the Department of Human Genetics within the Department of Medicine at UCT.



Emeritus Professor George Ekama

With heavy hearts, we bid farewell to Emeritus Prof Ekama, a well-established world leader and innovator in the wastewater treatment field. His research was part of the original biological nutrient removal modelling research which developed at UCT in the 1980s and was incorporated into the famous IWA (International Water Association) Activated Sludge Models. These models have had a profound impact on biological nutrient removal research worldwide. Prof Ekama received numerous accolades for his work throughout his career.

THANK YOU

INTELLECTUAL PROPERTY ADVISORY COMMITTEE (IPAC)

IPAC makes the decisions regarding UCT Evergreen Fund investments, recommends the appointments to spin-off companies, and needs to deal with the often urgent issues that arise in the life of fledgling start-ups. The committee provides guidance and steers policy development in the innovation space, striving for best practices. IPAC meets five times a year, excluding ad hoc meetings and round-robin decisions. **Prof Jeff Murugan:** Deputy Vice-Chancellor (acting): Research & Internationalisation (Chair), **Mr Mughtar Parker:** Chief Operating Officer (acting), **Mr Vincent Motholo:** Chief Financial Officer, **Mr Hardy Maritz:** Director: Commercial Development; **Prof Jonathan Blackburn;** **A/Prof Philippa Tumubweinee** and **Prof Liesl Zühlke.**

PRIVATE EQUITY ADVISORY GROUP (PAG)

PAG comprises a group of experts in the entrepreneurship and private equity investment space who advise both RC&I and IPAC on investments made by the UCT Evergreen Fund into spin-off companies. They propose deal structures and draw on their experience and sector knowledge. **Mr Gasant Orrie** and **Mr Limont Lehman.**

INNOVATION BUILDER FUND INVESTMENT COMMITTEE

UCT provides a budget to support technology development and innovation to mature the UCT IP portfolio. The Innovation Builder Fund Investment Committee (formerly the TIA Seed Fund Steering Committee) awards up to R500,000 to projects. The committee comprises UCT representatives with different technical expertise, aligned with our technologies as well as external members who have technology development and/ or start-up company experience. The committee is chaired by Piet Barnard, Director: RC&I and there are currently 33 active projects. Funding is tranching and project progress (monitored by the RC&I team) is reported on at committee meetings, which are held quarterly. Committee members include: **Dr Caryn Fenner** (external), **Prof Kit Vaughan** (external), **Prof Melissa Densmore,** **A/Prof Neil Ravenscroft,** **Mr Abu Adams.**

UCT-APPOINTED DIRECTORS

Whilst numerous individuals are appointed as Directors to a variety of UCT companies and trusts, the list here only includes people who are appointed to spin-off companies that are commercialising IP developed through UCT research. Appointments are only permitted when UCT holds above a threshold equity amount of equity in a company.



Prof Petro Terblanche - Strait Access Technology Holdings, **Mr Tony Pick** - Cape Bio Pharms and Elemental Numerics; **Dr Ntokozo Mthembu** - Cape Catalytix; **Dr Makhapa Makhafole** – HyPlat, **Ms Zanele Mbatha** – HyPlat, **E/Prof Cyril O'Connor** - HyPlat **Dr Susan Winks** – Nautilus Enterprises; and **Ms Hema Vallabh** – Hydrogen Energy Applications, **Mr Rowan Spazzoli** – MariHealth Solutions, **Mr Sebastian Primm** – Acinotech and **Ms Hilda Martins** – Sleep Science.

DEPARTMENT OF SCIENCE & INNOVATION (DSI) NATIONAL INTELLECTUAL PROPERTY MANAGEMENT OFFICE (NIPMO)

RC&I is in the first year of our fifth NIPMO-funded capacity development project. This has been a key enabler in establishing the RC&I technology transfer operation at its current level. The funding has supported new positions that have been adopted by UCT once trialled, as well as a range of awareness-raising activities focused on both IP and the marketing of technologies. Support is provided to facilitate RC&I's engagement with industry and commercial partners in a variety of modes, including expos. NIPMO also provides a 50% rebate of expenses incurred by UCT in the protection of our intellectual property portfolio. This greatly extends the ability that UCT has to support this important activity. The support of NIPMO on several levels is gratefully acknowledged.

UNIVERSITY TECHNOLOGY FUND

UCT is a Special Partner of the University Technology Fund (UTF) which was established by the SA SME Fund. We appreciate the ongoing support from both the SA

There are a number of people and funders who make a valuable contribution that supports our innovation activities, the people generally also do this mostly pro bono, and we appreciate what they do.

SME Fund (Pre-Seed and Seed-stage investments) and the UTF for investing in UCT companies and technologies. The relationship with the UTF Fund Managers, **Mr Wayne Stocks** and **Mr Daniel Strauss** has helped to shape the nature and direction of our spin-off companies as they review our pipeline of investment opportunities.

IP POLICY REVISION WORKING GROUP

Faculty and special representatives have constituted a Working Group to assist RC&I with the review and revision of the UCR IP Policy. A wide range of viewpoints have been ensured due to the diverse interaction with IP across the university. The Working Group has diligently reviewed drafts and suggested areas of classification and where implementing practical means of compliance need to be considered and implemented.

E/Prof Jack Fletcher, Prof Caroline Ncube, A/Prof Phumla Sinxadi, Prof Adam Haupt, Mr Jacques Rousseau, Prof Ralph Hamann, Prof Ulrike Rivett, E/Prof Edward Rybicki

INVESTMENT COMMITTEE FOR THE EVERGREEN SEED FUND

We appreciate the ongoing support of the Evergreen Seed Fund Investment Committee. Committee members include:

Limont Lehman, Sebastian Prim, Dr Rein Weber and Dr Jaco (JP) Theron.

Since its launch, a steady stream of spin-off companies has emanated from UCT's Research Contracts and Innovation, many of which the university holds equity in.

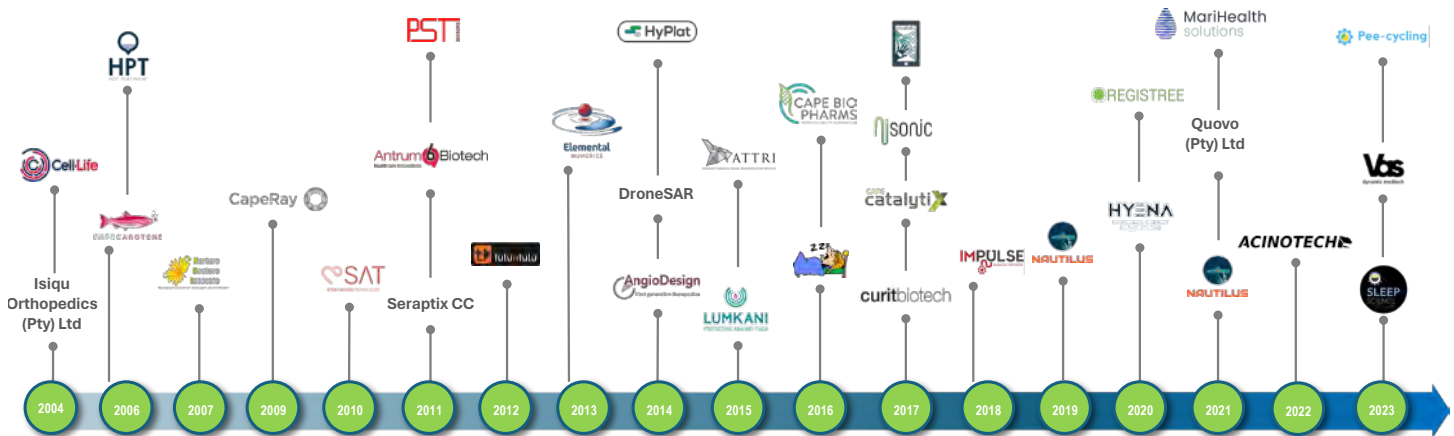


RESEARCH CONTRACTS & INNOVATION

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The Department of Science & Innovation's National Intellectual Property Management Office (NIPMO) is gratefully acknowledged for the financial support that it provides to RC&I for the production of this brochure as well as a host of other technology transfer activities and support to establish new posts and develop the capacity of existing staff. NIPMO also provide UCT with an up to 50% rebate of our IP protection expenses.

