

KNOWLEDGE TRANSFER RESEARCH TO IMPACT



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Foreword



Trinity, through its research, educational programmes and partnerships with industry, has contributed significant social and economic impact to Ireland.

Impact can be a difficult concept to tie down and measure. For Trinity it is straightforward. It is how our staff, students and graduates positively influence the world. It is how the research excellence for

which we are internationally renowned is translated to provide new solutions, technologies, and processes which increase the competitiveness of industry; enable life changing products to be developed and result in increased employment and improved quality of life.

Economic impact can be achieved through many mechanisms: The creation of new campus companies which commercialise Trinity research; the incubation and housing of new Irish businesses; the training of our graduates and research focused PhD students who are recruited to drive innovation in industry; the licensing of new technologies to existing businesses, increasing their competitiveness and feeding their innovation pipelines; and the development of collaborative research programmes with industry where Trinity focuses its world leading infrastructure and research expertise to solve the innovation challenges of our partner companies.

At the heart of enabling all of this activity is Trinity Research and Innovation; which encompasses the Office of Corporate Partnership and Knowledge Exchange. This office acts as the interface between our researchers and the commercial world;

building the bridges and interfaces which connect Trinity to both the entrepreneurial and commercial ecosystems. It also supports our academics in identifying and protecting their ideas which can change the world.

In 2014 Trinity registered its 500th invention disclosure; which is the first step in the chain of translating research to create impact. These inventions have resulted in the creation of 42 new campus companies and the licensing of 126 technologies to industry. The 500 inventions represent a decade of innovation and the hard work and dedication of our researchers and the team which connects these researchers with enterprise.

I hope this booklet provides an insight into how Trinity research is creating impact and is an appropriate testament to the Trinity research community; the funding agencies who support our research and the industry and entrepreneurial partners who we work with to translate this research to create value for Ireland.

Trinity as it implements its Innovation and Entrepreneurship strategy remains increasingly committed to impact. We look forward to how the next 500 inventions will change our world.

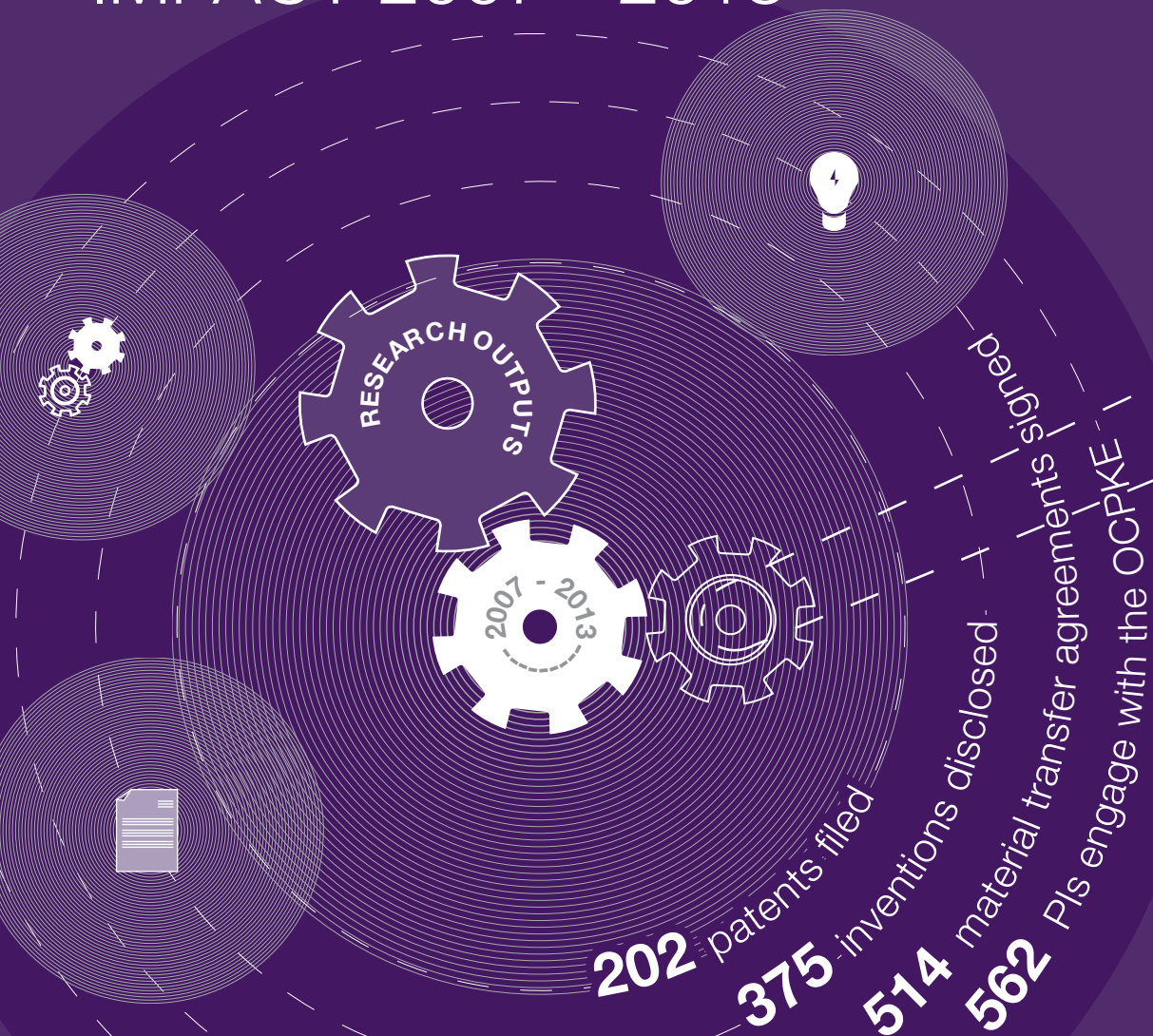
Dr. Diarmuid O'Brien

Dr. Diarmuid O'Brien

**Director Trinity Research & Innovation,
Trinity College Dublin**

Office of Corporate Partnership and Knowledge Exchange

TRINITY KNOWLEDGE TRANSFER IMPACT 2007 - 2013





The infographic features a central gear with the text 'RESEARCH IMPACTS' inside it. To the left of the central gear is a circular icon containing a double-headed arrow. Below the central gear is a circular icon containing a microscope. To the right of the central gear is a circular icon containing a network of nodes connected by lines. The background is a dark purple with concentric dashed circles. The text '39 spinout companies' is written in a curved path around the central gear.

39 spinout companies

250+ jobs created from spinouts

59 Patents Granted

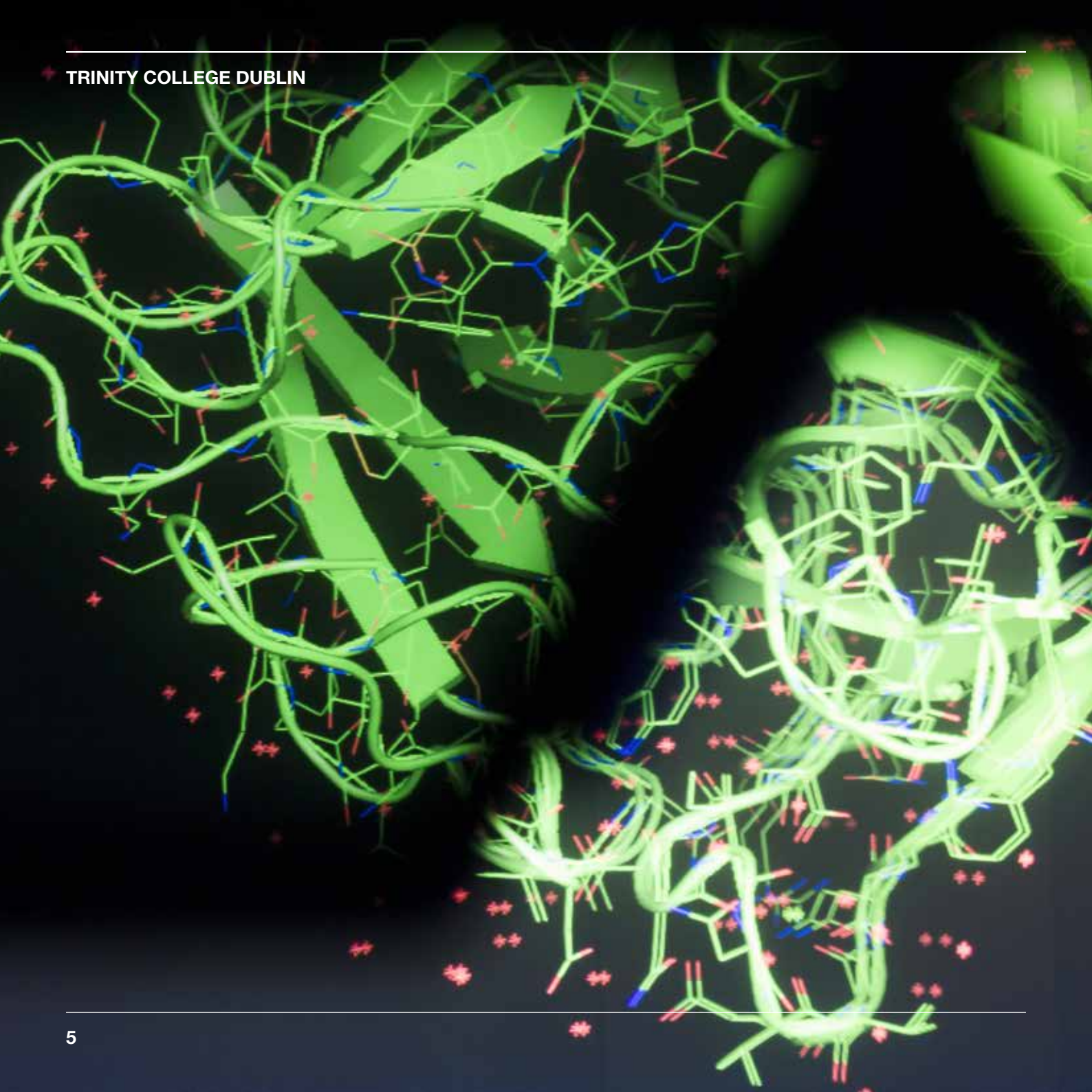
50+ companies incubated at Trinity

300+ collaboration agreements

107 licence agreements

450 PIs involved in Industry Collaboration

400+ Industry Partners



Knowledge Transfer in Action

Case studies: Trinity Research to Impact

The Office of Corporate Partnership and Knowledge Exchange translates the research of our academics to achieve both economic and societal impact.

The impacts described in the case studies are diverse in nature but all are derived from world leading research and education. Knowledge Transfer is a multi-faceted activity and key impacts include:

- The creation of new campus companies which commercialise Trinity research.
- The incubation and housing of new Irish businesses.
- The training of our graduates and research focused PhD students who are recruited to drive innovation in industry.
- The licensing of new technologies to existing businesses.
- Collaborative research programmes with industry.

Trinity is structured specifically to deliver impact from our research. The OCPKE brings together all the parts of the university that are required for a deal to be completed with industry. This centralisation of function ensures that the pathway for industry to engage is simple, flexible, professional and proactive; and that any challenges can be acted upon in a decisive manner.



Vaccine Technology

GSK - *Staphylococcus aureus*

Prof. Tim Foster - School of Microbiology & Genetics



GSK – Trinity Licence

Through initial links with Prof. Foster, GSK licensed Trinity's *Staph. aureus* ClfA technology in 2008 and evaluated it in a clinical trial. In that trial, the ClfA part of a combined vaccine also included three other antigens: the vaccine induced functional antibodies against ClfA as of day 14 after the first vaccine dose and ClfA-specific CD4+ T-cells with Th0/Th1 cytokine profile were induced but at low levels. This research has helped provide critical insights into the complexities of developing a *Staph. aureus* vaccine.

Background

Staphylococcus aureus infection is caused by a strain of Staphylococcal or 'staph' bacteria that become resistant to the antibiotics commonly used to treat ordinary infections. Since its first appearance in 1960 antibiotic resistant strains (methicillin-resistant *Staphylococcus aureus*; MRSA) have become widespread in medical facilities and cause life-threatening bloodstream infections, pneumonia and surgical site infections. Furthermore, community-acquired MRSA can spread readily from person to person. This has been found in many countries, including Ireland, and can cause severe infection in otherwise healthy individuals.

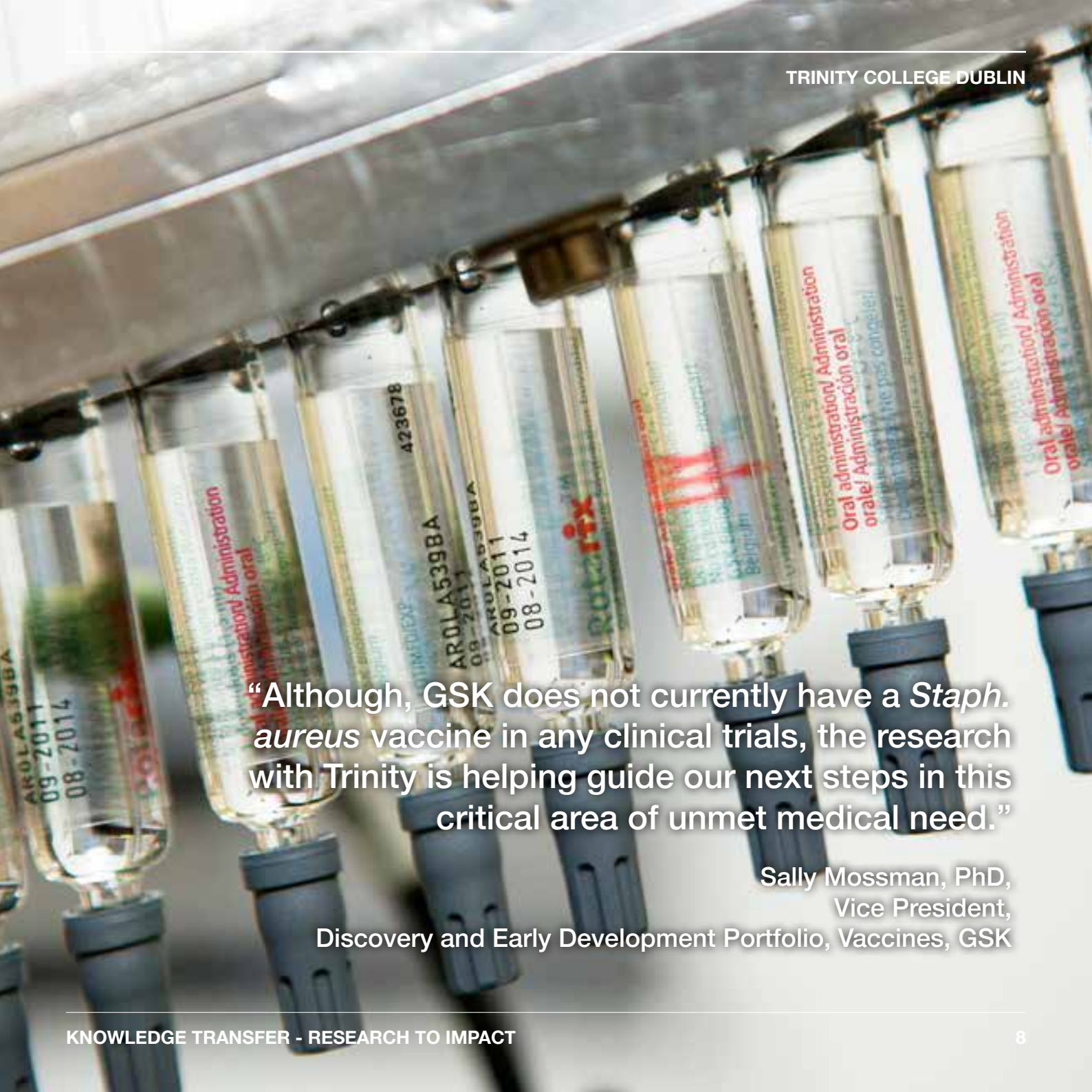
Intellectual Property Description:

The intellectual property developed by Prof. Tim Foster of the School of Genetics & Microbiology in 2008 relates to a potential new and improved investigational vaccine in development for possible use in the prevention of Staphylococcal infections. Patents are pending in worldwide jurisdictions, with patents already granted in four. Specifically the IP is an alternative and potentially improved therapy for preventing Staphylococcal infections, through genetic mutation of the 'clumping factor A protein', an adhesion protein component of *Staph. aureus*, required for bacterial infection.

Scope of problem :

The absence of an efficacious *Staph. aureus* vaccine is a major global, clinical, economical and societal problem. An estimated 25,000 in-patients develop healthcare associated *Staph. aureus* infection annually, in Ireland. The average cost of treating a patient in Ireland with MRSA is €3,221 per case and patients who acquire an infection stay in hospital 2.5 times longer than other patients, averaging 11 additional days. Furthermore, patients who acquired an infection in hospital were 7.1 times more likely than uninfected patients to die in hospital. In the United States, community acquired MRSA imposes an annual burden of \$478 million to \$2.2 billion on third-party payers and \$1.4–13.8 billion on society¹.

GSK remains convinced of the medical need for an effective *Staph. aureus* vaccine. However, the recent developments in the field in general have highlighted the scientific and clinical challenges associated with defining the antigens to include in a vaccine and the need to understand more about what constitutes protective immunity against *Staph. aureus* and how to induce it through a safe vaccine. Although, GSK does not currently have a *Staph. aureus* vaccine in any clinical trials, the research with Trinity is helping guide our next steps in this critical area of unmet medical need.



“Although, GSK does not currently have a *Staph. aureus* vaccine in any clinical trials, the research with Trinity is helping guide our next steps in this critical area of unmet medical need.”

Sally Mossman, PhD,
Vice President,
Discovery and Early Development Portfolio, Vaccines, GSK



Creme Global

Creme Global licensed IP (software, data and knowhow) from Trinity in 2005 enabling them to build a business in the area of predictive intake modelling. They have since gathered unique data sets on consumer habits, practices, consumption and chemical occurrence from all over the world and further developed the software tools and consultancy expertise.



Research Impact

Creme Global specializes in predictive intake modelling software, services and data, which enables better decisions across product formulation, health, consumer safety and innovation. Creme Global is unique in being able to predict the health implications of consumer intakes from all food and product types simultaneously i.e. aggregate exposure. This includes ingestion, inhalation and dermal absorption routes. Clients include manufacturing companies, industry associations, government regulatory agencies and safety authorities in the food, nutrition, cosmetics, fragrances, personal care, packaging, crop sciences and chemicals sectors.

Key Impact

- **26 jobs created in Ireland**
- **Modelling software & Consultancy Services on the market**
- **Patents & Scientific publications secured**

Thomas Swan

Thomas Swan has funded an industrially focused research project collaborating with AMBER and utilising Prof Jonathan Coleman's expertise in the field of graphene production, to develop methods to produce pure graphene on an industrial scale.



Research Impact


Graphene is both the strongest and most conductive material known to man. Applications for graphene include next generation electronic devices, mechanically strengthened plastics and new thermoelectric materials. However, production on an industrial scale is a significant challenge.

Thomas Swan embedded a researcher within Trinity College Dublin to ensure the programme was continually aligned to the company's strategy.

New patents have been applied for and Thomas Swan has licensed from Trinity the scalable graphene production developed in this collaborative project.

Key Impact

- **Breakthrough in production of 'Super-material' on an industrial scale**



“Igor is a natural born entrepreneur
– spins them off and lets them go.”

Ray Naughton, Entrepreneur
& Business Angel



Trinity enabling serial entrepreneurs

Professor Igor Shvets

Trinity sees innovation as an underpinning capability which is required to translate education and research excellence to create social and economic impact. Innovation and the development of entrepreneurship are now a core part of the Trinity story, and we are dedicated to enabling serial entrepreneurs like Professor Igor Shvets. Igor holds the Chair of Applied Physics in Trinity and is Head of the School of Physics. He is also a serial inventor and entrepreneur and in 2005 was awarded the Trinity Innovation Award.

Background

After a PhD in the USSR Academy of Sciences, Igor came to Trinity as a lecturer in 1991. He has supervised 38 PhD and MSc students to date and currently has 9 PhD students and 6 postdoctoral staff. He has 13 patent families to his name and has successfully spun out three campus companies.

Allegro Technologies

In 2000 Igor spun out Allegro Technologies (trading as Deerac Fluids) with Jurgen Osing, based on a technology for the dispensing of microlitre and nanolitre volumes of a wide range of liquids. In 2008 Allegro Technologies were bought by Labcyte Incorporated in order to offer a broader product range. Today, Labcyte are leaders in acoustic liquid handling for the life sciences industry. Moving liquids with sound, Labcyte technologies enable a wide range of liquids necessary to assemble miniaturised assays for biochemical and cell-based screening.

Cellix

In 2005 Cellix Limited was spun out of Trinity by Vivienne Williams, Dmitry Kashanin and Igor. Cellix develops, manufactures and sells microfluidic pumping solutions and biochips based on patents filed in a collaborative research programme between the School of Physics and Clinical Medicine at Trinity. In addition to being short-listed for the 2012 Irish Times Intertrade Ireland Innovation Award, Vivienne recently won the 2013 Trinity Innovation award.

Miravex

In 2009 Miravex Ltd was spun out of Physics by Guido Mariotto, Roman Kantor and Igor. Miravex develops a novel 3D imaging camera from research funded by Enterprise Ireland, allowing multi-spectral analysis of epidermis and dermis. Miravex are targeting the cosmetic surgery industry - aesthetic doctors, dermatologists and plastic surgeons. They and have sales in Europe, Russia, North and South America.

Igor's current research is in the diverse areas of energy and transparent conductive materials, ensuring that his impact on Irish startups is set to continue.

VenueOne

VenueOne gained expert Knowhow in the area of media content creation, management and delivery through an Enterprise Ireland Innovation Voucher Fast Track Project with Trinity College.

Research impact

VenueOne's new venture, Bean Bag



Sports, is a fully functional social media network for sports fans.

It provides a platform for both fans and professionals alike to connect and interact. VenueOne needed Trinity's computer science expertise help them deliver their on-line media streaming solution. Trinity's researcher investigated ways for VenueOne to simplify and scale their ability to deliver live and on-demand content to their global Content Management System (CMS) partners, while reducing costs. Trinity also assisted VenueOne with the challenging problem of providing groups of users on their social network with a shared interactive experience when viewing live and delayed events.

Key Impact

- **Created 25 jobs in Ireland**
- **Investment Received**
- **Developed & launched new social media networks**

Trinity Brain Health Ltd / FreeDem films

Dr. Sabina Brennan of the Institute of Neuroscience and School of Psychology has produced 10 quirky animated 'FreeDem' films relating to brain health awareness, now exclusively licensed to a campus company, Trinity Brain Health Ltd.

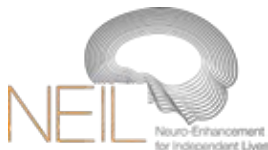


Research Impact

There are currently 41,740 people living with dementia in Ireland, and by 2041 there will be over 140,000. Stigma associated with dementia prevents open discussion of the condition and encourages the false belief that nothing can be done for people with dementia and their families. The films aim to increase public and professional awareness around the important issues of memory loss and brain health while at the same time tackle the stigma and fear that can accompany a diagnosis of Alzheimer's disease and dementia in later life. Each film addresses a question relating to brain health or dementia that older people identified as important.

Key Impact

- **139,000 online views in over 140 countries**
- **14 royalty free licences granted to non-profit entities for use & dissemination**



Innovative Polymer Compounds

IPC combined its own expertise with the polymer science expertise of Dr. Ramesh Babu's group at the CRANN Institute in Trinity College Dublin to develop PEBASlide technology to deliver to the market Pebax polymers with reduced friction and added functionality for use in medical devices.



Research Impact

The licensed technology allows IPC to enhance the properties of PEBAX, a widely used polymer in the medical device industry. Reducing the friction of medical tubing as it passes through blood and other vessels within the body is critically important to enable advanced catheters and stents to be deployed into even smaller blood vessels such as those present in arms, legs and the brain.

Key Impact

- **Product launched 2014**
- **Pebax polymers with enhanced properties brought to market**
- **Enables advanced catheters and stents to be deployed into small blood vessels**

µPower

Prof Tony Robinson and his team in Mechanical Engineering have developed a wood fueled cooking stove which uses a thermoelectric generator to convert heat into electrical power to benefit the developing World.




Research Impact

The final design has developed over numerous field trials and visits to Malawi, Africa. Modified clay stoves produced locally are connected to imported microprocessor based smart electronics and locally produced heat sinks. They allow households to generate light, charge mobile phones and rechargeable batteries via a USB power source.

2.7 billion people still cook over open fires. 1.6 billion people have no electricity. Fuel lamps commonly used are expensive to run and pose a health risk from fumes and fire. The socioeconomic benefits from improved communication and lighting and minimising health risks is very much welcomed by the local communities.

Key Impact

- **Huge social impact on developing World**
- **Supported by Irish Aid, Intel, ESBI and Enterprise Ireland**
- **Currently being rolled out with partners Concern Universal**



“Without access to Trinity’s technical capabilities,
it would be next to impossible for SMEs like us to
innovate.”

Henrik Bjoerk, Managing Director, IPC



*Probability (Success) \propto (Technology¹
+ Team² (Sales + Marketing)³)*

Steve Collins on the Probability of Success



Trinity Spinouts: Founder of Havok, Swrve & Kore

Steve Collins

Trinity College Dublin has acted as a platform for a number of successful spinouts. At the heart of such successes are the researchers and entrepreneurs that drive - and indeed are driven by - entrepreneurial achievement, none more so than Steve Collins, one of the most successful entrepreneurs ever to emerge from Trinity and recipient of the Trinity Innovation Award in 2007.

Most recently, together with Hugh Reynolds (also ex-Trinity), Steve's Trinity spinout Swrve has raised US\$10m in a second round of funding from Silicon valley investors. Swrve now employs 50 people and this is scheduled to increase significantly as a result of the latest funding.

Swrve is a data analytics company focussing on helping companies increase purchases from within mobile apps, by combining class-leading analytics, segmentation, AB testing, in-app messaging and push notification campaigns in a unified platform that allows monetization managers to continually test apps by tracking user behaviour, targeting specific user segments, tuning in-app elements, and talking to users via in-app messages and push notes.

Background

Steve first started working in computer gaming for Domark in 1986 and in 1989 he ported the arcade game Badlands from Atari to the Commodore 64.

Following a stint with Hitachi in Japan he took up a position as Lecturer in the School of Computer Science at Trinity College Dublin where he became director of the Graphics Research Group.

Havok

In 1999 he combined his industrial and academic experience to found Havok - based on a research project to develop real time physics simulation for computer games.

The Havok success story is well documented - in 2007 the company was acquired by Intel for USD110million. Havok continues to grow and now employs over 200 hundred people mostly in Ireland.

Havok's technologies - based on technology developed in Trinity - have been used in over 500 game titles including top franchises such as Halo, The Elder Scrolls, Assassin's Creed, Call of Duty, Uncharted, Dead Rising and Skylanders.

Its products have also been used to drive special effects in movies such as X-Men First Class, World War Z, Harry Potter, James Bond, and The Matrix.

Continued Success

After the sale to Intel, Steve returned to Trinity College as a Lecturer and researcher but once again the entrepreneurial spirit took him and in 2008 he launched a Trinity campus company with a product known as Kore. This company is based on technology developed in computer science at Trinity with Professor David Gregg.

Kore is a scripting language for game development and after employing a number of people, it in turn was sold to Havok for a significant sum in 2010. The Trinity technology is now branded as Havok Script within the Havok product suite.

Steve continues to work with Trinity, providing insight and expertise to those involved with entrepreneurship such as the students of the Innovation Academy.



Glanta Ltd: *SureWash*

GLANTA Ltd is a Trinity College Dublin spin-out company founded by Gerard Lacey and Sean Bay to commercialise SureWash, an advanced mobile hand hygiene training and assessment solution.



Research Impact

The spread of diseases in hospitals is one of the World's most pressing problems. SureWash aims to vastly improve hand hygiene in hospital wards and to make training and compliance much less labour intensive.

The SureWash product range helps hospitals to implement the World Health Organisation (WHO) hand hygiene improvement strategy by ensuring that hand hygiene training, evaluation and feedback is accessible to staff, 24-7. It also provides interactive reminders for staff and visitors, helping everyone to improve their hand hygiene.

Key Impact

- **Helps to prevent the spread of disease in hospitals**
- **Patents granted in EU & USA**
- **Product being used in hospitals worldwide**

Nicotine Patch

Trinity scientists Profs. John Corish and Owen Corrigan together with co-inventors Yvonne Bannon, Edward Geoghegan and Joseph Masterson filed the patent application "a Method for the treatment of withdrawal symptoms associated with smoking cessation" in 1988.



Research Impact

In the mid-1980s pharmaceutical companies recognised the major market potential for nicotine replacement therapy. The barrier, or technical challenge at the time was that nicotine is poorly absorbed from the stomach (due to acid protonation). However in the mid-80s transdermal drug delivery technology was in its infancy and nicotine delivery was in the vanguard for development on this platform. With 1.2 billion tobacco users in the world – the market for smoking cessation products was estimated at USD1 billion in 1990 and stands at USD 5.1 billion in 2012 and is estimated to grow to USD 16 billion by 2019.

Key Impact

- **1st Irish Company to list on the NYSE**
- **Estimated first year sales of \$200M**
- **Recorded sales of \$1.9 billion by 2001**

Creating new pharma companies

A pipeline of success stories

Trinity has an unrivalled track record of creating pharma spinouts which have attracted significant financial investment. Genable, Trino, Opsona and Solvotrin have collectively attracted over €60 million in the past 5 years. The intellectual property on which these companies were founded was identified and protected by the Office of Corporate Partnership and Knowledge Exchange together with the academic founder inventors.

Licensing mechanisms provided the spinouts with appropriate rights and commercial terms around their key assets to enable large scale funding to flow in from sophisticated international investors. The companies maintain a physical presence in Trinity, either embedded in high-tech laboratories on campus or in the companies own leased facilities at Trinity incubator units in the Trinity Technology Enterprise Centre. Trinity pharma companies can often leverage equity funding through Enterprise Ireland's Innovation HPSU fund. Research funding can also be leveraged through EI and SFI centres, such as the Solid State Pharmaceutical Cluster (SSPC) or AMBER, of which Trinity is a partner.

Trino Therapeutics is a Drug discovery and development company focused on anti-inflammatory therapeutics, founded by Prof. Helen Sheridan & Prof. Neil Frankish. The company is currently completing GMP manufacture and pre-clinical evaluation of first-in-class oral small molecule drug for inflammatory bowel disease which could be used in both ulcerative colitis and Crohn's disease.

Opsona Therapeutics is a Drug development company for autoimmune and inflammatory diseases based on Toll-Like Receptors and inflammasome signalling, founded by Prof. Luke O'Neill, Prof. Kingston Mills and Prof. Dermot Kelleher. They are currently completing Phase 2a clinical trials.

Solvotrin Therapeutics develops drugs for the prevention of intestinal lining damage due to continued medication which provides major benefits as an anti-metastatic agent in colorectal cancer due to its aspirin antiplatelet effects. Solvotrin was founded by Prof. John Gilmer, Pat O'Flynn, and Dr. Mark Ledwidge.

Genable, founded by Prof. Jane Farrar, Dr Paul Kenna & Professor Peter Humphries, develops products for the treatment of patients with rhodopsin (RHO)-linked autosomal dominant retinitis pigmentosa (adRP) - a debilitating, progressive form of inherited blindness resulting from a diverse array of mutations in the RHO gene. Their lead product GT038 (orphan drug status in US and EU) has undergone successful proof of concept studies in mice and pigs, and first-in-human studies are planned to begin in 2015.



“The Trinity team is proactive and responsive and delivers outstanding support as a Solvotrin partner”

Pat O’Flynn, Solvotrin



Fenestra Pro

Trinity College Dublin delivered a web based façade design software and functional prototype to Fenestra Pro, to aid in the design of environmentally efficient non-domestic building façades more cost effectively.



Research Impact

Building analysis software and processes are complex, they consider multiple aspects of the building and require the design to be practically complete – therefore are generally used late in the design process.

Fenestra Pro improves the process of facade design by allowing real-time compliance checking (including regulatory and environmental standards) from an early stage in the design process, thereby eliminating the requirement for redesign late in the process. It also allows building designers to optimise thermal, solar and daylighting performance through digital testing.

Key Impact

- **Reduces time and cost of facade design**
- **Enhances ‘green’ design by optimising thermal, solar and daylighting performance**

IdentiGEN

IdentiGEN is a leading provider of DNA-based solutions to the agri-food industry with operations in Ireland, UK, USA and Canada.



Research Impact

Their principal product, the DNA TraceBack® system, provides food retailers, processors and producers with the capability to identify and trace the source of meat products through the entire supply chain. This generates value-added assurance for consumers. By combining the unique power of ‘nature’s bar code’ to serve as a permanent, accurate and tamper-proof identifier with advanced genetic analysis technologies, IdentiGEN has developed and implemented a system that is both practical and cost-effective.

Key Impact

- **Consumers assured of the origin of meat**
- **Validates industry claims of ‘aged-verified’, ‘kosher’, ‘Angus’ etc**
- **Created 30+ jobs for Ireland**



Vitalograph

Prof. Richard Reilly of the Trinity Centre for BioEngineering developed the Inhaler Compliance Assessment (INCA) device which provides integrated acoustic analysis for inhalers and can report the key parameters from the point-of-use back to the clinician.



Research Impact

The INCA device addressed the significant issue of patient non-compliance in inhaled medicine regimens. INCA resulted in a product which has the potential to provide significant healthcare benefits to patients globally and the potential to provide socioeconomic benefits to an Irish Medical Device company, Vitalograph.

Inhaled medicines have the advantage of direct application of the drug to the lung with less systemic side effects. The consequences of incorrect use are poor clinical outcomes, wasted medications and higher healthcare cost.

Key Impact

- **Product is in clinical evaluations**
- **Next generation technology licensed to Irish Company**

Commercialising life sciences research tools

There is an increasing demand for innovative and superior research tools that will result in more informative, precise and expedient scientific research. Academics at Trinity College carry out world class research to understand complex challenges in the life sciences field, and efforts to do so involve innovative improvements to existing research tools to address these complex challenges. Research tools have been licensed to industry on non-exclusive, royalty bearing, fair and mutually beneficial terms, resulting in products sold internationally.



TLR4 'VIPER' peptide inhibitor developed by Prof. Andrew Bowie¹, impacting on Toll-receptor biology research.

1. Lysakova-Devine et al., J Immunol. 2010 Oct 1;185(7):4261-71



PHF19 polyclonal antibody developed by Dr. Adrian Bracken², impacting on stem cell specialisation and epigenetic research

2. Nat. Struct. Mol. Biol. 2012 Dec;19(12):1273-81



Superior, highly efficient E. Coli strains developed by Dr. Ian Monk & Prof. Tim Foster³, impacting on Staphylococcal molecular research

3. Monk et al., mBio 3(2):e00277-11

“The research centres like CRANN, CTVR and CNGL provide the high quality graduates we need to sustain and grow our business within Ireland.”

Leonard Hobbs,
Research Program
Manager,
Intel Ireland

Knowledge Exchange through People Exchange

Two-way interaction of people between Trinity & Industry is an important aspect of Knowledge Transfer



Horizon 2020: Connecting Industry

Trinity is Ireland's most successful university at winning European research funding, securing over €80M in funding from Framework 7. In 2014, the European Commission launched Horizon 2020 as a follow on programme to FP7, making in excess of €70Bn available to fund research. Half of this funding will be allocated to Industry, and Trinity will work with companies to ensure that they are best placed to benefit from this opportunity. Below are some case studies on how we have helped Irish companies in the recent past.

Cellix Ltd & Radisens Diagnostics Ltd

NAMDIATREAM is a €13M large scale European Union framework programme, formed to develop a nanotechnology based toolkit to enable early detection and imaging of molecular biomarkers for the most common cancer types and of cancer metastases, as well as permitting the identification of cells indicative of early-stage disease onset. The project is built on the innovative technology concepts of super-sensitive "lab-on-a-bead", "lab-on-a-chip" and "lab-on-a-wire" nano-devices.



Research Impact

Over 3.2M new cancer cases and 1.7M cancer-related deaths are registered in Europe every year. Current diagnostic methods are not sensitive enough, limiting their potential for early disease identification. Earlier detection and more precise diagnosis of disease provides patients with the correct therapies at an earlier stage in the disease development, helping to reduce morbidity and mortality.

Key Impact

- **€3.95m directly invested in Ireland**
- **Brings Irish SMEs together with international consortium of 7 high-tech SMEs**

Tapastreet

Trinity researchers in Computer Science worked in partnership with Tapastreet to secure significant European framework funding to enable the company to further develop their technology - a web app that allows users to access real-time content such as breaking news stories, or live content from sports events, concerts and festivals.



Research Impact

The Tapastreet system organizes and displays social media postings based on their time and location. Typically this would include images or comments posted in a particular location. Users can create social media content streams based on their own passions, and then simply and intuitively curate and republish that content to digital magazines, websites and other apps.

Key Impact

- **Non-exchequer funding for an Irish startup**
- **Job creation for Ireland**

“Working with Trinity has opened up new European funding opportunities which has supported the growth of research and innovation in Cellix and introduced us to new business relationships in Europe”

Vivienne Williams, Cellix Ltd

Ranked 27th in the World University Incubator rankings



83% of companies still going after a year

A pyramid of 17 coffee cup icons, with 4 cups in the top row, 4 in the second, 4 in the third, and 5 in the bottom row.

2400
CUPS OF
COFFEE
CONSUMED

15 Angels

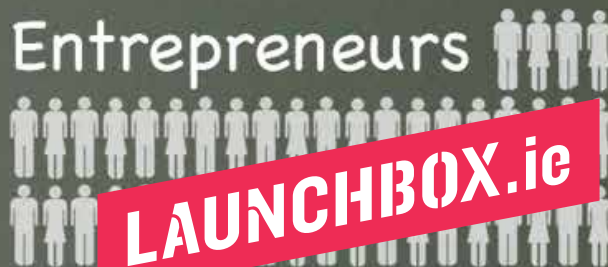
€500,000+ INVESTMENT RAISED

Five money bag icons, each with a Euro symbol (€) on it.

LAUNCHBOX.ie

44

Entrepreneurs



LAUNCHBOX.ie

Trinity Cultivating Entrepreneurship

Creating a culture of entrepreneurial education

Trinity's Strategy for Innovation and Entrepreneurship maps out a revolutionary view of how Trinity will educate, train and support our undergraduate community. Whether they plan to start a new business or not, we believe that every student can be trained to have entrepreneurial characteristics - which in turn will help Irish companies to develop and grow and make them more attractive to investment.

For a number of years now, Industry has been calling for a greater focus on the training of our graduates, and Trinity's strategy ensures that the university will provide not just the graduates needed today but the skills which will allow these graduates to evolve into the employees of the future.

Existing initiatives such as LaunchBox and the Innovation Academy are some of the ways in which Trinity has invited students to access the tools and facilities required to start a business, and Trinity has committed to providing every undergraduate with an opportunity to incubate their ideas for new products, companies or services within their degree programme.



Social enterprise Foodcloud, co-founded by Iseult Ward and Aoibheann O'Brien, is one of the earliest success stories to emerge from LaunchBox. The team entered LaunchBox in the inaugural year of the programme in 2013, and have since secured a major deal with Tesco under which all of the Irish superstores' surplus food will now be donated to charity via the Foodcloud app.

Identifying the Problem

450,000 people in Ireland suffer from food poverty, and at the same time, one million tonnes of food is wasted, making Ireland is fifth worst waster of food in Europe. Supermarkets, restaurants, cafés and caterers contribute significantly to this figure. This isn't their fault, it's just that uncertain demand means that good food goes unsold. Disposing of food adds to the already high costs of running their business.

The Foodcloud Solution

There are many wonderful organisations helping the needy in every town in Ireland. On the other hand food businesses often have good food that they haven't served at the end of the day. Often businesses and charities are unaware that they can help each other. To solve this problem, Foodcloud brings them together in order to reduce both food waste and food poverty. We do this with the use of a snazzy app, legal contracts (to make sure everyone follows all the food safety rules), and a network of businesses and charities willing to restore some of that old Irish community spirit based on shared food. Visit foodcloud.ie for more information.





TRINITY COLLEGE DUBLIN
COLÁISTE NA TRÍONÓIDE, BAILE ÁTHA CLIATH

THE
UNIVERSITY
OF DUBLIN

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