



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Annual Review

2018— 2019

DR PATRICK PRENDERGAST
PROVOST & PRESIDENT



Contents

01	01.0	Welcome from the Provost	02
02	02.0	Trinity at a Glance	06
03	03.0	Trinity's Global Relations Strategy	14
04	04.0	Research Case Studies	20
	04.1	Aonghus McNabola	22
	04.2	David Finlay	24
	04.3	David Shepherd	26
	04.4	Eunan O'Halpin	28
	04.5	Jarlath Killeen	30
	04.6	Juliette Hussey	32
	04.7	Lidia Tajber	34
	04.8	Lorina Naci	36
	04.9	Paula Colavita	38
	04.10	Rachael Walsh	40
	04.11	Sarah O'Brien	42
	04.12	Timothy Savage	44
05	05.0	Inspiring Generations – The Campaign for Trinity	46
06	06.0	Research Charter and Living Research Excellence Strategy	50
07	07.0	Innovation and Entrepreneurship	54
08	08.0	Public Engagement	58
09	09.0	The Student Experience	64
10	10.0	Healthy Trinity	68
11	11.0	Sport at Trinity	72
12	12.0	New Professor Interviews	76
	12.1	Professor Andrew Murphy	78
	12.2	Professor Blánaid Daly	81
	12.3	Professor Ruth Karras	84
13	13.0	Trinity's Visitors	88
14	14.0	Governance	92
15	15.0	Financial Elements	96

Welcome from the Provost

In a particularly busy and dynamic year, two launches really stand out: on 2nd May we launched *Inspiring Generations* in the Public Theatre - the first comprehensive philanthropic campaign in the history of the university. *Inspiring Generations* has two goals: to raise €400m in philanthropic donations to contribute to projects and initiatives that drive excellence across the university, and to inspire 150,000 volunteering hours from alumni and friends of Trinity around the world. You can read about the campaign and its flagship projects in **Chapter 5, Inspiring Generations**.

Just three weeks later, on 23rd May came the formal opening of the Trinity Business School. Six years after we announced our intention to build this, it was thrilling to be standing in this flagship new building, an iconic, contemporary design by Scott Tallon Walker, which houses Tangent, Trinity's Ideas Workspace and the A & K Dargan theatre, now the largest auditorium on campus. The Trinity Business School was enabled by donations from graduates and friends and it's their generosity and enthusiasm that gave us the confidence and ambition to reach out worldwide for *Inspiring Generations*.

After the Dublin launch, I went on to launch *Inspiring Generations* in London, Paris, New York, and San Francisco, with plans for Asia launches in 2020. Trinity now has more than 121,000 alumni in 150 countries, and research partnerships as measured by joint publications numbered 2,905 in 2019 – in all our initiatives for the university, we have to think globally.

Another important launch this year was our third **Global Relations Strategy**, or 'GRS3', as we call it, (see

Chapter 3). This builds on the dynamic initiatives we've put in place over the past decade. Our headline actions for the next five years include: expanding our partnerships with like-minded universities round the world; further diversifying our student body and giving students more opportunities to study abroad; and continuing to integrate students into the global Trinity community. Global travel was a highlight of the year. I led a delegation to Morocco to discuss research collaboration and student exchange with key universities, as well as a trip to East and South Africa (Dar es Salaam, Nairobi, Johannesburg, Cape Town) where we visited 10 universities/research institutes to discuss future collaboration and partnerships, building on Trinity's strong existing academic relationships on the African continent.

The **Student Experience** is central to the Trinity Education and **Chapter 9** details our multiple co-curricular and extra-curricular initiatives. A key development this year was growing the *Zón Mac Léinn* network of student spaces, to turn spaces into places where students can meet friends, recharge, and socialize. Two new spaces come into the network this year - the Buttery after hours and a new space in the Trinity Biomedical Sciences Institute (TBSI) and three more spaces were identified for development; there's now an App showing students their nearest Zón Mac Léinn. **Chapter 11, Sport at Trinity**, highlights how we engage students in sport, from the athletes who win medals to the 6,200 students who joined a sports club this year and through their participation improved not just their health and fitness, but their leadership, organisational and social skills.



→ Inspiring Generations has two goals: to raise €400m in philanthropic donations to contribute to projects and initiatives that drive excellence across the university, and to inspire 150,000 volunteering hours from alumni and friends of Trinity around the world.

01



A milestone for the Healthy Trinity initiative this year was the introduction of a tobacco-free policy which removed tobacco use from the entire campus, with three minor exceptions. You can read more about this, and other developments supporting healthy behaviours as a natural part of life on campus in **Chapter 10, Healthy Trinity**.

The student experience is also central to our innovation and entrepreneurship initiatives which continue to go from strength to strength. **Chapter 7, Innovation and Entrepreneurship**, presents the key successes of staff and student innovation.

Innovation comes out of outstanding research. In June we launched our first ever **Research Charter and Living Research Excellence Strategy** (see **Chapter 6**) at a special event in the Douglas Hyde Gallery. The Charter and Strategy are the result of a highly collaborative process, headed by the Dean of Research, Prof Linda Doyle, which sought inputs from across the university. The process identified seven core principles which form Trinity's Research Charter and six key actions for the Excellence Strategy.

In **Chapter 4, Research Case Studies**, we give a brief snapshot of Trinity research, showcasing twelve researchers across three faculties engaging in urgent research – from measuring consciousness in comatose patients to developing technology solutions to reduce energy consumption in the water sector; from the Irish contribution to Gothic horror to developing appropriate models of higher education for the digital age. And in **Chapter 12, New Professor Interviews** we talk to three new professors – in Medieval History, Special Care Dentistry and English Literature – and hear about the exciting research they're undertaking in their disciplines.

As ever, public lectures, symposia, talks, exhibitions, films and performances were some of the key ways in which Trinity delivered on our commitment to engage wider society. We talk about some of these in **Chapter 8, Public Engagement**. Some of my favourite events – choosing from a very competitive field – include *Schrödinger at 75 – the Future of Biology*, a symposium commemorating the 75th anniversary of Erwin Schrödinger's iconic *What is Life?* lectures in Trinity in 1943, and attended by five Nobel Prize-winners and some of the world's most brilliant science minds. I also enjoyed Hannah Sullivan speaking in Trinity when she won the inaugural John Pollard Foundation International Poetry Prize; and the 3-D digital scan of the Museum Building on the new interactive public website, makingvictoriandublin.com, which also has information on the building's design, materials and history, from leading Trinity geologists and architectural historians. Do take a moment to check it out.

It's been another exceptional Trinity year. My thanks to the whole community – staff, students and alumni – for their inspiration.

Dr Patrick Prendergast
Provost & President

LEFT – Among the contributors and representatives of areas included in this Provost's Review are, standing (L-R) Sally-Anne Fisher, Head of Communications; Dr Diarmuid O'Brien, Chief Innovation & Enterprise Officer; Martina Mullin, Health Promotion Officer; Prof Kevin O'Kelly, Dean of Students; Kate Bond, Director of Advancement, Trinity Development & Alumni; John Coman, Secretary to the College; Prof Linda Doyle, Dean of Research; Michelle Tanner, Head of Sport & Recreation; seated (L-R) Prof Juliette Hussey, Vice-President for Global Relations; Prof Juergen Barkhoff, Vice-Provost / Chief Academic Officer; and Prof Paula Murphy, Registrar



→ The student experience is also central to our innovation and entrepreneurship initiatives which continue to go from strength to strength...

ABOVE – An Taoiseach Leo Varadkar TD, Provost Patrick Prendergast and TBS Dean, Prof Andrew Burke at the opening of the Trinity Business School

RIGHT – State-of-the-art interior of the new Trinity Business School



Trinity at a Glance

Trinity is Ireland's
No. 1 University

QS World University Ranking, THE World
University Ranking, Academic Ranking
of World Universities (Shanghai)

→ A 427 year old university in the heart of Dublin city centre

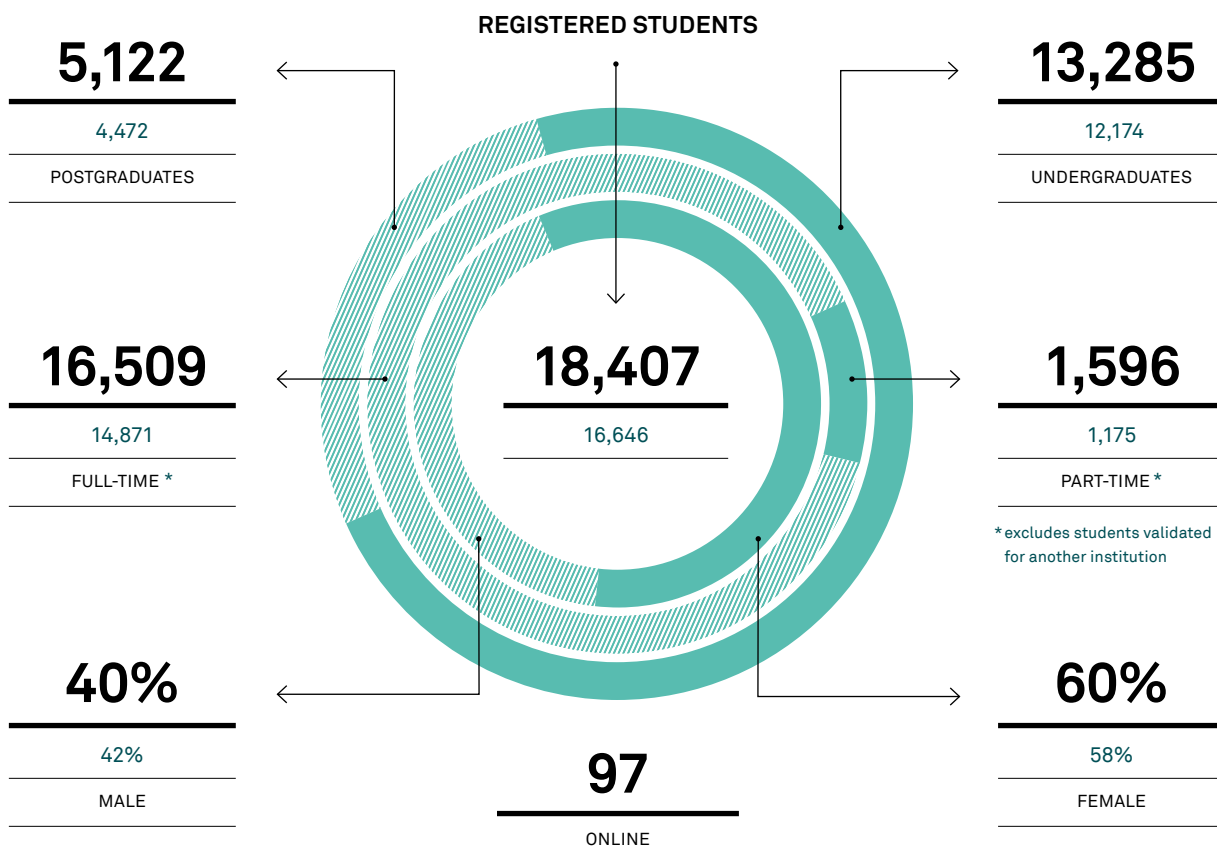


02

Student Statistics

2019 | 2013

(7 year comparisons)



ALUMNI

2019 | 2013

121,647 | 100,277

REPUBLIC OF IRELAND	80,723 74,170
GREAT BRITAIN	9,983 9,616
NORTHERN IRELAND	4,641 4,621
USA	7,697 3,557
CANADA	1,393 1,162
REST OF WORLD	17,210 7,151

CLUBS AND SOCIETIES

49 | 49

SPORTS CLUBS

127 | 112

STUDENT SOCIETIES

THE LARGEST SOCIETIES ARE:

THE VINCENT DE PAUL SOCIETY

THE PHILOSOPHICAL SOCIETY (THE PHIL)

DU PLAYERS

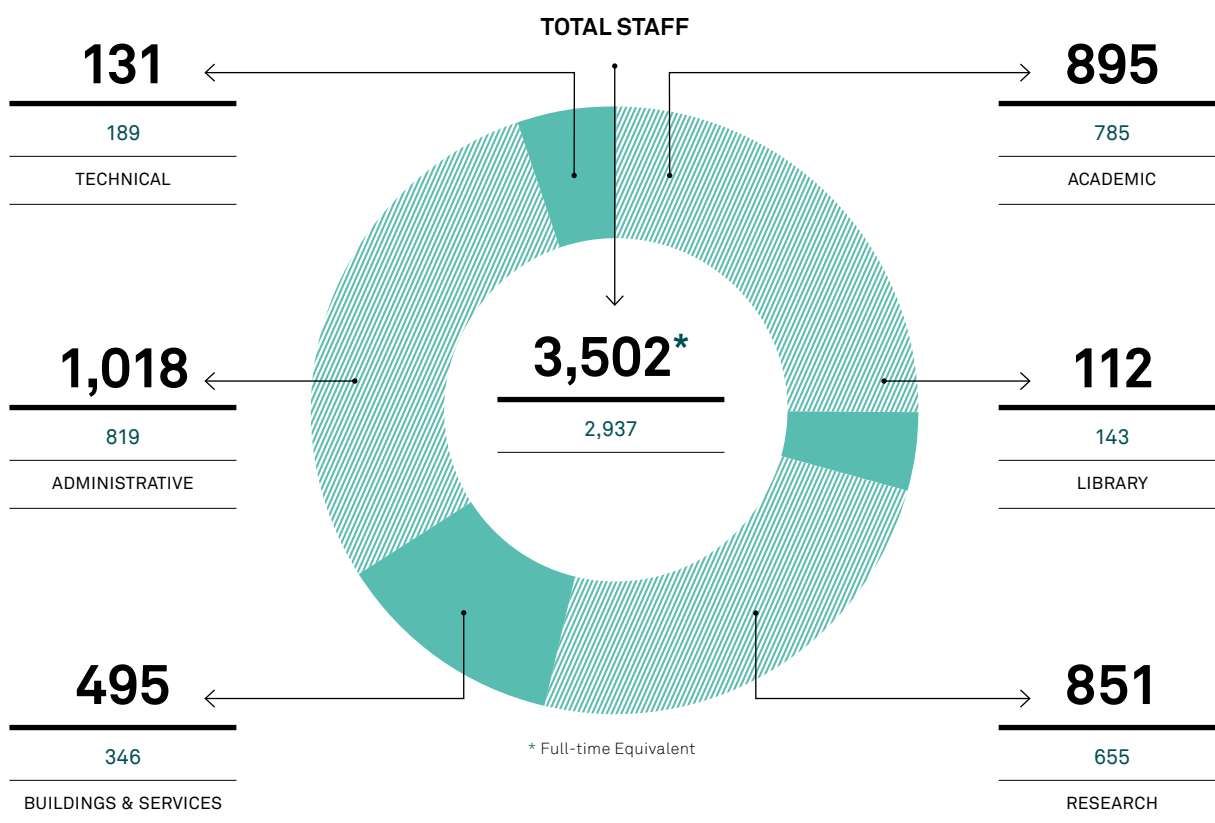
THE COLLEGE HISTORICAL SOCIETY (THE HIST)

— The college historical society (the hist) is the oldest student society in the world, founded in 1770

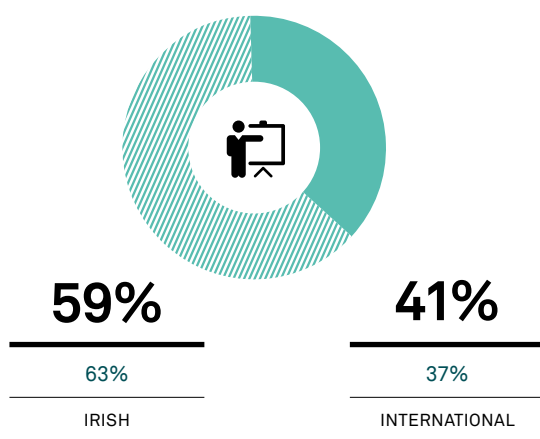
Staff Statistics

2019 | 2013

(7 year comparisons)

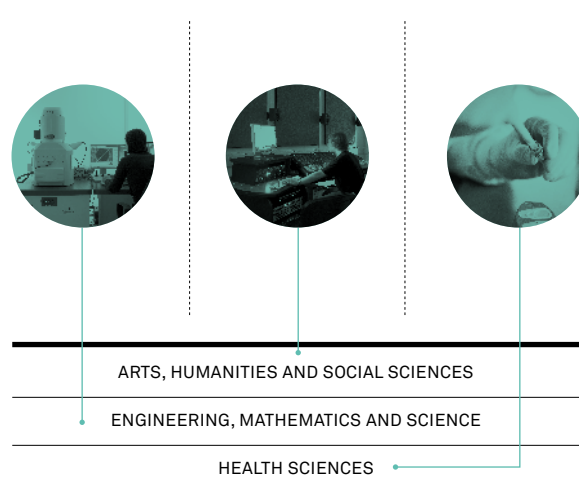


ACADEMIC STAFF*



* Headcount

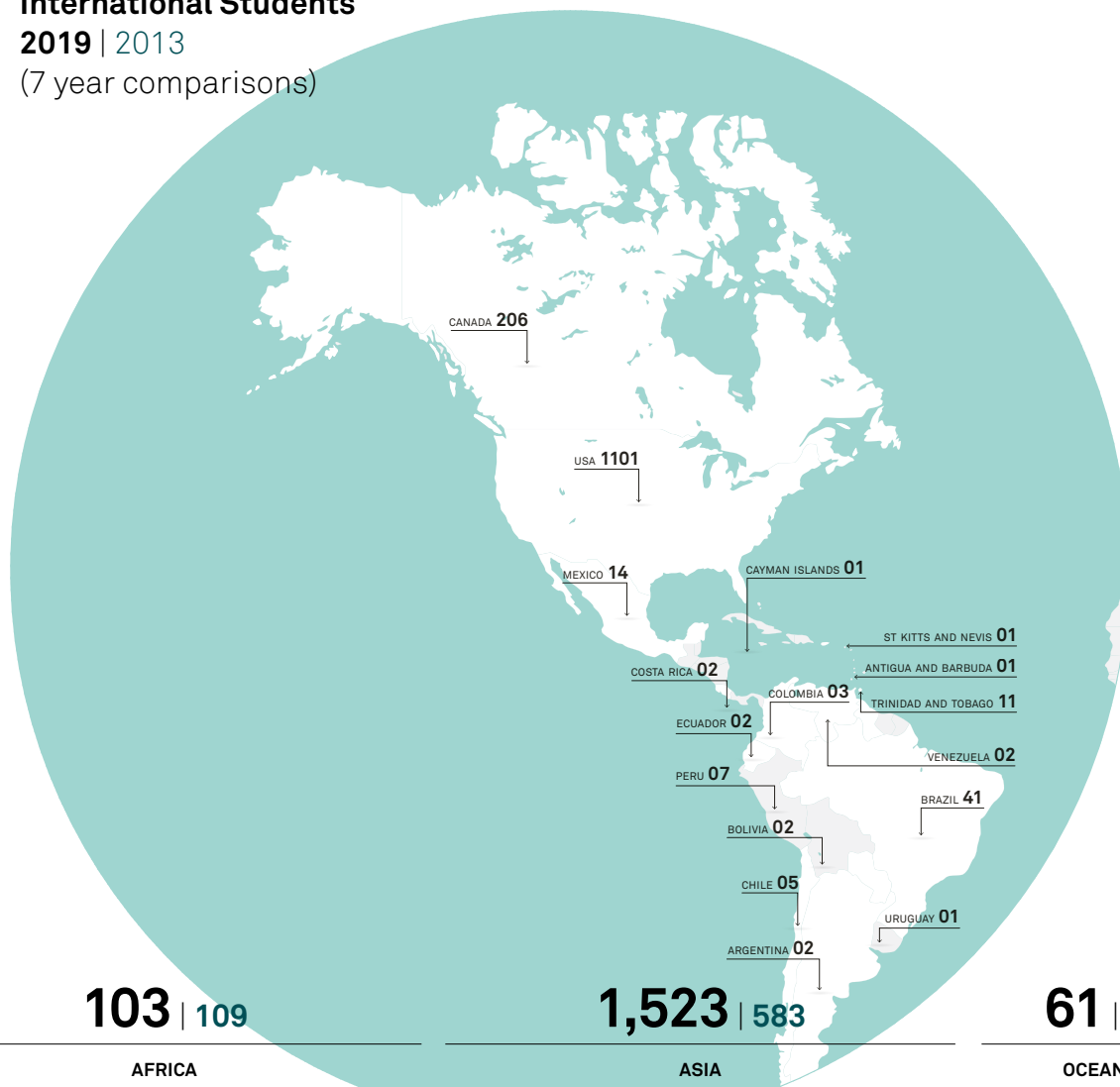
FACULTIES



02 International Students

2019 | 2013

(7 year comparisons)



AFRICA

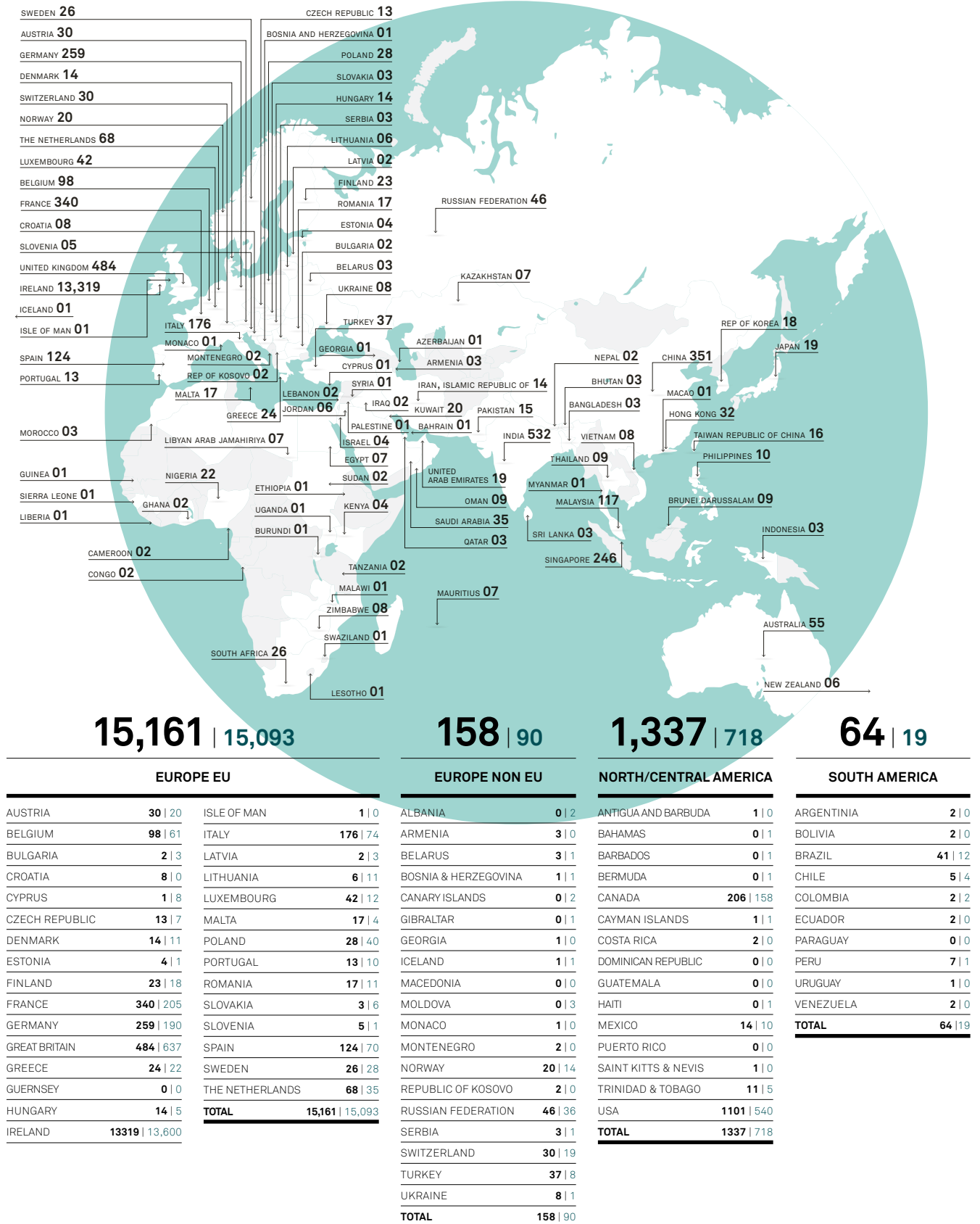
ALGERIA	0 1	MOROCCO	3 2
ANGOLA	0 0	MOZAMBIQUE	0 1
BOTSWANA	0 5	NIGER	0 1
BURUNDI	1 0	NIGERIA	22 33
CAMEROON	2 1	RWANDA	0 1
CONGO	2 0	SIERRA LEONE	1 0
EGYPT	7 3	SOMALIA	0 0
ETHIOPIA	1 3	SOUTH AFRICA	26 18
GAMBIA	0 0	SUDAN	2 6
GHANA	2 0	SWAZILAND	1 0
GUINEA	1 0	TANZANIA	2 1
KENYA	4 4	TUNISIA	0 0
LESOTHO	1 1	UGANDA	1 3
LIBYA	7 6	ZAMBIA	0 3
LIBERIA	1 0	ZIMBABWE	8 5
MALAWI	1 4	TOTAL	103 109
MAURITIUS	7 7		

ASIA

AZERBAIJAN	1 2	MACAO	1 2
BAHRAIN	1 2	MALAYSIA	117 107
BANGLADESH	3 7	MYANMAR	1 0
BHUTAN	3 0	NEPAL	2 0
BRUNEI DARUSSALAM	9 1	OMAN	9 3
CHINA	351 99	PAKISTAN	15 17
HONG KONG	32 1	PALESTINE	1 0
INDIA	532 90	PHILIPPINES	10 10
INDONESIA	3 1	QATAR	3 1
ISLAMIC REP OF IRAN	14 12	REP OF KOREA	18 14
IRAQ	2 7	SAUDI ARABIA	35 24
ISRAEL	4 1	SINGAPORE	246 120
JAPAN	19 16	SRI LANKA	3 2
JORDAN	6 6	SYRIAN ARAB REPUBLIC	1 1
KAZAKHSTAN	7 16	TAIWAN REP OF CHINA	16 1
KUWAIT	20 8	THAILAND	9 1
LEBANON	2 1	UNITED ARAB EMIRATES	19 6
		VIETNAM	8 3
		TOTAL	1523 583

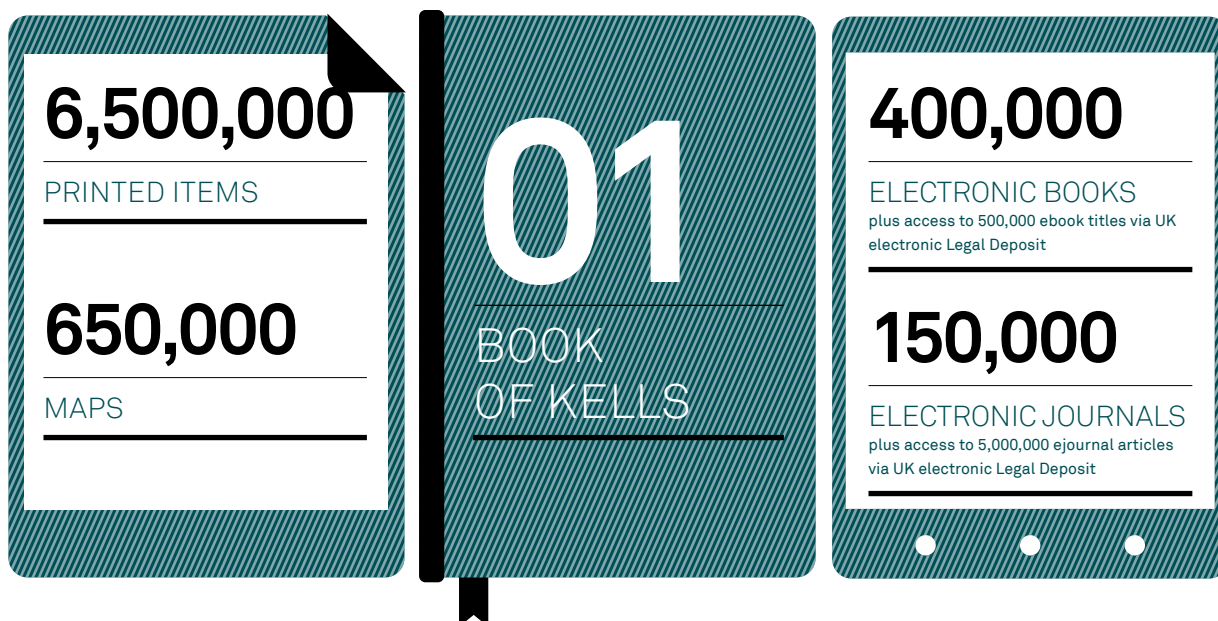
OCEANIA

AUSTRALIA	55 26
FIJI	0 0
NEW ZEALAND	6 7
TOTAL	61 33



02 Library

LIBRARY COLLECTION HAS



TRINITY'S RESEARCH THEMES

— AGEING	— GENES AND SOCIETY	— MANUSCRIPT, BOOK & PRINT CULTURES
— CANCER	— IDENTITIES IN TRANSFORMATION	— NANOSCIENCE
— CREATIVE ARTS PRACTICE	— IMMUNOLOGY, INFLAMMATION & INFECTION	— NEUROSCIENCE
— CREATIVE TECHNOLOGIES	— INTERNATIONAL DEVELOPMENT	— NEXT GENERATION MEDICAL DEVICES
— DIGITAL ENGAGEMENT	— INTERNATIONAL INTEGRATION	— SMART AND SUSTAINABLE PLANET
— DIGITAL HUMANITIES	— MAKING IRELAND	— TELECOMMUNICATIONS

LEADING FLAGSHIP RESEARCH INSTITUTES

05

- TRINITY BIOMEDICAL SCIENCES INSTITUTE (TBSI)
- CENTRE FOR RESEARCH ON ADAPTIVE NANOSTRUCTURES AND NANODEVICES (CRANN)
- TRINITY COLLEGE INSTITUTE OF NEUROSCIENCE (TCIN)
- TRINITY LONG ROOM HUB, ARTS AND HUMANITIES RESEARCH INSTITUTE (TLRH)
- TRINITY TRANSLATIONAL MEDICINE INSTITUTE (TTMI)

Commercialisation of Research

2019 | 2014

(6 year comparisons)

374 | 308

INVENTION DISCLOSURES

141 | 81

LICENCES TO INDUSTRY

22 | 37

TRINITY CAMPUS
COMPANIES APPROVED

04 | 04

TRINITY CAMPUS COMPANIES

62 | 58

DISCLOSURES OF NOVEL INTELLECTUAL
PROPERTY

16 | 28

COMMERCIALISATION LICENCES
TO INDUSTRY

13 | 23

NEW PATENT APPLICATIONS FILED

40 | 32

COLLABORATIVE RESEARCH
AGREEMENTS WITH INDUSTRY EACH <€25K

67 | 51

COLLABORATIVE RESEARCH
AGREEMENTS WITH INDUSTRY EACH >€25K

CONSOLIDATED FINANCIAL STATEMENTS

€379.2M

TOTAL INCOME FOR
YEAR ENDED 2018
(EXCLUDING GRANT
AMORTISATION)

€356.2M

TOTAL INCOME FOR
YEAR ENDED 2017
(EXCLUDING GRANT
AMORTISATION)

€335.8M

TOTAL INCOME FOR
YEAR ENDED 2016
(EXCLUDING GRANT
AMORTISATION)

€323.0M

TOTAL INCOME FOR
YEAR ENDED 2015
(EXCLUDING GRANT
AMORTISATION)

€305.7M

TOTAL INCOME FOR
YEAR ENDED 2014
(EXCLUDING GRANT
AMORTISATION)

FINANCIAL YEAR	€m 2012	€m 2018
STATE GRANTS	€58.70	€48.7
ACADEMIC FEES	€113.80	€149.0
RESEARCH GRANTS AND CONTRACTS	€75.90	€99.7
COMMERCIAL REVENUE UNIT INCOME	€27.10	€44.4
OTHER INCOME	€22.40	€15.4
ENDOWMENT AND INVESTMENT INCOME	€6.60	€22.0
INCOME (EXCLUDING GRANT AMORTISATION)	€304.50	€379.2

Trinity's Global Relations Strategy

Trinity launched its ambitious new Global Relations strategy, which builds on the university's great recent successes in this area, in February 2019.

The launch of GRS 3 provided an opportunity to look back and celebrate the developments in Global Relations that have taken place since 2012. Global Relations is one of the gateways between Trinity and our global community of students, staff, institutional partners, academic collaborators and alumni network.

GRS 3 will see a step change in internationalisation. Building on Trinity's global reputation for education and research, GRS 3's headline actions over the next five years are:

- Further diversification and growth in the student body;
- Expanding strategic partnerships with targeted universities around the world to increase, strengthen and leverage the global reach and impact of our research, education and innovation;
- Providing more opportunities for our students to spend time studying in other countries;
- Continuing to integrate students, whether based in Dublin or abroad, into the global Trinity community and enhancing the student experience.

RIGHT – International students during Freshers' Week



→ Global Relations is one of the gateways between Trinity and our global community of students, staff, institutional partners, academic collaborators and alumni network.

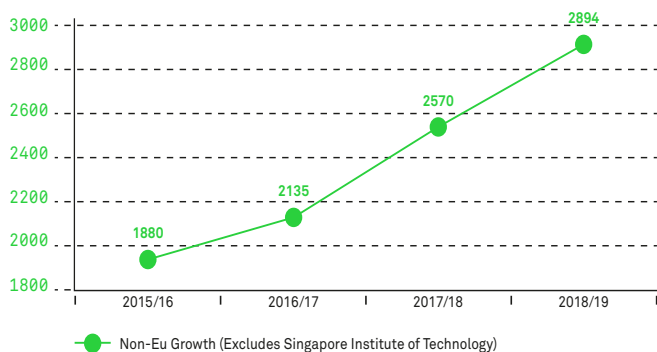
03

Table 1	2015/16	2016/17	2017/18	2018/19
No. of Junior Sophister students who availed of outbound opportunities	812	784	831	931
Percentage availing of international study and experience (% is derived from the approximate number of Junior Sophister students, which is normally when students take up overseas opportunities)	30%	29%	30%	34%

A diverse and global student community

In terms of diversity, we have students from 119 countries registered in Trinity. In 2018/19, 5,088 students came from outside of Ireland and 3,247 students came from outside of Europe (approximately 28% and 18% respectively). The steady increase in non-EU students is illustrated in Figure 1.

Figure 1. Non-EU Growth 2015/16 to 2018/19



Student recruitment activity includes relationship management with key stakeholders such as students, parents, international high school counsellors, university partners, government bodies and an education agent network to diverse international markets. Trinity is now represented by 102 education agents in 38 different countries.

The International Foundation Programme (IFP), in partnership with the Marino Institute, has helped Trinity achieve greater diversity in the undergraduate student body, with growth from countries such as China and the establishment of a strong brand presence in strategically important regions such as the Middle East and South East Asia. In 2018/19 there were 80 students from 14 countries enrolled on the IFP.

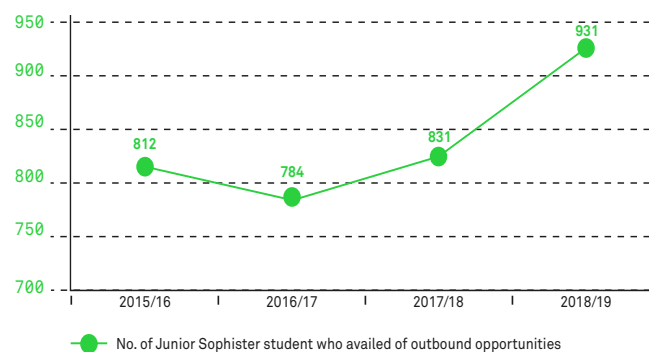
Student international study and experience

Overall the international study and experience programme at Trinity has increased in recent years, with just under 34% of the undergraduate student body that have access to these opportunities (Table 1 & Figure 2). In this context this global experience relates mainly to student exchange arrangements with a focus on outbound mobility. Data for international placements/projects as part of undergraduate programmes is also included where relevant. The ambition, as stated in GRS 3, is for this to increase to 50% by 2023/24.

In the last year new student exchange agreements were signed and/or activated with: Monash University, Waseda University, Nanyang Technological University, American University of Beirut, University Mohammed V Rabat and the University of Florida.

The number of junior sophister students who availed of outbound opportunities increased from 812 in 2015/16 to 931 in 2018/19, as illustrated in Figure 2.

Figure 2. No. of Junior Sophister students who availed of outbound opportunities 2015/16 to 2018/19



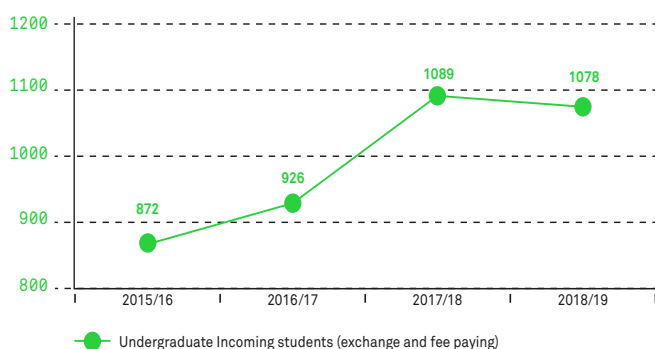
Below – Yun Yu celebrating her graduation day



Student inbound opportunities

There has been a steady increase in incoming students to Trinity (exchange and fee paying) from 872 in 2015/16 to 1078 in 2018/19 as illustrated in Figure 3.

Figure 3. Undergraduate incoming students (exchange and fee paying) 2015/16 to 2018/19



Global partnerships

The number of educational partnerships with universities globally continues to grow and this year approval was given by the University Council for the programme with University of Michigan-Shanghai Jiao Tong (SJTU) Joint Institute, which will enable students to graduate with an MAI Engineering from Trinity and BSc from SJTU. Building on the success of the dual

degree with Columbia University which commenced in 2018, three new programmes were approved in 2018/19 for intake in 2020, namely History of Art and Architecture; Classics, Ancient History and Archaeology; and Film. Discussions on the inclusion of programmes in Sciences are at an advanced stage and the expectation is that these will also be open for intake in 2020.

Global travel

In October-November 2018 the Provost led a visit to Australia, Singapore and Malaysia. Meeting alumni and cultivating strategic relationships with universities such as the University of Melbourne, the University of Sydney, LASALLE College of Arts and Singapore Institute of Technology were the main objectives. Increasing the number of student exchanges places is in progress, as is early work on deeper partnerships in specific programmes.

In July 2019 the Provost led a delegation to Morocco to discuss research collaboration and student exchange with the University of Mohammed V in Rabat and Al Akhawayn University in Ifrane. In both universities the Provost addressed staff and students on “Innovation and Entrepreneurship”, and Trinity’s success in this area. Later in July the Provost led a delegation to East and South Africa (Dar es Salaam, Nairobi, Johannesburg, Cape Town) and visited 10 Universities/Research Institutes to discuss future collaboration and partnerships, building on Trinity’s strong existing academic relationships on the African continent.

03

In addition to hosting 49 visits by universities in 2018/19 the Provost, Chief Innovation & Enterprise Officer and/or Vice-President for Global Relations and senior staff from her office made visits to the following universities:

Australia	University of Sydney University of New South Wales University of Technology Sydney University of Melbourne University of Western Australia Monash University
Singapore	Nanyang Technological University LASALLE College of Arts Singapore Management University Singapore Institute of Technology
Morocco	University of Mohammed V Rabat Al Akhawayn University, Ifrane
Tanzania	University of Dar es Salaam
Kenya	University of Nairobi Strathmore University International Livestock Research Institute
South Africa	University of Cape Town Stellenbosch University University of Witwatersrand University of Pretoria University of the Western Cape Nelson Mandela University
Israel	Tel Aviv University Hebrew University of Jerusalem Weizmann Institute
USA	Columbia University Bard College Duke University Penn State University Drexel University University of California, San Francisco
England	University of Oxford Imperial College London University College London University of Birmingham
Canada	University of Toronto

TOP – Prof Juliette Hussey VP for Global Relations with Prof Sibongile Muthwa, Vice-Chancellor of Nelson Mandela University in Port Elizabeth, South Africa

BOTTOM – Provost Patrick Prendergast with Prof William A. L. Anangisy, Vice-Chancellor of the University of Dar es Salaam and colleagues during his trip to Tanzania

European partnerships

In June 2019 the European Commission announced the first 17 “European Universities” alliances. CHARM-EU was one of the successful applications. The CHARM-EU alliance is made up of the Universities of Barcelona, Trinity College Dublin, Utrecht, Montpellier and Eötvös Loránd (Budapest) together with associated and support partners including the Irish Universities Association (IUA) and the National agency Quality and Qualifications Ireland (QQI). CHARM-EU stands for a Challenge driven, Accessible, Research based, Mobile European University with a mission to create a sustainable, transferable, inclusive model for a European inter-university campus.

Following on from high level visits in 2017/18, senior delegations from the Sorbonne and the University of Birmingham were received leading to the signing of bilateral agreements to collaborate in research and education programmes as well as staff and student mobility.

Academic engagement with the University of Birmingham will focus, in the first instance, on digital humanities, bioengineering and collaboration in medicine through the clinical research facilities in both universities.

The strategic partnership with the Sorbonne University will focus on digital humanities, material science, Neuroscience/GBHI, Cancer and Ageing research.



Research Case Studies

01 Aonghus McNabola

02 David Finlay

03 David Shepherd

04 Eunan O'Halpin

05 Jarlath Killeen

06 Juliette Hussey

07 Lidia Tajber

08 Lorina Naci

09 Paula Colavita

10 Rachael Walsh

11 Sarah O'Brien

12 Timothy Savage



BACK (L-R) – David Finlay, Paula Colavita,
Aonghus McNabola, Lidia Tajber,
David Shepherd, Lorina Naci
FRONT (L-R) – Eunan O’Halpin,
Juliette Hussey, Jarlath Killeen

04 Reducing the energy consumption, cost and environmental impact of water supply

Aonghus McNabola

Water is a fundamental resource. Yet it is something we often take for granted, and most of us will be unaware of the very significant cost and resources required to bring water to your door within very stringent quality criteria.

The water supply sector is the 4th most energy intensive sector in the EU and it is one that is responsible for considerable contributions to CO₂ emissions and climate change as a result. Large amounts of energy are required to extract water from its source, treat it and distribute it across many hundreds of kilometres of pipelines. My work is focused on the development of technology solutions which contribute to the reduction of energy consumption of this sector.

Reducing leaks and generating electricity

— A major source of inefficiency in water supply systems is leakage. This has been estimated to be as high as 40-50% in Ireland. The most effective method of reducing leakage is to reduce pressure in pipelines. This is commonly carried out using pressure reducing valves or tanks, which expel the excess pressure to the atmosphere. However this is a waste of the considerable energy consumption required to achieve this pressure to begin with. My research is leading the development and application of low-cost hydropower turbines, designed

to be installed in water pipe networks to reduce pressure and leakage while also generating green electricity.

Conventional hydropower turbines are very large machines which cannot be miniaturised to this scale economically. I am leading the development of systems to design and operate conventional water pumps in reverse to act as turbines. This includes the development of software tools to predict the behaviour of a pump operating in reverse as a turbine.

The new low-cost system has been designed and installed at a water treatment works in County Wexford in Ireland in 2019. The system produces 20-25% of the energy requirements of the treatment works by reducing incoming water pressure through pipelines. The resulting cost savings are being donated to the water development charity Wells for Life in Uganda. The associated CO₂ emissions of the works are also reduced by up to 25% as a result of on-site green electricity production.

Reducing pressures in food production

— I have also applied this concept to the irrigation sector in the south of Spain, reducing energy consumption in the production of walnuts and other water-intensive crops. Over 40% of water in the EU is used in irrigation activity.

The energy from the turbine replaces a diesel generator on the farm, and its associated air pollution. By avoiding the purchase of €3,000 in diesel fuel annually, the turbine also reduces the cost of food production for the farmer.

This research activity has been made possible by two EU projects I am leading, the €3.4 M Dwr Uisce Project, funded by the Interreg Ireland-Wales Programme and the €2.9 M REDAWN project funded by the Interreg Atlantic Area programme.



Aonghus McNabola received his BAI and PhD from Trinity and practiced as a Civil Engineer in industry before joining the School of Engineering as a Lecturer in 2007. He is now Associate Professor in Environmental Fluid Dynamics and Head of the Department of Civil, Structural & Environmental Engineering. He has published over 75 peer-reviewed journal articles. His research focuses on the engineering of fluid systems to improvements in energy efficiency, such as water supply and air pollution control.

Contact: amcnabo@tcd.ie

LEFT – Hydropower installation at Palma del Rio, Spain, reducing water pressure at a Walnut farm, generating green electricity and replacing a diesel generator.

TOP – Walnuts

BOTTOM – Walnut farm & irrigation pipes, Palma del Rio, Spain

→ A major source of inefficiency in water supply systems is leakage. This has been estimated to be as high as 40–50% in Ireland.



04 Fuelling our immune system

David Finlay

Therapeutic manipulation of our immune systems is a new and potentially ground-breaking way of treating diverse diseases. For instance, it is now clear that, if given proper instruction, the immune systems of cancer patients can find and destroy tumours. The emergence of 'check-point' inhibitors as a revolutionary cancer treatment is evidence of this.

My research over the past eight years has contributed to an exciting transformation of classical immunology to reveal the importance of metabolic processes in shaping immune responses. There is now a new understanding that the fuels available to immune cells and the ways that these fuels are used have a substantial impact on immune cell function. We are now revealing novel and exciting strategies to control immune cells through changing their metabolism - this has potential towards treating a range of diseases.

Natural Killer Cells — Natural Killer (NK) cells are a type of cytotoxic immune cell, "immune assassins", with important roles in defending our bodies from cancer and viral infection. NK cells operate through directly killing their targets by injecting cytotoxic poisons. When NK cells become activated they ramp up their metabolic processes to allow them to generate sufficient energy and to make the tools they need to be effective killers.

However, these metabolic processes can be disrupted during disease, leading to NK cells that do not work properly. For instance, our work in collaboration with Lydia Lynch and Andrew Hogan shows that NK cells from individuals with obesity cannot increase their metabolism when activated and fail to kill tumour cells.

In partnership with Clair Gardiner's lab, our research teams at TBSI have revealed that NK cells from patients with metastatic breast cancer have abnormalities in the cellular powerhouses called mitochondria. Normally mitochondria form elongated structures, but the mitochondria in patient NK cells are shortened and have reduced energy production (Figure 1). We are investigating how these metabolic processes are disrupted in NK cells in these diseases. The ultimate goal is to develop strategies to provide NK cells with robust and irrepressible metabolism and therefore enhanced abilities to protect us from cancer and viral infection.

Can nutrients shape immune responses?

I'm also interested in the different ways that metabolic fuels, or nutrients, control our immune systems. For instance, in many immune cells glucose is important in fuelling metabolic processes to make energy. But glucose can also act as an immunological signal because cells contain glucose sensors that detect

the presence or absence of glucose and change their behaviour accordingly. The EU has funded an ERC Consolidator award to allow my lab to investigate the new concept that nutrients are important signals that can shape immune responses.

My research has made the interesting discovery that starving Dendritic cells (DC) of glucose enhances their ability to activate other immune cells. This starvation can result from competition for glucose with neighbouring cells. When a DC is surrounded by glucose-hungry cells the DC can become starved and the nutrient switch called mTORC1 is turned off leading to a change in DC behaviour (Figure 2). My lab is now studying the complex relationship between the local availability of nutrients and the control of our immune responses.

NK cells operate through directly killing their targets by injecting cytotoxic poisons. When NK cells become activated they ramp up their metabolic processes to allow them to generate sufficient energy and to make the tools they need to be effective killers.

David Finlay is Associate Professor in Immunometabolism in the Schools of Biochemistry and Immunology, and Pharmacy and Pharmaceutical Science. A Trinity graduate, he was awarded a BA (Mod) in Biochemistry in 2001. He completed his PhD (2006) and postdoctoral training at the University of Dundee in Scotland and was elected to fellowship of Trinity College Dublin in 2018. He has been a principal investigator in the Trinity Biomedical Sciences Institute since 2011. His research expertise lies at the interface of immunology and cellular metabolism.

Contact: finlayd@tcd.ie

→ The ultimate goal is to develop strategies to provide NK cells with robust and irrepressible metabolism...

Fig 1. Competition for nutrients controls Dendritic cells (DC): T cells (green) clustering around a DC (purple) consume all the available nutrients, such as glucose, leading to the inhibition of nutrient sensing signaling pathways like mTORC1 (red). Inhibition of mTORC1 alters the function of DC leading to enhanced T cell immune responses. Dashed lines outline DCs of interest.

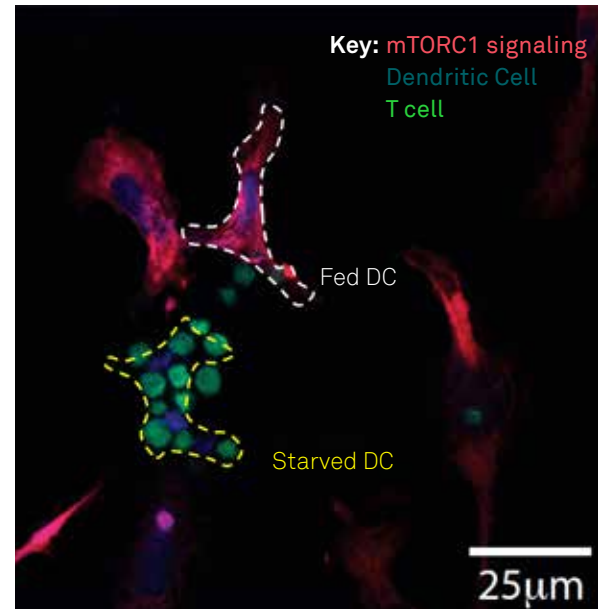
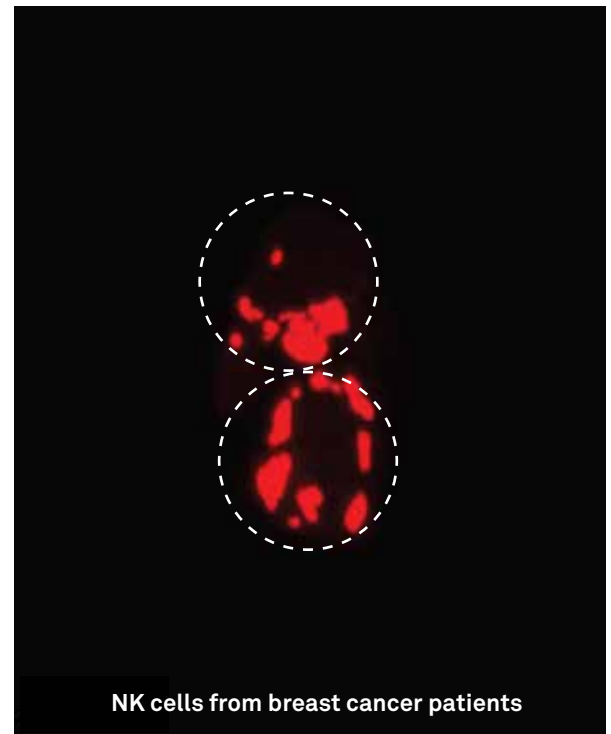
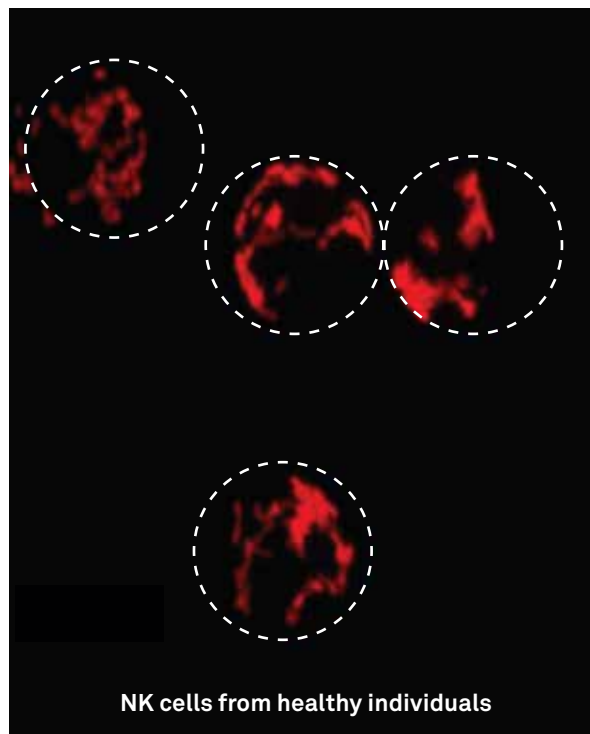


Fig 2. NK cells from the blood of healthy individuals (left) and patients with metastatic breast cancer were analysed for mitochondria (red) structure. The structure of mitochondria from breast cancer patients is altered and they are not making energy efficiently.



04 In living colour: Jewish scripture in stained glass

David Shepherd

Of all the English incursions into Ireland, amongst the least known is one which took place in the latter half of the 19th century. In 1850, there were less than 40 stained glass windows to be found in Anglican churches across the island of Ireland; by 1900 there were nearly 1,400, thanks in large part to the Gothic revival championed by the English architect Pugin and the English firms which furnished the bulk of the stained glass installed in so many churches on both sides of the Irish Sea during this period.

It is of, of course, little wonder that this stained glass was populated by stories from the life of Christ, but the Victorians' unbridled passion for their Bible ensured that figures from the Hebrew Bible (Old Testament) also featured prominently, including well-known characters like David and Moses and also more obscure figures ones like Ahimelek, Miriam, Samuel and Melchizedek. While this inheritance of ancient Judaism is being increasingly forgotten by contemporary worshipping communities, the vivid illustration of these stories in stained glass offers an important opportunity for re-engagement both with the glass and the ancient stories they interpret.

From typology to tragedy — Thanks to a grant from the Irish Research Council, I am currently exploring how the Hebrew Bible has been interpreted in the stained glass of

selected churches in the United Dioceses of Dublin and Glendalough (Church of Ireland). In essence, my research asks how the images of the Old Testament found in these windows reflect those found in earlier biblical paintings, how they relate to other stained glass found in the same building and how these images have been influenced by those who made them and those for whom they were made.

Initial research has confirmed the significance of 'typology', in which events and people found in the Hebrew Bible/Old Testament (such as Abraham's near sacrifice of his son Isaac) are depicted in the stained glass windows as 'types' which prefigure events and people described in the New Testament (e.g. the 'sacrifice' of Christ on the cross). While some stained glass windows are 'conventional' in their interpretation of the Old Testament, others have come to light which are profoundly personal.

In one parish church (Leeson Park) near the centre of Dublin, a set of three adjacent windows from the late nineteenth century depicts Samuel the prophet, Miriam, the sister of Moses, and Jacob from Genesis. As in other windows of the time, Miriam is depicted as a young woman; however Samuel, often pictured as a very young child, appears here uniquely in late adolescence, while Jacob, who appears in other windows as a grey-bearded patriarch, is also pictured as a

young man. What inspired this grouping of Old Testament characters in adolescence – a grouping found in no other church in Ireland? The tragic answer is to be found in their dedication to three siblings from one family, all struck down in their youth: Maurice Nelligan, age 22, Helen, age 17 and Matthew, just 15 – confirmation that here, as elsewhere, the Old Testament stories which appeared in the stained glass were bound up with the stories of the parishioners themselves.

The fruit of this project will be seen not only in the research published in peer-reviewed journals, but also in the equipping of local communities with the education and tools they need to nurture a deeper appreciation of the interpretive resources to be found in the fabric of their own physical environment.

Initial research has confirmed the significance of 'typology', in which events and people found in the Hebrew Bible/Old Testament... are depicted in the stained glass windows as 'types' which prefigure events and people described in the New Testament.

David Shepherd received his BA from the University of Saskatchewan and PhD from Edinburgh University and joined the Loyola Institute as lecturer in Hebrew Bible/Old Testament in 2013. He was elected Fellow of Trinity College Dublin in 2018. The founding director of the Trinity Centre for Biblical Studies within the School of Religion, he has published widely on the Old Testament both in its ancient context and in the visual and performing arts of the late 19th and early 20th century. Contact: shepherd@tcd.ie

BACKGROUND – Stained glass window depicting Miriam from the Old Testament in Lesson Park Church © Reproduced with the permission of the Representative Church Body of the Church of Ireland; photograph by David Lawrence



→ In 1850, there were less than 40 stained glass windows to be found in Anglican churches across the island of Ireland; by 1900 there were nearly 1,400...

04 Afghanistan, the British Empire and the Second World War belligerents, 1937-1947

Eunan O'Halpin

Britain formally recognised Afghanistan as an independent state only in November 1921, just three weeks before the Anglo-Irish Treaty did the same for Ireland. Both those settlements resulted in uncontrollable borders, unresolved territorial issues, divided communities, and complex political, economic and geostrategic relationships.

Arising from research for my book *Spying on Ireland: British Intelligence and Irish Neutrality during the Second World War* (Oxford, 2008), I have developed a deep interest in Britain's political and strategic relationship with her other awkward small neighbour, independent Afghanistan, between 1921 and 1947.

There is no accessible Afghan foreign policy archive, but British records include decoded Afghan diplomatic communications, and those of other powers dealing with Afghanistan, and these provide a unique insight into how Kabul saw the world and sought to protect Afghanistan's interests in the 1930s and 1940s in the face of not one difficult neighbour, but four: China, Persia, British India, and the dreaded Godless Soviet Union. The records also show how Afghanistan's engagement with wider Muslim issues across Central Asia and the Near and Middle East, from Palestine to China, was qualified by consideration of her relations with her powerful, feared and demanding neighbours the Soviet Union and British India.

Small states in the post-WWI international system: Afghanistan and Ireland

This research aims to make a contribution not only to the neglected history of decades of sophisticated and successful Afghan management of external affairs, and to the British Empire's difficulties in controlling its land borders, but to wider scholarship on the role of small weak states in the post-First World War international system of which Afghanistan and Ireland are interesting examples.

Finally, the study will cast more light on Irish contributions to British imperial governance: key officials dealing with Afghanistan such as Sir Francis Wylie and Sir Philip Vickery were Trinity graduates, and other Irishmen involved include Sir Aubrey Metcalfe and Brigadier Bill Magan (whom I interviewed in 2001).

My underlying argument is clear: for all the apparent chaos, under development, and weakness of central

government in Afghanistan, for forty years the state proved remarkably successful in securing its external interests and in managing its difficult Soviet and British Indian frontiers. How this was achieved, and what it says about the complex nature of governance in Afghanistan, is of contemporary as well as historical interest.

I aim to produce a full monograph on this project in 2021. Significant publications to date include articles in *Holocaust and Genocide Studies* (2016) and *Twentieth Century China* (2017), and co-authored entries in the *Encyclopedia of Jews in the Islamic World Volume IV*.

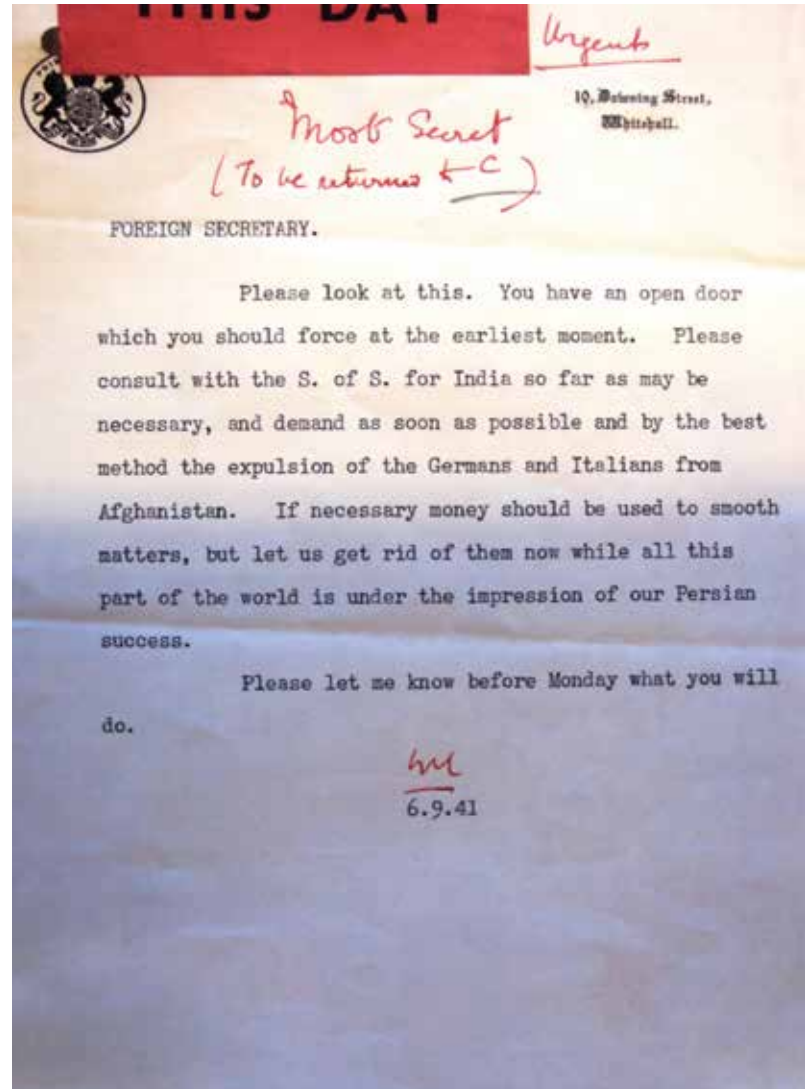
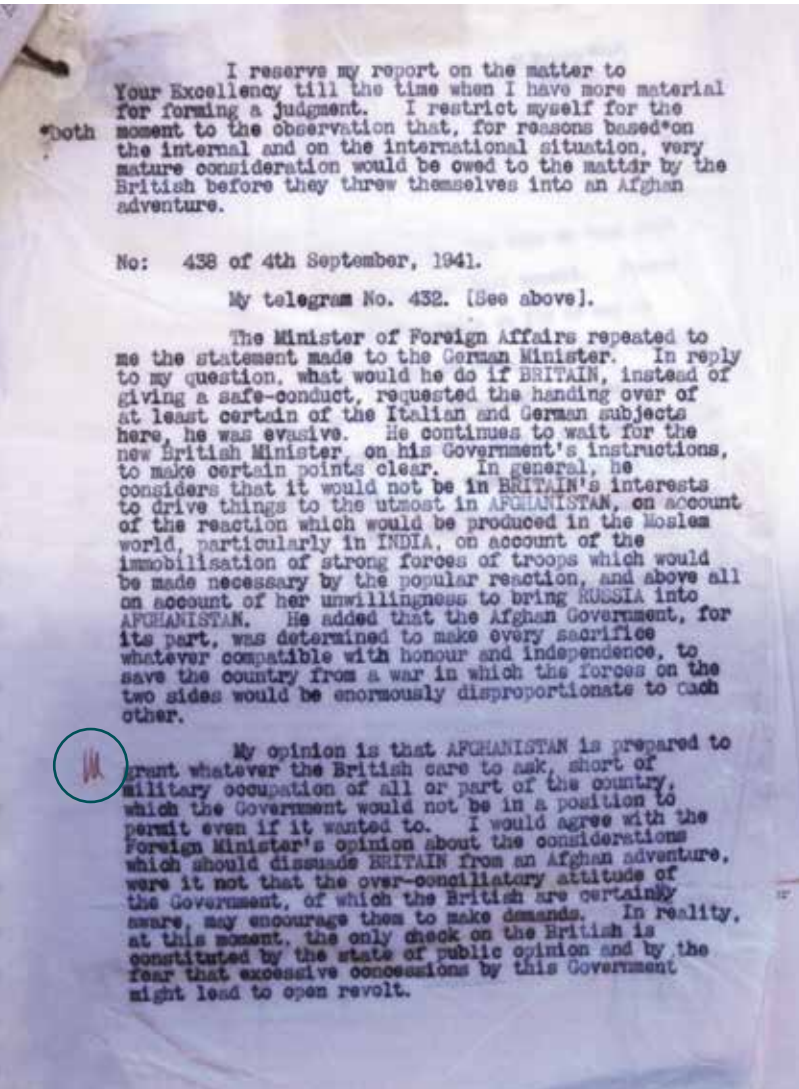
Opposite is a dramatic illustration of how a decoded cable concerning Afghanistan could influence high policy: the consequence was a much-resented but successful Anglo-Soviet demarche which forced the Afghan government to expel Axis civilians in September 1941.

→ For all the apparent chaos, under development, and weakness of central government in Afghanistan, for forty years the state proved remarkably successful in securing its external interests...

Eunan O'Halpin received his BA and MA from UCD, and PhD from Cambridge. He worked in DCU's Business School from 1982 to 2000, becoming the first Paddy Moriarty Professor of Government. Since 2000 he has held the Bank of Ireland Chair of Contemporary Irish History (1999) and was elected Fellow in 2003. He has published widely on aspects of 20th century British and Irish history, including bi-lateral and international relations. He makes extensive use of British, American and Irish archival holdings, and has particular expertise in exploiting diplomatic and intelligence records. Contact: ohalpine@tcd.ie

LEFT – Part of decoded cable from the Italian Legation in Kabul to Rome, setting out reasons why the Afghan government feels it will have to give in to British pressure to expel Axis civilians from the country.
Note Churchill's marginal marks in red ink on the last paragraph.

RIGHT – Churchill's impulsive response to this raw intelligence is reflected in this memo to the Foreign Secretary. He rightly assumed that Kabul had been profoundly intimidated by the Anglo-Soviet invasion of neighbouring Persia the previous month.



04 Understanding Irish Gothic literature

Jarlath Killeen

In the 1897 novel which first introduced him to the world, Count Dracula warns his enemies, 'I spread over centuries and time is on my side'. He appears to have been right. Not only is Dracula the best-known vampire of them all, he is one of the most recognisable characters in literary history.

What is not as well-known, however, is that he was the creation of a middle-class, Irish Protestant, Trinity graduate, who lived in Dublin for half of his life. Moreover, if Bram Stoker provided the world with the best example of the male vampire, his fellow Dubliner, Joseph Sheridan Le Fanu, gave the world the most significant female vampire ever in Carmilla, the eponymous anti-heroine of his 1870 novella. An 'unholy trilogy' of Trinity College-educated Gothic writers is rounded-off by Charles Maturin, the author of *Melmoth the Wanderer* (1820), now almost completely forgotten except by scholars of horror fiction and the students they continue to require to read his enormous and labyrinthine masterpiece. Why (and how) did middle-class Irish Anglicans from nineteenth-century Dublin generate such extraordinary influential monsters? More generally, why has Ireland produced such a long and distinguished line of Gothic, horror and 'weird fiction' writers?

Irish Gothic — Much of my own research has focused on answering questions like this. I have demonstrated that the Gothic in Ireland has a history that stretches back into the 17th and 18th centuries, and has had a major impact on shaping ideas about what Ireland is like, and what it means to claim particular kinds of Irish identity.

My published work argues that what Frank O'Connor once termed "submerged population groups" may well be attracted to and gravitate towards forms and genres that speak to their in-between status, their religious, social, political and personal liminality, and provide fantasy solutions to the real world difficulties with which they are struggling. Through monographs such as *Gothic Ireland* (2005), *The Emergence of Irish Gothic Fiction* (2013), essay collections on Bram Stoker (2014) and Sheridan Le Fanu (2017), and the organisation of international conferences on the major Irish Gothic in Trinity College, my aim has been to generate more scholarly interest in 'Irish Gothic' literature, and also suggest possible explanations about the wider implications of a genre which has such mesmeric attraction for readers and audiences around the world.

The Gothic, which is packed full of 'in-between' monsters, like vampires (who are living and dead), may well be

irresistible to hyphenated figures and groups. As Ireland continues to grapple with its own in-between status, between tradition and post-modernity, Berlin and Boston, Britain and Europe, the Gothic will most likely continue to occupy a central place in its literary scene. I am currently co-editing a collection of essays on Irish Gothic literature for Edinburgh University Press with Christina Morin of the University of Limerick.



Jarlath Killeen received his BA from Trinity College Dublin and his PhD from University College Dublin. He joined the School of English in 2006 as a lecturer in Victorian literature, and he is now the Head of School. He was elected Fellow of Trinity College Dublin in 2010. He is the author of five monographs, and has published widely on the work of Oscar Wilde, and Irish Gothic fiction. He is currently completing a study of the discourses of childhood in seventeenth and eighteenth century Irish writing.

Contact: killeej@tcd.ie

→ The Gothic, which is packed full of ‘in-between’ monsters, like vampires (who are living and dead), may well be irresistible to hyphenated figures and groups.



LEFT– Death Mask of Joseph Sheridan Le Fanu. Courtesy of Anna and Francis Dunlop.

FAR LEFT – Bram Stoker by W. & D Downey photogravure, 1906 NPGx3769 Copyright National Portrait Gallery, London. Creative Commons.

04 Rehabilitation following a cancer diagnosis

Juliette Hussey

The National Cancer Registry of Ireland reports an overall improvement in cancer survival, including for cancers traditionally associated with poor outcomes. This has led to an increased population of cancer survivors, many of whom have physical and psychological needs that require interventions in order to optimise quality of life.

Physical functioning is affected by both the disease itself and the adverse side effects of treatment (surgery, chemotherapy, radiation) – studies show that patients complete initial treatment with significantly reduced physical performance (poor exercise tolerance, muscle weakness and lower levels of muscle mass with increased body fat). These impairments need to be addressed to enable the patient to return to pre-morbid functioning (participating in family life, return to work etc). Addressing the adverse changes in body composition and physical performance may also assist in the prevention of secondary disease, particularly cardiovascular disease which cancer survivors are at a greater risk of developing.

Specific personalised exercise prescription — While the general benefits of exercise in both the prevention and treatment of cancer are understood, less is known about specific personalised exercise prescription which considers

the specifics of the cancer and its treatment. My research group in the Clinical Research Facility in St James's Hospital works closely with the Department of Surgery and Prof John Reynolds to evaluate exercise interventions aimed at optimising therapeutic responses to exercise at various time points.

Early work from my group has revealed that, following treatment, breast cancer patients engaged in similar levels of physical activity as controls but had reduced muscle strength and aerobic fitness. Since activity levels in the general population have decreased and approximately 65% of people in Ireland are not engaging in enough physical activity, the aim of ensuring that patients return to pre-diagnosis activity levels is

not sufficient. This has led to a paradigm shift for physiotherapists. In patients surviving cancer, major behaviour change is needed to bring exercise levels to those required for health benefits.

Exercise specific to particular cancers

Different cancers have different rehabilitation requirements. People surviving complex cancers such as oesophageal cancer are found to have significant physical and nutritional impairment, and surgery performed after chemo(radio)therapy can have a marked attritional impact on overall wellbeing. Findings from the project RESTORE (Rehabilitation Strategies following Esophagogastric Cancer), include significantly improved cardiorespiratory fitness of disease-free patients without



Juliette Hussey is a Professor in Physiotherapy in the School of Medicine and Vice President for Global Relations. She received her MSc from King's College London and her PhD from Trinity. She was elected to fellowship in 2011. Her research focuses on evaluating exercise interventions aimed at increasing physical performance in patients undergoing treatment for cancer. She has obtained over €1.4 million in grant funding in 2018 from the Health Research Board and the Irish Cancer Society.
Contact: jmhussey@tcd.ie

LEFT – Exercise interventions aimed at optimising therapeutic responses to exercise are being evaluated

compromises in body composition. This initial work formed proof of principle for rehabilitation programmes and was the basis for RESTORE 2 (Rehabilitation Strategies in Oesophagogastric and Hepatopancreaticobiliary Cancer) which will investigate the efficacy of the programme as it applies to a wider cohort of cancer survivors (oesophagus, stomach, pancreas and liver).

In patients with lung cancer or oesophageal cancer the symptoms

of the disease result, respectively, in breathlessness on activity and difficulty swallowing, which both lead to decreased exercise tolerance. Lower fitness levels are associated with post-operative complications. Prehabilitation or exercise training pre-surgery is the obvious intervention, but the time between diagnosis and surgery does not generally permit gains in exercise tolerance using typical exercise programmes. Early results from pilot work demonstrated that high

intensity interval training led to positive changes in exercise tolerance in as little as two weeks and work on a randomised control trial has begun.

The expectation is that this research over the coming four years will provide the evidence to support guidelines for rehabilitation including individualised exercise prescription for patients with gastro-intestinal cancer and for prehabilitation for patients facing oesophageal or lung resection.

→ Approximately 65% of people in Ireland are not engaging in enough physical activity, the aim of ensuring that patients return to pre-diagnosis activity levels is not sufficient.

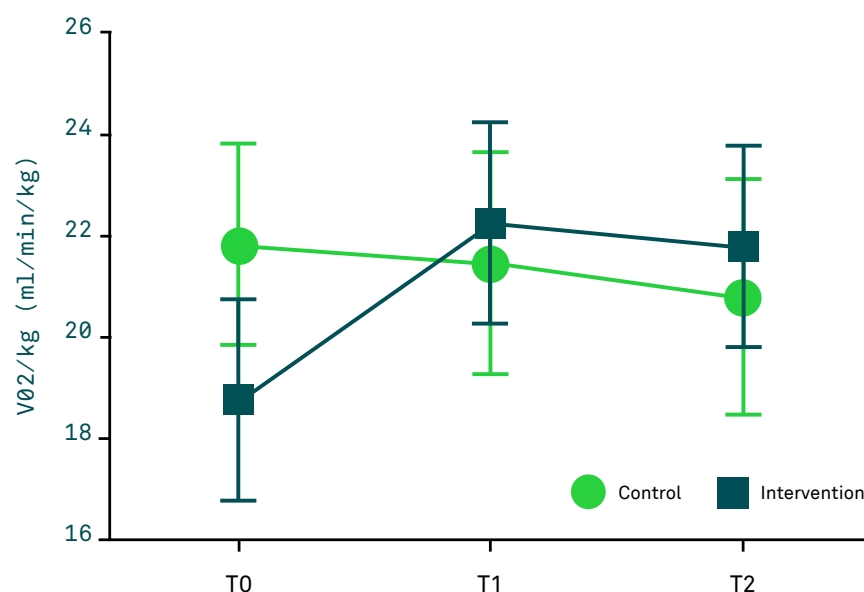


Fig 1 – Changes in Cardiorespiratory Fitness (VO2max (ml/min/kg)) from T0 to T2

Correcting for baseline values, cardiorespiratory fitness levels were significantly higher in the intervention group compared to the control group at T1, 22.20(4.35) vs 21.41(4.49)ml/min/kg, $F(1,37)=19.67$, $p=.000^*$, partial eta squared (η^2) =0.35, and at T2, 21.75(4.27) vs 20.74(4.65)ml/min/kg, $F(1,35)=13.29$, $p=.001^*$, $\eta^2 =0.28$.

04 How to make medicines more effective?

Lidia Tajber

Many therapeutic agents – both newly discovered and long existing – lack efficacy because they have difficulty getting to the bloodstream when ingested and cannot therefore reach the required therapeutic destination sites. Typically, the therapeutic agents, also called active pharmaceutical ingredients, that are often given to patients as tablets to swallow must fully disperse into individual molecules following ingestion before being taken up into the circulation, move about the body and show their pharmacological effects.

Nowadays, those active molecules are invented using computer modelling to specifically deal with a given ailment and to have minimum side effects, which means that other properties of those substances, such as solubility (the ability of therapeutic agents to dissolve into a solution containing individual molecules), are often overlooked. It means that the oral medicine (e.g. tablets) will not work effectively or will not work at all. Also, many companies may not engage in development of poorly soluble therapeutic agents due to the enormous costs of transforming such molecules into medicines. Therefore, there is a definite need for smart technological formulation approaches to make drug molecules bioavailable, so the existing and new medication to treat ailments are of the highest efficacy and quality.

Anti-crystal engineering — To address the above problems, my research concentrates on:

- firstly, understanding the origins of poor solubility of active substances,
- secondly, developing a suitable technological strategy to tackle the problem and,
- thirdly, testing the approach using a panel of sophisticated instrumentation and in prototype formulations (simple medicine).

On the first question, why does it happen, the pharmaceutical industry has coined the term “brick dust” for poorly soluble molecules, but often the issue is not with the “bricks” but the “cement”, e.g. the strong bonds that the molecules develop to hold them together in an entity called a crystal.

On the second issue, tackling the problem, breaking the “cement” can be achieved by mixing the crystals with another substance that is able to break the bonds and keep the active molecules separate and readily available for absorption. This approach is called “anti-crystal engineering”. (See Figure 1)

My group in Trinity’s School of Pharmacy and Pharmaceutical Sciences, which is supported by Science Foundation Ireland, aims to develop those multicomponent mixtures, scientifically termed ionic liquids and deep eutectic mixtures, as a viable approach to enhancing bioavailability.

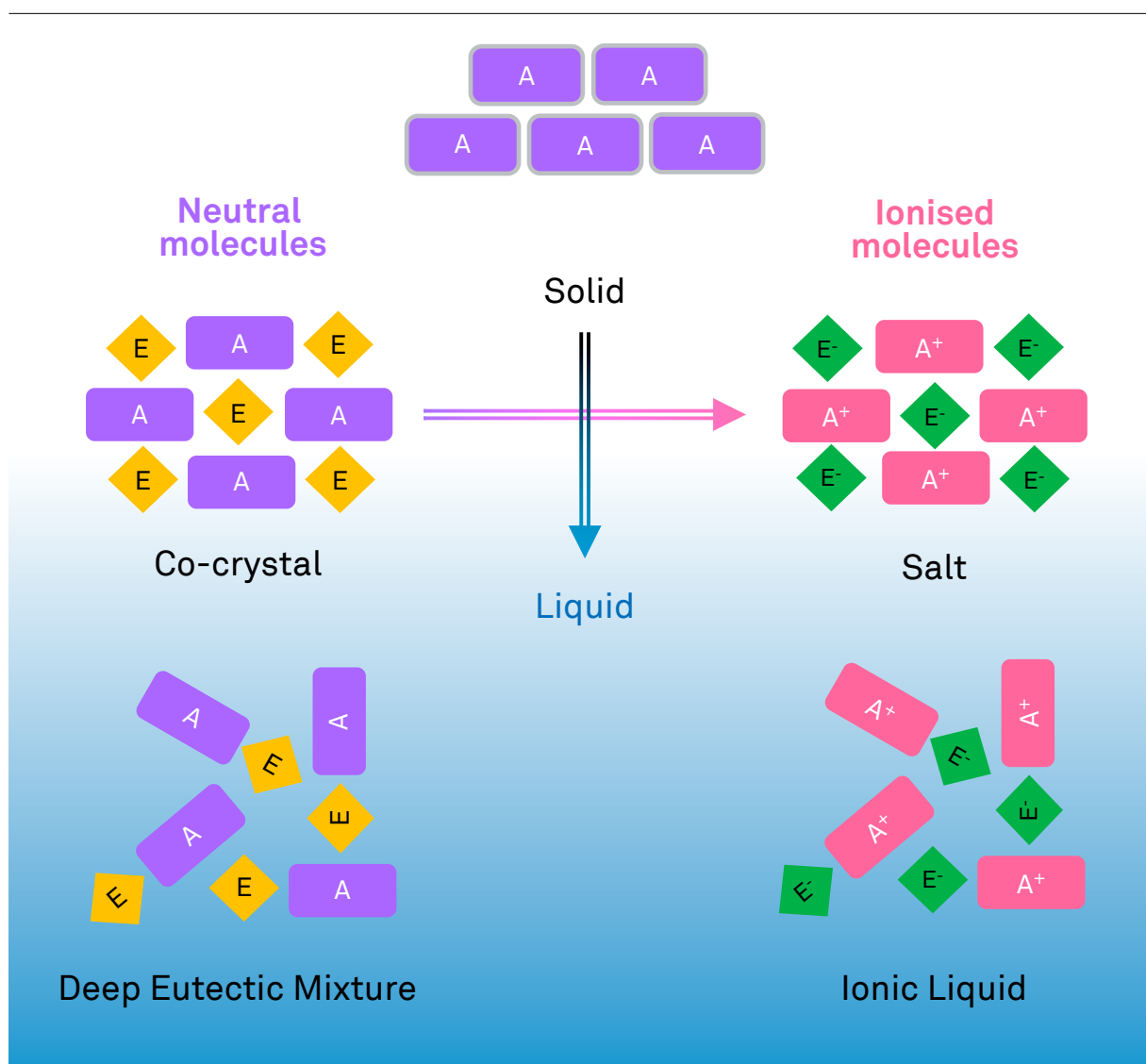
A collaborative approach — On the third issue, testing the approach, we know that critical issues with medicine design can’t be dealt with in isolation, so I have engaged in several networks. Within the Synthesis and Solid State Pharmaceutical Centre (SSPC), a unique collaboration between industry partners and Irish and international academia, my research has mainly concentrated on amorphous (“cement”-devoid) materials for pharmaceutical applications. My group is also involved in two European Commission (EC) supported collaborations:

- the Open Research Biopharmaceutical Internships Support (ORBIS) is composed of six academic partners and four pharmaceutical companies from Poland, Czechia, Finland, Ukraine, Ireland, Germany and the US to advance the current scientific, economic and social challenge of increasing the effectiveness and productivity of drug development processes. The core of ORBIS is the intersectoral and international exchange of researchers working together on solving the problems with medicine development;
- for the project LongActNow, academic partners from Ireland, Germany and a pharmaceutical company based in Belgium will work on injectable long acting medicines.

Lidia Tajber received her MSc Pharm from Medical University of Silesia, Poland, and PhD from Trinity, where she is now an Associate Professor in Pharmaceutics and Pharmaceutical Technology and Director of Research in the School of Pharmacy and Pharmaceutical Sciences. She joined the School in 2007 as a lecturer. Lidia has published nearly 90 peer-reviewed manuscripts and is a co-inventor on patent applications. Her research focuses on fundamental and applied aspects of developing medicines containing poorly soluble drugs.

Contact: ltajber@tcd.ie

Fig 1. Schematic representation of the molecular arrangement of poorly soluble active substance (A) showing the “cement” in grey (top of figure) and comparison between the structures of conventional, solid forms of the active comprising another substance (excipient, E) and the novel, ionic liquid and deep eutectic mixtures, systems.



04 Revealing consciousness after severe brain injury

Lorina Naci

Coma is the acute state of behavioural non-responsiveness occurring immediately after a severe brain injury, during which the patient is thought to lack consciousness.

Improvements in intensive care have led to increased survival rates for coma patients but patient outcome remains highly variable and, currently, no clinical tool offers accurate prognostic indicators of recovery for individual comatose patients. Some go on to make a good recovery, while others progress into the so-called 'vegetative stage' or minimally conscious states.

The first days and weeks following a serious brain injury are a time of tremendous prognostic uncertainty; if the patient appears non-responsive during this period, this frequently biases medical decisions in favour of withdrawing life-sustaining therapies - this might happen as early as within the first 72 hours post-injury.

My research suggests that, in some cases, this may be a mistake since a proportion of comatose patients may retain consciousness despite their apparent non-responsiveness.

MRI — I have shown that functional Magnetic Resonance Imaging (fMRI) is a highly sensitive tool for uncovering covert consciousness in long-term behaviourally non-responsive patients,

who are diagnosed as vegetative state. I have demonstrated that a significant minority of patients thought to lack consciousness for many years, can modulate their brain activity wilfully, accordingly to commands. Not only can they demonstrate that they are conscious, they can also communicate while inside the MRI scanner, by using brain activity to answer questions such as "Is your name John?" and "Are you in a hospital?"

Other patients, such as those in a comatose state, are unable to follow commands in order to communicate in this way. But despite their apparent profound non-responsiveness, we suspect that a significant proportion of these may actually retain some consciousness and the ability to process information around them.

Feeling suspenseful — To test this hypothesis, I have developed an innovative approach in which patients view suspenseful movies by, for instance, Alfred Hitchcock, or listen to engaging stories. Through this, I was able to demonstrate that a patient who was non-responsive for 16 years was not only consciously aware, but critically, able to follow the story and feel suspense, from moment to moment, as well as every healthy individual that we tested.

Due to its scientific novelty and impact, my work has been strongly cited

and has received international coverage, including in *Science*, *Nature*, *New Scientist*, *BBC*, *The Times*, *International Business Times*, *NBC News*, *Reuters*, *Irish Times*, *the Irish Independent*, and *Discovery News*. Speaking to the journal *Nature*, Dr Russell Poldrack, a cognitive neuroscientist at Stanford University in California, said that this study "provides the best evidence to date that fMRI can be used to identify consciousness in vegetative patients."

Currently, my group is working to determine the clinical prevalence of covert consciousness in comatose patients and identify novel and objective prognostic markers of recovery in this group. This work could have profound implications for the diagnosis and clinical care of comatose patients, as well as the medical and legal decision-making relating to life after severe brain injury.

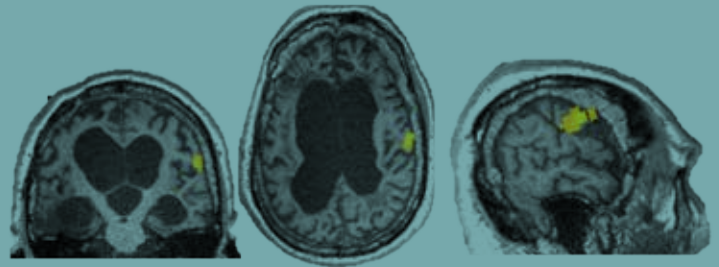
"I have shown that functional Magnetic Resonance Imaging (fMRI) is a highly sensitive tool for uncovering covert consciousness in long-term behaviourally non-responsive patients, who are diagnosed as vegetative state."

Lorina Naci is Assistant Professor at the School of Psychology and Global Brain Health Institute (GBHI). She received her PhD from the University of Cambridge as a Cooke Fellow in 2011. In 2017, she received the L'Oréal – UNESCO International Rising Talent Award. Professor Naci is member of the Governing Board of GBHI, held at Trinity and University of California San Francisco, USA. She is funded by the Wellcome Trust, the Irish Research Council, and Enterprise Ireland, among others.

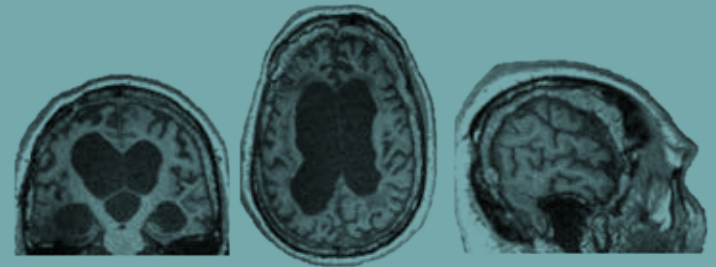
Contact: nacil@tcd.ie

Fig 1. A patient, who had been clinically diagnosed as being in a vegetative state for 12 years, uses his brain activity to correctly respond ‘Yes’ to the question “Are you in a hospital?”

“Are you in a hospital?” (Attend to the word that is your answer.)



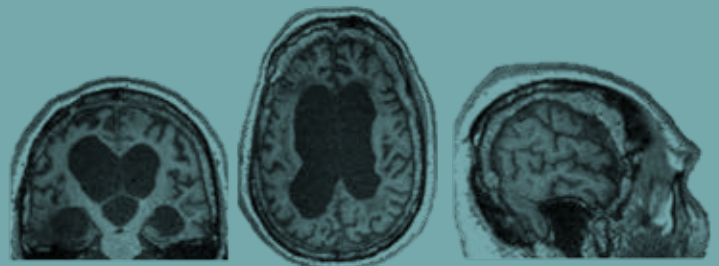
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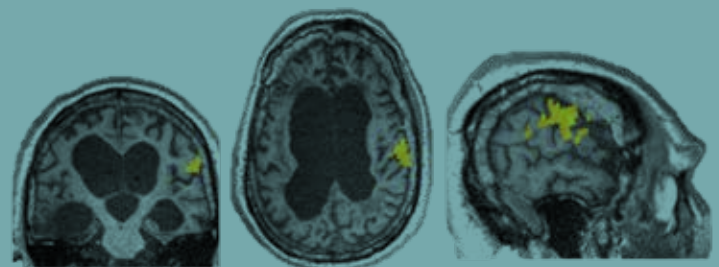
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Fig 2. A patient, who had been clinically diagnosed as being in a vegetative state for 12 years, uses his brain activity to correctly respond ‘No’ to the question “Are you in a supermarket?”

“Are you in a supermarket?” (Attend to the word that is your answer.)



Yes



No

04 Developing advanced carbon materials for electrocatalysis and energy technologies

Paula Colavita

Carbon materials are ubiquitous in every day applications, from electrode materials to medical implantable devices. Their success is largely due to their versatility and the wide range of properties they display. Carbons can adopt tetrahedral, trigonal or linear bonding arrangements. Crystalline forms, such as diamond or graphite, display long-range order with a well-defined periodic arrangement of centres of the same bonding type; however, if long-range order is sacrificed, a vast range of non-crystalline carbons can be obtained. Depending on the presence and distribution of carbon centres, these can have wide ranging electronic, optical and chemical properties.

Interest in tailoring the properties of non-crystalline carbons for electrocatalysis has increased exponentially over the last few years. Currently, electrochemical energy technologies such as fuel cells and electrolyzers rely on the use of precious and/or scarce elements for catalysing electrochemical reactions and this poses severe limitations due to cost and sustainability concerns.

However, it has now been discovered that carbon materials that don't rely on precious metals (or are entirely "metal-free") can display electrocatalytic activity in reactions that are critical for electrochemical technologies. The dual role of carbon as support and as an intrinsic electrocatalyst, in combination with its low cost and high availability, has

prompted an explosion of research aimed at exploiting the potential of advanced carbons in electrocatalysis.

This is a new research area and much remains to be discovered about these extraordinarily versatile advanced carbons and how they work. Understanding more about substitution and functionalization with either heteroatoms (e.g. nitrogen) or low-cost transition metals will further expand the materials landscape in carbon electrocatalysis.

Understanding the role of nitrogen-sites and oxygen reduction reaction

— My research work in Trinity's School of Chemistry has focused on addressing this knowledge gap by developing model carbon surfaces with controlled density and type of chemical sites, with the aim of understanding the bulk and surface properties that translate into high performance in electrocatalysis. Through the use of well-defined carbon material and nanomaterial platforms we have proposed structure-activity relationships to aid in the interpretation of activity trends in fundamental interfacial charge-transfer reactions.

My team has developed model disk electrodes with smooth topography to investigate the role of nitrogen-sites (N-sites) and graphitization degree on charge-transfer rates to diagnostic outer-sphere and inner-sphere redox species. We then used nanofiber carbon

electrodes with nanostructured morphology to explore the role of surface defects in the oxygen reduction reaction (ORR), a process critical to fuel cell and metal-air battery technologies. More recently, we developed model electrodes with controlled topography and N-site chemistry to understand the correlation between onset and selectivity in the ORR, and the distribution of N-sites at non-crystalline carbons.

Importantly, in collaboration with Prof García-Melchor's group in the School of Chemistry, we offered a new vision for cooperativity among N-sites that explains ORR selectivity. These recent results have enabled a new understanding of charge-transfer at non-crystalline electrodes, including the development of predictive models applicable to these highly disordered materials.

Our findings provide new guidelines for the rational design of catalytically active carbons and are currently guiding our synthetic efforts towards developing novel sustainable electrocatalyst materials to expand the use of renewable energy to industrial transformations and to the valorisation of untapped bio-resources.

Paula Colavita received a Laurea in Chemistry from the University of Trieste and PhD from the University of South Carolina. She joined Trinity's School of Chemistry in 2008 and was elected Fellow of Trinity College Dublin in 2014. Her research aims at understanding chemical reactions and achieving control of interfacial chemical processes at functional materials. She has authored more than 70 peer-reviewed publications and her work has been supported by Science Foundation Ireland, EPA Ireland, Irish Research Council and Enterprise Ireland.

Contact: colavitp@tcd.ie

Fig 1. Voltammetry of oxygen-saturated alkaline solutions (top-right) obtained using graphene nanofiber carbon electrodes grown with the varying morphology shown in the electron microscopy images (bottom). Adapted from Stamatini et al. ACS Catalysis 2016, 6, 5215-5221.

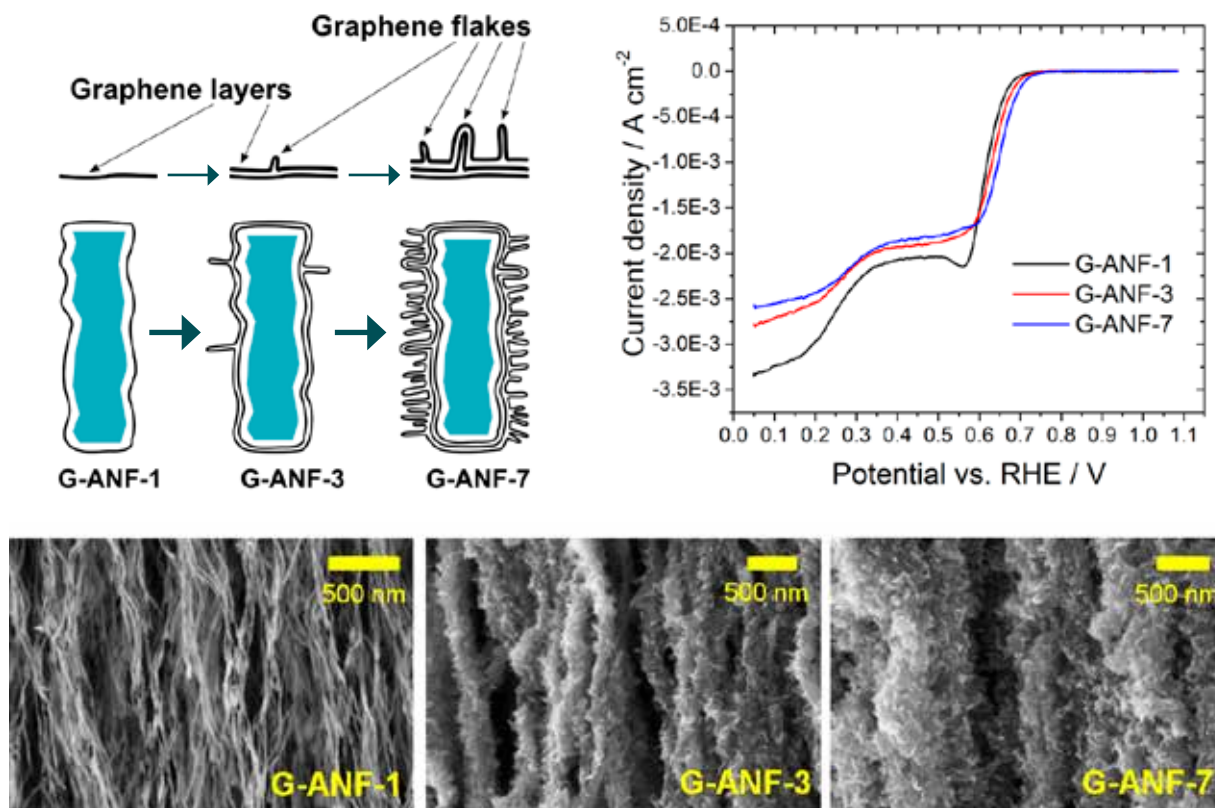
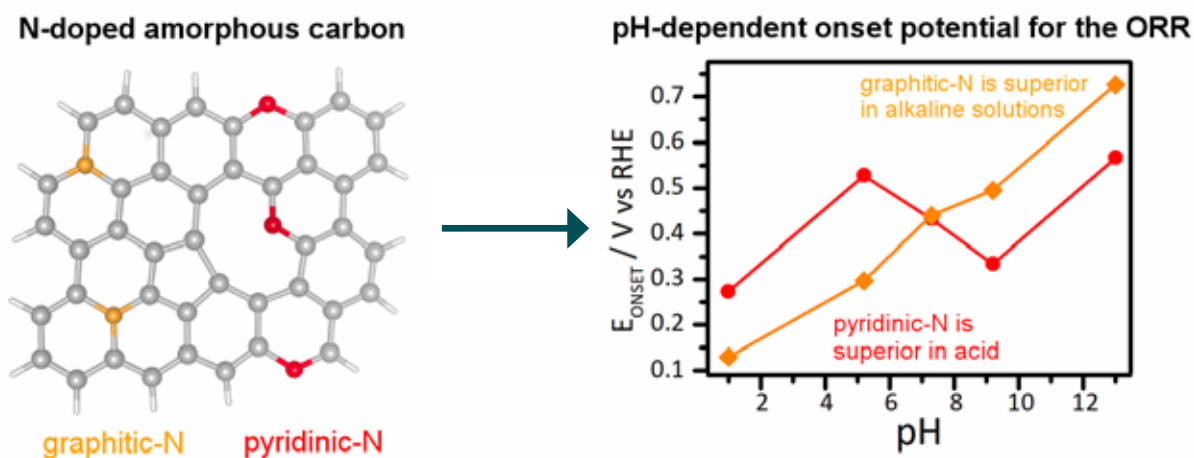


Fig 2. Trends in the onset potential for materials with selected N-functionalities. Adapted from Behan et al. Carbon 2019, 148, 224-230.



04 Constitutional frames for political problem-solving

Rachael Walsh

Constitutions shape democracies and set parameters for solving social problems, both procedural and value-based. My research examines how they do this. In my current projects, I analyse the role of citizens in constitutional reform and the balance between the individual and the community in the protection of property rights.

Involving citizens in constitutional amendment processes

— Given the rise of populist politics around the world, there is an urgent need to reconnect people with political processes. Deliberative democracy is proposed as one solution. It prioritises policy-making through inclusive and informed discussion, including the open confrontation of disagreement. Ireland is at the forefront of these developments, in particular leading the integration of deliberative democracy with constitutional amendment processes. As constitutional law adviser to the Citizens' Assembly which recommended reform of Ireland's abortion laws, I worked directly with citizens as they analysed and debated highly charged and complex constitutional questions and developed practical proposals for change.

In my scholarship, I am demonstrating the impact of such deliberative exercises and the lessons that can be learnt for future iterations, for example to inform the proposed Irish Citizens' Assembly on gender equality and similar

deliberative exercises elsewhere. Since Ireland's Citizens' Assembly, equivalent bodies have been proposed in the UK on Brexit, in Scotland on independence, and in Australia on the voice of indigenous people. The first permanent Citizens' Assembly was established in Belgium in February 2019. The Irish experience shows how the democratic nature of constitutional amendment processes can be enhanced by involving citizens in formulating proposals for reform. I have presented the results of this research at international conferences. In September 2019, I led a practical workshop in Belgium for global political leaders on the problem-solving potential of deliberative democracy.

Constitutional property rights and the rhetoric of political conservatism

— Property rights are perhaps unique amongst individual rights in their exclusionary nature: the essence of my right 'to have' is everybody else's duty to 'keep off'. Where constitutions protect property rights, judges are called upon to review policy decisions on the basis that such decisions 'take away' privately owned property. At the same time, legislatures must be able to act to secure the common good. The Irish constitutional protection for property rights does both these things: it protects individuals and recognises the collective interest in the distribution of resources.

This tension between the individual and the community has loomed large as an influence on the Irish legislative response to social problems such as housing, pensions reform, and environmental and planning regulation. Government ministers regularly state that solutions proposed by opposition politicians cannot be pursued because of the constitutional protection of property rights. In *Property and Social Justice: Progressive Property in Action* (Cambridge University Press, 2020), I challenge this claim and situate Irish constitutional property law in the global context. The Irish experience shows that constitutional protection of property rights does not, as a matter of law, prevent progressive legislative responses to social problems. However, such protection can be used rhetorically to justify political conservatism and may in fact be misunderstood as a barrier to reform. My scholarship challenges this tendency by deconstructing judicial interpretations of the Constitution's protection for property rights in light of prevailing cultural attitudes about property.

Rachael Walsh has an LLB and PhD from Trinity and completed an LLM at Harvard Law School as a Fulbright Scholar. Appointed Lecturer at King's College London in 2010, she joined Trinity as an Assistant Professor in 2012. She has published internationally on constitutional law and property theory and is co-author of the leading Irish book on constitutional law, *Kelly: The Irish Constitution*. She was constitutional law adviser to the Citizens' Assembly. Her current research examines deliberative democracy in constitutional amendment processes and the impact of constitutional protection for property rights on legislative reform.

Contact: rachael.walsh@tcd.ie

BOTTOM – The Referendum Campaign on the Eighth Amendment

→ Given the rise of populist politics around the world, there is an urgent need to reconnect people with political processes. Deliberative democracy is proposed as one solution. It prioritises policy-making through inclusive and informed discussion, including the open confrontation of disagreement.



04 Remapping memories of the Irish diaspora

Sarah O'Brien

My research is made from the words of Irish people who search the past for their future. They appear as unremarkable folk: they live in ordinary houses, decorated with framed pictures of their families. They prefer talking to writing. They are *émigrés*, members of Ireland's lost generations, scattered from Birmingham to Buenos Aires. As such, they are often presumed to have formed their memories in the absence of place.

My research interrogates this presumption. I work to accrue migrant stories, using cultural history and linguistics to promote a deeper understanding of narrative and memory as it pertains to the Irish Diaspora.

Irish emigration — What is troubling about Irish emigration is not the act of leaving but the myths that precede it. By 1948, the notion of Irish identity as an extension of the Irish landscape was deeply imprinted upon the cultural imagination. "Land frames human endeavor" announced geographer Emyr Estyn Evans, following his survey of Ireland's human geography in the 1950s. Later, the folklorist Henry Glassie would carry out a decade-long study of a small townland in County Fermanagh. His conclusion, like Evans', sings to the indelible relationship between memory and place in 1970s

Ireland. "The landscape we share with the dead swells into an encompassing mnemonic, embodying our history and urging us to judgement", Glassie writes, in his own transcendent language.

For those concerned with the development of the still young Irish free state, these were comforting, wholesome thoughts that helped to set the march of the nation. Conversely, for Irish migrants now living in bedsits in Birmingham and Croydon, they crippled the mind. The idea of native landscape being a preservative of Irish identity tortured those who suspected their own decay in its absence. As the years passed, it seemed, the identities of Irish migrants would lose their very essence, left to spoil *out foreign*. In 2006, when I asked Bill Collins, an Irish immigrant in Birmingham if he ever thought of returning home to West Limerick, he answered like this:

"I can't go back to Ireland. We'd be Brits if we went back. And that is the saddest part of it."

Myth and memory — My research works to disrupt this closed-circuit arrangement of Irish memory, Irish landscape and Irish identity. Recording stories with Irish women has been especially helpful in this regard. As an oral historian, I have learned that female narrators proffer

two rare gifts. First, as demonstrated by Svetlana Alexievich, women seem better equipped to recall memories of *what a thing felt like*. The death of a beloved child, the loss of a cherished parent: such is the matter of their memory. Second, as my current work suggests, women tend to use matrices of proximity rather than conflict to tell their stories. By prioritizing stories of their relationships — of families, friends or neighbours — women's memories reveal a logic of interdependence that seems to transcend a logic of borders.

In our globalized world, with narratives of nationalisms aggressively re-emergent, such insights as to the true vectors of memory seems increasingly urgent.

The idea of native landscape being a preservative of Irish identity tortured those who suspected their own decay in its absence. As the years passed, it seemed, the identities of Irish migrants would lose their very essence, left to spoil out foreign.

Sarah O'Brien received a PhD from University of Limerick. Her doctoral research, funded by the Irish Research Council, investigated Irish associationalism in post-World War II Birmingham. Her subsequent research on the Irish in Argentina won an outstanding research award from *Riocht na Midhe* and was published as a monograph in 2017 by Palgrave Macmillan. Current research will be published with Indiana University Press in 2021. Widely published, she is Director of Trinity's Centre for English Language Learning and Teaching and Assistant Professor in the School of Linguistics, Speech and Communications Sciences.

BOTTOM – Women's stories offer new insight into patterns of memory-making in Irish migrant enclaves

→ “The landscape we share with the dead swells into an encompassing mnemonic, embodying our history and urging us to judgement” (Henry Glassie).



04 Exploring higher education in the digital age

Timothy Savage

Globally the demand for higher education has never been greater and this massification brings issues of both access and quality. Society is looking to universities to tackle global issues around sustainability and humanity through research and equipping graduates with the right skills and mindsets.

Simultaneously, new and emerging technologies offer opportunities unthinkable a few decades ago. Students can collaborate in real-time across the globe. Learners can access vast and ever-expanding learning resources, videos, documents and online discussions from an ubiquitous handheld device - the mobile phone.

My research focus over the last 20 years has been on meaningfully integrating technology into teaching and processes and, more recently, developing appropriate models of higher education for the digital age, within the European context.

The meaningful integration of technology into learning — The first decade of this millennium saw an incessant stream of new technologies, each promising to revolutionise education. My initial focus, working with a small team of researchers and PhD students, was on the role of virtual worlds for learning. These avatar-driven immersive environments offered great

potential in creating highly immersive constructed and constructible spaces. An Irish Aid funded project in development education for schools soon followed along with a National Digital Research Centre funded commercialisation project exploring the role of virtual worlds in corporate training and onboarding.

MOOCs for Trinity students and the wider public

— As the technology matured, my research focused on providing accessible online education and part-time higher education for non-traditional students. In 2012 I was appointed Trinity's first Associate Dean of Online Education where I led a talented team creating the university's first online courses and massive open online courses (MOOCs) aimed at both Trinity students and the broader public.

The CHARM European university project

— In 2018 the European Commission announced the European Universities initiative, a high-profile call to support the emergence of bottom-up networks of universities offering a future model of higher education within Europe.

The CHARM-EU consortium was formed by the rectors of Trinity College Dublin and the Universities of Barcelona, Montpellier, Eötvös Loránd (Budapest), and Utrecht. In 2019 we were awarded funding as one of the first European

University networks. This exciting and challenging three-year project will deliver on the vision of a truly European University experience.

The key challenge CHARM-EU will address is *Reconciling Humanity and the Planet*. It envisages a truly mobile, research informed, challenge-based European educational experience aimed at confronting issues of climate emergency and sustainability.

As Trinity's Principal Investigator, I am responsible for leading the development of this new model of curriculum. CHARM-EU students will co-construct their own curriculum, moving seamlessly between the partner institutions, following their emergent interests and engaging with the business and research communities, all the while addressing authentic challenges based around sustainable development goals.

This approach to deep and authentic learning will empower students and provide a deep and meaningful learning experience that focuses on the ability of future graduates to tackle head-on the problems of sustainability and the reconciliation of humanity with the planet.

Timothy Savage received his BA in Sociology from the University of East Anglia (1987), his MSc in Computer Science and PhD in Education and Technology from Trinity. In 2002 he became an Assistant Professor in Technology and Learning. This multidisciplinary background underlies his research focus on the meaningful integration of technology into learning and the future of higher education in the digital age. Appointed Trinity's first Associate Dean of Online Education, he led the online education initiative and is the Trinity PI on the CHARM-EU European University project.

Contact: tsavage@tcd.ie

BACKGROUND – Avatar-driven immersive environments offer great potential to create highly immersive constructed and constructible spaces



→ New and emerging technologies offer opportunities unthinkable a few decades ago...

Inspiring Generations – The Campaign for Trinity

***Inspiring Generations*, the first comprehensive philanthropic campaign in Trinity's history, was launched in the Public Theatre in Front Square on 2nd May 2019.**

The largest philanthropic campaign ever launched on the island of Ireland, and the fourth largest of its kind in Europe, *Inspiring Generations* has two key goals: to raise €400m in philanthropic donations and to inspire 150,000 volunteering hours from alumni and friends of Trinity around the world.

Ever since Dublin Corporation granted the College lands in the 1590s, Trinity has survived and thrived with the help of supporters who believed in the fundamental importance of Ireland having a world-class university as a centre of independent learning.

Inspiring Generations is a new departure; it's the first time that Trinity has launched a global public philanthropic campaign. In today's highly competitive global environment, the top universities are supported by a strong philanthropic culture. If Trinity is to maintain excellence in education and research and continue to represent Ireland as a leading university on the world stage, we need to harness the enormous goodwill that exists among alumni and friends to create our own committed philanthropic community.

RIGHT – Marking the launch of the philanthropic campaign, Trinity commissioned a mural, 'The Youth Need to see their Greatness reflected in our eyes', by artist Joe Caslin, at the Campanile in Front Square



→ Inspiring Generations has two key goals: to raise €400m in philanthropic donations and to inspire 150,000 volunteering hours from alumni and friends of Trinity around the world.

05



The University was hugely supported in the planning and execution of *Inspiring Generations* by the Provost's Council, a group of supporters with diverse life experiences and now living in many countries, who give strategic advice to the Provost and the College Board. Established in 2015, the Provost's Council now counts 52 members who remain closely involved with the Campaign.

At Campaign launch events in Dublin, London, Paris, New York and San Francisco, alumni and friends of Trinity heard from the Provost and leading Trinity academics about why philanthropy and volunteering are so important to the University and the positive impact that *Inspiring Generations* will have across Trinity. Provost's Council members and volunteers also spoke about why they choose to give both their time and financial support.

Financial donations supplement other income and enable the University to leverage additional funding from other sources including the State, research grants and bank loans. Donations also play a crucial part in enabling Trinity to attract brilliant people and give them the freedom to do research with potential to yield world-changing results. The valuable time and expertise given by volunteers supports many activities, both on campus and across our worldwide network of 70 alumni branches.

From scholarships and mentoring of talented students to the funding of Professorships or cutting-edge research projects, the support of our donors and volunteers means that Trinity can do many things that would not otherwise be possible.

Inspiring Generations will support a range of flagship initiatives including a critically-important plan to conserve and redevelop the Old Library and its precious collections; the Trinity St James's Cancer Institute that in September 2019 achieved Ireland's first Cancer Centre accreditation from the Organisation for European Cancer Institutes; and the landmark E3 initiative that will bring engineers, computer scientists and natural scientists together to work on engineering and scientific solutions for a sustainable world.

Everyone studying and working in Trinity will benefit from the positive impact of *Inspiring Generations*. The 'New Generations' programme will expand scholarships, support new academic posts that will attract the brilliant educators and researchers who are the lifeblood of the University, and build on the success of two Trinity pioneers: Trinity Access, now a world leader in widening access to third-level education, and Science Gallery Dublin, which shares the impact of Trinity research with a wide public audience through compelling exhibitions and events.

LEFT (L-R) – Provost Patrick Prendergast, Senator and alumna, Lynn Ruane, Chair of the Provost’s Council, Fergal Naughton and student Leah Kenny at the *Inspiring Generations* launch

BELOW – The Long Room in the Old Library



People have different motivations for supporting Trinity: some are proud of how Trinity represents Ireland and recognise that innovative role Trinity is playing in advancing Ireland’s economic and social development; others want to support particular areas of research like cancer or sustainable living, or to develop education in their own fields. Many alumni support student clubs and societies in ways that would have made a big difference to themselves as students, whether through scholarships, a grant to a society, career mentoring or offering financial support to the Trinity sports stars of today.

What all Trinity’s donors and supporters have in common is that they want to make a positive difference to the world. *Inspiring Generations* speaks to students, alumni and friends of Trinity about how, by joining together in support of the University, they can achieve that. For students, the Campaign creates an awareness that their connection to the university is lifelong, something that will sustain them long after they graduate; for the 121,000 alumni in 150 countries, the Campaign is a reminder to stay connected and join the local alumni branch community; for all friends of Trinity, in Ireland and around the world, joining the Campaign helps them enable Trinity to inspire many generations into the future.

→ **Inspiring Generations will support a range of flagship initiatives including a critically-important plan to conserve and redevelop the Old Library and its precious collections...**

Research Charter and Living Research Excellence Strategy

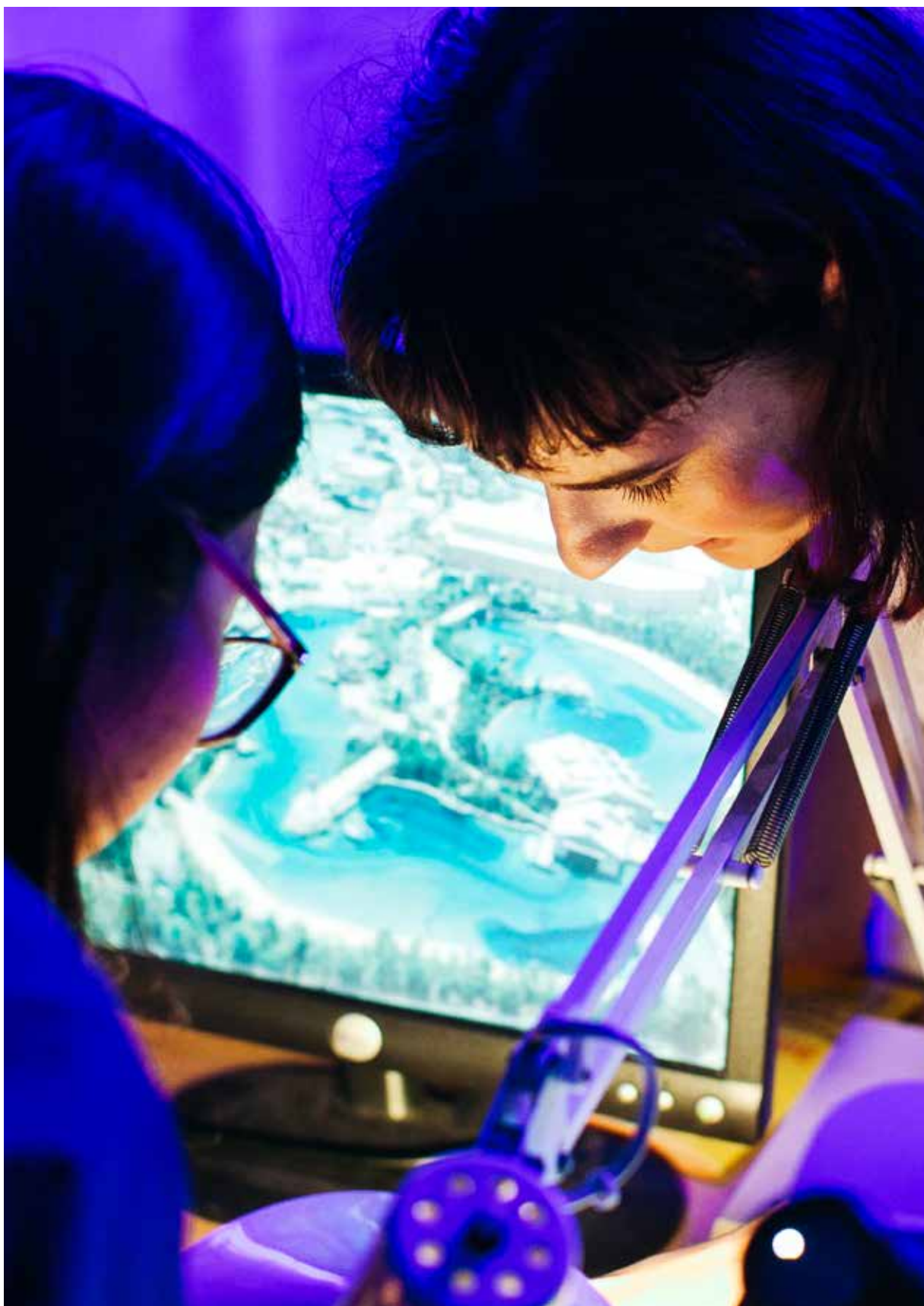
Trinity's first ever Research Charter and Living Research Excellence Strategy were launched at a special event in the Douglas Hyde Gallery in June.

More than 250 colleagues from across the University attended the launch which served as a celebration of the culmination of an intensive consultative and collaborative process and as an opportunity to celebrate research and the vital role it plays in the life of Trinity. The event featured brief presentations from researchers at all stages of their careers – undergraduates, postgraduates, early career researchers, senior principal investigators – and it showcased musical compositions from Trinity researchers to emphasise that research takes many forms and happens in myriad ways.

→ The development of the Charter and Strategy reinforced that the work of a university in standing up for research is never finished ...



06



LEFT – Discussing research at PROBE, a free public pop-up festival showcasing the diverse range of academic research taking place in Trinity as part of European Researchers' Night

→ Through engaging the whole Trinity community, the Charter and Strategy belong to everyone in the University...

The Research Charter: seven core principles

The Research Charter and the Living Research Excellence Strategy are the result of a highly collaborative process that started in early 2018. Hundreds of different inputs were received from across Trinity.

A team from the Office of the Dean of Research, headed by the Dean of Research, Professor Linda Doyle, reviewed the contributions. They identified a real desire, across the university, to reassert and affirm core principles around research and to clearly articulate what matters in terms of how and why we research. The team crystallised the inputs into the seven core principles which form Trinity's Research Charter:

1. Cherish academic freedom, diversity of scholarship, and pursuit of truth.
2. Position research at the heart of Trinity.
3. Foster and grow research talent.
4. Harness our collective expertise for the greater good.
5. Broaden our local and global impact.
6. Engage profoundly with our publics.
7. Stand up for research.

Living Research Excellence Strategy: actions

The next phase of the process involved identifying how to 'live' the core principles. What kind of issues might prevent researchers from 'living' these principles? How could the principles become reality? The team embarked upon several months of discussion during which ideas were collected and approaches mapped. This ultimately resulted in the broad actions captured in the Living Research Excellence Strategy:

1. Stimulate and build strategic research collaborations.
2. Make it easier to do research.
3. Generate the research funding and resources we need.
4. Radically revise how we do research communications.
5. Join the dots on all policies relating to our research.
6. Be bold in planning our long-term research future.

The word 'LIVING' was deliberately chosen and included in the strategy's title in order to reflect that this is not a static document, but one that is dynamic and flexible and

designed to adapt to the rapidly changing research landscape in which Trinity operates. This is a living, breathing document and its implementation will inevitably identify new challenges and opportunities over time, and there should be scope within the Strategy to address these.

The college-wide consultation process was the foundation on which the entire Charter and Strategy are built. Through engaging the whole Trinity community, the Charter and Strategy belong to everyone in the University and create a sense of ownership which will help to make living the principles of the Charter a reality.

Standing up for research

The development of the Charter and Strategy reinforced that the work of a university in standing up for research is never finished. We need to constantly and persistently ensure that adequately resourcing excellent research is always on the agenda of politicians and decision-makers. This is not just about accessing the necessary resources to conduct excellent research; it's about showing how and why research matters to the wider society.

We have to constantly make the case for basic research as well as applied research. We must show how all the different elements of research are part of an inter-dependent system. We need to make the case for working outside the constraints of limited priorities and allowing discovery to follow its own path. In short: we need to stand up for research. By creating Trinity's first Research Charter and Living Research Excellence Strategy, we are reaffirming our commitment to do just that.

The word 'LIVING' was deliberately chosen and included in the strategy's title in order to reflect that this is not a static document, but one that is dynamic and flexible and designed to adapt to the rapidly changing research landscape in which Trinity operates.

Innovation and Entrepreneurship

Innovation and entrepreneurship is a fast-growing mission for universities globally and one in which Trinity excels, both in terms of commercialising ground-breaking research and educating students to be creative and entrepreneurial.

Trinity generates a fifth of all spin-out companies in Ireland and interacts with 400+ industry partners annually, ranging from multinationals to Irish SMEs and startups. This year Trinity researchers won almost a third of all SFI/Enterprise Ireland Technology Innovation Awards (TIDAs) which fund the development of innovative projects with strong commercial potential.

For the fifth year running, Trinity has been ranked 1st in Europe for producing entrepreneurs, according to *The Universities Report* published every September by private equity and venture-focused research firm, Pitchbook. Between 2006 and 2019 Trinity graduates raised US \$4.1 billion in funding across 228 companies. Trinity is the only European university in Pitchbook's Top 50 for producing venture-backed entrepreneurs from its undergraduate programmes.

Trinity's student accelerator, LaunchBox, has been very successful: since its inception in 2013, LaunchBox has created 81 startups that have gone on to raise over €9.5 million in funding and investment and 130 full-time jobs.

RIGHT – Aimee-Louise Carton, co-founder with Will Ben Sims, of mental wellness app *KeepAppy*, participants in LaunchBox, Tangent's Student Accelerator programme 2019

→ Between 2006 and 2019
Trinity graduates raised
US \$4.1 billion in funding
across 228 companies...



07

BELOW – Minister of State, Pat Breen, TD and CEO of Tangent, Ken Finnegan at the launch of Tangent, Trinity's Ideas Workspace

RIGHT – Provost Patrick Prendergast meeting Provost's Innovation Challenge participants



Trinity's Ideas Workspace: Tangent

This year Trinity integrated its innovation and entrepreneurship programmes and initiatives in a new cutting-edge innovation space. Tangent, Trinity's Ideas Workspace, on the first floor of the new Trinity Business School, was officially launched by Minister of State for Trade, Employment, Business, EU Digital Single Market and Data Protection, Pat Breen, TD in September 2019.

Supported by the university's Innovation Partner, Bank of Ireland, Tangent will invest €6 million in aspiring innovators and entrepreneurs by 2020. The new facility, which is open to students, staff, alumni, entrepreneurs and innovators, has been designed to foster the creation of ideas, with co-working flexible workspaces and event space.

Trinity's existing student accelerator and mentorship programmes, including LaunchBox, Blackstone LaunchPad, the Innovation Academy, and the Women Who Wow mentorship programme are now located in Tangent together with new ventures, Tangent Pioneers, an international accelerator, and Entrepreneurs in the Arts, a mentorship programme for Trinity's Arts & Humanities students.

Tangent also co-locates Trinity's EIT Knowledge Innovation Communities (KICs) – which are large-scale, Europe-wide innovation communities, funded by the European Institute of Innovation and Technology (EIT) to develop innovative products and services, launch new companies, and train new generations of entrepreneurs.

According to the Global Entrepreneurship Report, less than 50% of people in Ireland believe they have the skills and knowledge to start a business. To bridge this gap, Tangent, in partnership with HEA initiative, Springboard+, launched a new regional Postgraduate Certificate in Innovation and Enterprise Development in Waterford, Tipperary, Cavan and Longford.

Student innovation and entrepreneurship

Thirteen student-led start-up teams were selected for LaunchBox this year, receiving coaching, seed funding and access to incubator space and facilities. A number of these, including *Bounce Insights* and *KeepAppy*, have already moved to next-stage entrepreneur development programmes and are kick-starting operations with paying customers.

Bounce Insights is a platform enabling brands to get customer feedback from millennial customers by incentivising millennials to complete surveys. *KeepAppy*, a mental wellness app with over 3,000 downloads, offers a comprehensive toolkit for mental wellness, including a mood journal and period tracker. They have pitched at Web Summit and are currently Dogpatch Labs residents.

The inaugural Provost's Innovation Challenge @ Tangent was a hackathon around Homelessness, as chosen by the College community. More than 100 students, working in multidisciplinary teams, participated, with ideation supports provided by Tangent in the form of workshops, mini-hackathons and light-touch 1:1 contact hours.



Blockchain and upcycling provided the inspiration for the winning teams: *Aquahomes*, which upcycles decommissioned rescue boats into homes for couples, and *The Homeless Wallet*, which enables cashless, transparent donations directly to individuals and charities via a blockchain digital wallet. *Aquahomes* became the first ever team from the Provost's Innovation Challenge to be awarded a place on LaunchBox.

A 2018 Launchbox startup struck gold at the world's biggest startup competition, the "Internet+" Innovation and Entrepreneurship Competition, organised by China's Ministry of Education and hosted in Xiamen University in November 2018. *Biological & Optical Prevention* (BOP), founded by Trinity business, computer science and genetics students, offers a colour-change solution to healthcare infections. It emerged from an enormous field of 2,600,000 participants and 640,000 projects to win top honours in the International Track of the competition.

Blackstone LaunchPad, powered by Techstars campus entrepreneurship programme, connects student entrepreneurs with the startup ecosystem. Over 305 student startups have registered since LaunchPad opened in 2016, and more than 53 student startups have progressed to early-stage funding.

In January Trinity teamed up with NGO, Médecins Sans Frontières (MSF) to host a 12-week hackathon for the inaugural *Trinity Synergy Challenge*. Researchers and students from the E3 schools - Engineering, Computer Science and Natural Sciences - were invited to develop solutions to some of the problems that MSF faces in delivering healthcare to patients around the world.

→ According to the Global Entrepreneurship Report, less than 50% of people in Ireland believe they have the skills and knowledge to start a business. To bridge this gap, Tangent... launched a new regional Postgraduate Certificate in Innovation and Enterprise Development...

Public Engagement


Trinity achieves its mission to 'engage wider society' through festivals, lectures, events, exhibitions, showcasing research online, and through media and social media activity.

Festivals and broadcasts

Trinity partners with national and international organisations to host events and festivals on campus. As in previous years, the college took part in the annual fixtures Culture Night and Open House Dublin, and this year Front façade lighting up was extended beyond Christmas and St Patrick's Day with Front façade turning rainbow for the Dublin Pride festival.

Over 3,000 visitors attended *PROBE: Research Uncovered* in September, a free pop-up festival showcasing academic research, with over 50 live experiments, exclusive demonstrations, laboratory and observatory tours and interactive workshops. PROBE, a collaboration between Trinity and Science Gallery Dublin in partnership with the British Council, was part of European Researchers' Night, taking place in cities across the continent.

RIGHT – PERFECTION exhibition
at Science Gallery Dublin



→ The science programme Growing Up Live was broadcast live from Trinity's Anatomy Museum as part of Science Week 2018.

08



The science programme *Growing Up Live* was broadcast live from Trinity's Anatomy Museum as part of Science Week 2018. Supported by Science Foundation Ireland and including leading Trinity researchers, the three-part series tracked human life from birth to death and everything in between, with experiments and studies.

Trinity's Professor in Genetics, Aoife McLysaght joined Prof Alice Roberts to deliver the 2018 *Christmas Lectures* from the Royal Institution, aired on BBC Four. Prof McLysaght was the first guest lecturer in the iconic *Christmas Lectures*' 194-year history. She added her expertise in the field of genetics to Prof Roberts' in biological anthropology to help answer the most fundamental of questions: 'Who am I?'

Five Nobel Prize winners and some of the world's most brilliant science minds spoke at the *Schrödinger at 75 – the Future of Biology* in September, commemorating Erwin Schrödinger's iconic *What is Life?* lectures in Trinity in 1943.

Beyond the campus, Trinity researchers showcased pollinator and sustainability friendly gardens at the 2019 Bloom Festival. The Pollinator-Friendly Organic School garden and The E3 garden were created by botanists, educators and engineers collaborating to inspire children and adults with appreciation and respect for nature.

Public lectures

The Trinity Long Room Hub (TLRH) regularly engages the public with arts and humanities research and its lectures and

discussion series have become annual events. The 5th annual Edmund Burke lecture in October was delivered by Pulitzer Prize-winning poet Paul Muldoon who explored the rights of the artist in society.

Among the topics this year for TLRH's on-going 'Behind the Headlines' discussion series were: 'Does Race Matter?', 'Can Stories Save the World?', and 'Crises of Democracy'. The three-year 'Out of the Ashes' public lecture series, exploring collective memory, cultural loss and recovery, was opened by the founding director of the new Library of Alexandria, Dr Ismail Serageldin, who spoke about recapturing the spirit of the ancient Library of Alexandria 1600 years after its destruction. And a new cross-disciplinary lecture series for 2019, 'What does it Mean to be Human in the 21st Century?' was launched in partnership with The Dock, Accenture's global research & incubation hub in Dublin.

Nobel Peace prize winner, His Excellency former President of Colombia, Juan Manuel Santos, spoke about his search for peace and the challenges of ending Colombia's fifty year civil war at a public event in November organised by the School of Religion, in conjunction with the Department of Foreign Affairs and Trade.

In November, American journalist and author of the bestseller 'Marley & Me' John Grogan gave a public talk and interview, hosted by the School of English and the Oscar Wilde Centre for Irish Writing. While Celeste Kidd, Assistant Professor and Principal Investigator, University of California, Berkeley

LEFT – Poet Paul Muldoon, who delivered the Edmund Burke lecture, with Trinity Long Room Hub Director, Prof Jane Ohlmeyer

BELOW – Members of the public enjoying the INTIMACY exhibition at Science Gallery Dublin



and one of the leading figures of the global #MeToo movement visited in April as part of the 2019 TCD Neurohumanities Public Talks series to give a talk entitled 'How Sexual Harassment Creates Inequality in Academia'.

Exhibitions

Science Gallery Dublin and the Old Library's Long Room provide Trinity with world class spaces for innovative public exhibitions.

In 2018/19, Science Gallery's three shows were INTIMACY, OPEN LABS and PERFECTION. In December the artist Siobhan McDonald, winner of a Trinity Creative Challenge award, exhibited 'Future Breath', an evolving work about the importance of the air we breathe and the unmistakable threat that plants and nature face in the wake of climate change. While the Trinity Centre for People with Intellectual Disabilities (TCPID) showed its third annual 'SciFest@TCPID supported by Abbott' exhibition in May - the investigative science and technology projects were researched and curated by current TCPID students.

The Old Library's Long Room hosted several exhibitions in 2018/19. In April, the *Bookmarks* exhibition, displayed 80 handmade books written and illustrated by Dublin primary schoolchildren over a two-month period with the help of authors, artists and children's book specialists, and was organised by the Trinity Access Programmes (TAP) which supports students from under-represented backgrounds to progress to further education

The Old Library's Collections were on display for *Ireland and the English Lake Poets* which ran April-May, showcasing hand-coloured political cartoons, manuscripts, first editions of poetry and prose, and illustrations from rare nineteenth-century travel books exploring Wordsworth's, Coleridge's and Southey's connections to Ireland.

The Old Library's extensive 18th and 19th century collection of political cartoons gifted by writer and cartoonist Nicholas Robinson, was the centrepiece of 'Drawing your attention: Four Centuries of Political Caricature' in June with contemporary works lent by freelance and Irish Times' artist, Martyn Turner.

Over 1,600 entries were received from across Ireland and from the US, UK, Europe and Australia for the second annual *Book of Kells Creative Competition*. Entrants of all ages were invited to interpret themes from the Book of Kells in art and writing. Twelve prizes were awarded in six categories.

The Old Library's extensive 18th and 19th century collection of political cartoons gifted by writer and cartoonist Nicholas Robinson, was the centrepiece of 'Drawing your attention: Four Centuries of Political Caricature' in June...

08

BELOW – The Pollinator-Friendly Organic School garden on display at the 2019 Bloom Festival

RIGHT BOTTOM – Nobel peace prize winner Juan Manuel Santos with Professor of Ecumenics, Linda Hogan

RIGHT TOP – Front façade lights up for the Dublin Pride Festival



Awards for public and civic engagement

The Registrar's Civic Engagement Award, created to recognise exceptional contributions made by staff to civic engagement, had two joint winners in 2019, both addressing issues of intellectual disability:

- Prof Michael Shevlin, Director of the Trinity Centre for People with Intellectual Disabilities, was awarded for his work developing a higher education programme designed to enhance the capacity of learners to participate fully within society as independent adults;
- the IDS TILDA research team (Intellectual Disability Supplement to The Irish Longitudinal Study on Ageing) led by Prof Mary McCarron. IDS-TILDA is the first study in the world to directly compare the ageing experience of people with an intellectual disability to the general population.

Dr Jacek Kibilda of the CONNECT future networks and communications centre was awarded its inaugural 'Education and Public Engagement Award' in recognition of his work with the Separated Children's Service, managed by the City of Dublin Education and Training Board, to create a programme for Transition Year students from migrant backgrounds. The 2018 iteration of the programme focused on female students to address the gender imbalance in STEM.

Online and digital public engagement

Trinity geologists and architectural historians collaborated to create a new interactive public website (www.makingvictorian-dublin.com) which enables a 3-D digital scan of the Museum Building in order to better understand the building industry responsible for Ireland's Victorian architecture. Funded by the Irish Research Council, the project aims to open new interdisciplinary horizons for the research of Ireland's past.

The digitisation of *The Dublin Apocalypse*, one of the great medieval treasures of the Library, has made this remarkable manuscript and its arresting vision of the end of days available to a global online audience. A full digital copy of the manuscript incorporating 118 individual digital scans, can be viewed via the Library's [Digital Collections](#) platform.



The Student Experience

The Trinity Student Experience encompasses all the activities that students undertake in college, including those linked directly to their academic programme and those associated with the co-curricular and extracurricular – sports clubs, societies, students' union, volunteering, activism and internships.

Through the sum of its student activities, Trinity supports the development of the Graduate Attributes – to think independently, communicate effectively, develop continuously and act responsibly.

A key initiative of the Student Life Committee and Students' Union was to grow the Zón Mac Léinn network of student spaces, to turn spaces into places – places where students meet, recharge, relax, socialize, and share their stories. This year saw two new spaces come into the network: the Buttery after hours and a generous space in the Trinity Biomedical Sciences Institute (TBSI). Three other spaces were identified and are in development. An App has been developed to locate the nearest Zón Mac Léinn so students can find a place to relax, wherever they are on campus.

Further collaborative opportunities were identified in the annual Student Partnership Agreement, where the College and the Students' Union jointly identify initiatives that enhance the student experience. This year that included a focus on the implementation of the Trinity Education Project, including workload and assessment methods, co-curricular reflection, and staff-student liaison committees.

RIGHT – Freshers' Week in Front Square



→ Societies and sports clubs are essential to the Trinity education. They develop skills in leadership, communication, event management, and financial control...

09



TOP LEFT – Trinity Surf Club recruiting new members during Freshers' Week

BELOW LEFT – EU Commissioner for Competition, Margrethe Vestager receives the Historical Society's Gold Medal from Auditor Catherine Kelly

BOTTOM LEFT – Students relaxing in the student spaces

BOTTOM RIGHT – Provost Patrick Prendergast meets students Abigail Whelan and Niamh Ennis from Dublin Draíochta Dragons, Trinity's Quidditch Club

→ The Postgraduate Student experience was a strong focus of the Student Life Committee this year.

Orientation and transition

The Postgraduate Student experience was a strong focus of the Student Life Committee this year. Working with the Transition to Trinity Officer, the Working Group is developing a more comprehensive orientation modeled on the undergraduate 'Trinity in Twelve Weeks' initiative. This model runs themed weeks of activities and information sessions in small groups to ensure a successful transition to all aspects of college life.

The Counselling Service, in cooperation with the Students' Union, ran consent workshops for over 800 first year students as part of a healthy relationships initiative. The workshops are being rolled out to students in accommodation and those involved in clubs and societies and student representation. The programme is being expanded to include bystander and first responder workshops. The model, developed by Trinity, has become a national benchmark for consent education and is being adopted by external organisations.

Dean of Students Roll of Honour for Volunteering

The current strategic plan sets the mission 'to fearlessly engage in actions that advance the cause of a pluralistic, just and sustainable society'. Trinity seeks to educate graduates to act: to have the awareness to see things, the empathy to care, and the confidence to engage with local, national, or international communities. For many students, action starts with volunteering. The range of activities that students engage in outside their academic lives is best captured by the Dean of Students Roll of Honour for Volunteering, the Dean's List, and the Dean's Leadership Awards. This year the highest award, the Trinity Legacy Award for Volunteering, was presented to three students, James Cotter of the Voluntary Tuition Programme, Rachel Skelly for the Trinity Consent Education programme, and Phoebe O'Leary from the Ardclough Drama Group. The awards were presented by Sam McGuinness, CEO of the Dublin Simon Community.

Clubs and societies

Societies and sports clubs are essential to the Trinity education. They develop skills in leadership, communication, event management, and financial control, and they instill and maintain

the values that define the Trinity community in all of its activities: freedom of thought, responsibility in action, promotion of equality, dignity and respect.

Notable achievements and anniversaries this year include:

- The Central Societies Committee welcomed alumni from all around the world for a celebration marking the 50th anniversary of the CSC and its contribution to maintaining Trinity's student community as one of the most vibrant in the world.
- Enactus TCD were crowned the winners of the Enactus Ireland National Competition and went on to represent Ireland at the Enactus World Cup in Silicon Valley, finishing in the top 16.
- The Biological Association raised €56,000 via Trinity Med Day for St James's Hospital, Tallaght Hospital and the National Rehabilitation Centre.
- The EU Commissioner for Competition, Margrethe Vestager took part in a Citizens' Dialogue with the Historical Society and was presented with the Society's Gold Medal.
- The Gold Medal of the University Philosophical Society was awarded to renowned British food writer Mary Berry, Mayor of London Sadiq Khan and the President of Microsoft Brad Smith among others.
- DU Photographic Association celebrated 70 years with their highly successful exhibition entitled 'Celebrating Age'. Ninety photographs from 45 staff and student photographers were showcased on the night.
- Trinity Orchestra - Ireland's only entirely student-run orchestra performed across a number of Ireland's top festivals including Electric Picnic and the Metropolis festival.
- At the 2019 Student Achievement Awards Ireland, Trinity organisations and individuals were nominated in 12 of the 17 categories - three of the six nominees in the Student Media Award and 13 of the 17 nominees for Outstanding Contribution to Student Media were from Trinity.

To help students capture the benefits from all their activities, the Trinity Education Project has developed a reflective tool to guide students in embedding the Trinity Graduate Attributes through their participation in academic and co- and extracurricular activities.

Healthy Trinity

Healthy Trinity aims to harness the energy and positivity of our community. If everyone is to fulfil their potential, our environment must support health, and healthy behaviours must be a natural part of life on campus.

Healthy Trinity is a cross-university initiative involving over a hundred academic, professional services and student partners.

Tobacco-free campus

A milestone for the initiative this year was the introduction of a tobacco-free policy which removed tobacco use from the entire campus, with three minor exceptions.

The policy was introduced in partnership with the Students' Union and Graduate Students' Union and supported by student-led campaigns, which highlighted the local environmental impact of smoking, by focusing on a clean campus and fresh air, and the global impact, by highlighting the detrimental effects of tobacco production on the planet.

Healthy Trinity engaged the energy of Trinity's clubs and societies to facilitate alternatives to tobacco use. For example, during the Healthy Library initiative, student clubs including volleyball, table tennis, Frisbee and soccer set up 'come and try' events beside the library. Students and staff could participate for as long as they liked, in their ordinary clothes, in an active break rather than a cigarette one. Our student meditation and yoga societies moved their weekly sessions to the Berkeley training room and the Library provided board games for social breaks, all to highlight how study breaks could be used positively rather than for smoking.

RIGHT – Bicycle parked in Front Square

→ With car use of only 1.5% among staff and students when commuting daily to campus, Trinity is a world leader in sustainable transport use and has very high modal share for cycling



10



Healthy Trinity used the introduction of the policy to practice the 'Living Lab' concept, as described by the International Sustainable Campus Network's third principle. This is important as there is a deficit of global research on tobacco free campuses. Healthy Trinity Ambassadors completed regular circuits of the campus to request compliance with the policy and to conduct research into how many were smoking. Through this, we determined that there has been an 83% reduction in frequency of observed smoking in certain zones on campus. We have published one paper on our work to limit tobacco use and will continue to contribute to the knowledge base by using our campus as a living lab.

Research-led and innovation-driven

Healthy Trinity has ten committees focused on a breadth of topics including eating, alcohol, mental health, workplace and physical activity. Each committee is co-led by an academic and professional service partner. Through this structure, academics bring the latest research in their area to professional service staff who facilitate innovation within Trinity's services as well as the publication of data. This year, the physical activity group installed stair prompts that encouraged people to use the stairs rather than the lift; the group presented at a conference on their findings. The alcohol, mental health, healthy eating,

smarter travel and tobacco groups all took data on the Trinity population and will use it for future initiatives.

Healthy Trinity engages in teaching innovation. H-TOT is an online platform where first year students can learn how to maintain work-life balance. Previously available to medical students only, its content was extended this year to include more health behaviours and it was launched for all junior fresh students in September 2019. Another innovation involves professional services staff teaching on academic courses related to health topics.

Active commuting – promoting cycling

Healthy Trinity looks beyond our campus for opportunities to promote health. There is strong evidence that active commuting promotes physical activity. With car use of only 1.5% among staff and students when commuting daily to campus, Trinity is a world leader in sustainable transport use and has very high modal share for cycling. However Healthy Trinity data taken in 2019 suggests there is an opportunity to increase cycling as between 2011 and 2018, cycling modal share in Trinity declined by 37%.

To address this decline, Healthy Trinity continued to work with partners in the National Transport Authority (NTA) to promote walking, cycling and public transport. This year we won

LEFT – Mark Nugent, cyclist, Owen Keegan, Dublin City Council Chief Executive, Prof Paula Murphy, Registrar and Isabelle Clemente from Wheels for Well Being at the announcement of the new disabled cycling parking facility at Trinity

BELOW – Launching Tobacco Free Trinity were, from left, Provost, Dr Patrick Prendergast, Minister of State for Health Promotion, Catherine Byrne, Students' Union Sports Officer, Darragh Flood, and Healthy Trinity Ambassador, Nuria de Cos Lara



two of the NTA's Smarter Travel awards - for best engineering project and for best lecturer. We also worked more closely with Dublin City Council (DCC) to assess building segregated cycling infrastructure between Trinity's campuses and residences. Trinity also hosted a Bike Curious event in partnership with DCC to mark the global cycling conference, Velo City, held in Dublin. We invited the public to attend a pop-up Dutch Cycling Lab, a showcase of ongoing Trinity research related to walking and cycling, a showcase of student inventions addressing cycling-related problems, and a seminar with three international cycling experts. We also installed Ireland's first disability bike parking.

UN Sustainable Development Goals

Healthy Trinity frames the university's health policies, data and actions within the UN Sustainable Development Goals. With so many actors contributing to the achievement of the Goals, Healthy Trinity has devised a framework to show how small actions in our community are contributing to the Goals.

→ A milestone for the initiative this year was the introduction of a tobacco-free policy which removed tobacco use from the entire campus, with three minor exceptions.

Sport at Trinity

2019 marked a milestone in the history of sport in the university as we celebrated 100 years of organised sport with Dublin University Central Athletic Club (DUCAC).

The anniversary was an opportunity to reflect on the benefits of sport, not just for the student athletes at the top of their game, but for all students transitioning from school to university and integrating into college life. Alongside the obvious health and fitness benefits, sport develops leadership and organisational skills and allows students to form strong friendships and networks; students who participate in sport tend to be more engaged academically and socially. The range and diversity of sporting opportunities available to Trinity students are a key part of campus life and integral to the Trinity student experience.

RIGHT – Erica Markey, sports scholar
and Irish U-21 hockey player

→ Increasing participation amongst students continues to be a driving objective for Trinity Sport...



11



Trinity Sports Centre

The Sports Centre is the central hub of sporting activity on campus. There were 276,185 attendances at the Sports Centre from October 2018 to June 2019, 72% of users were students, a 2% increase in comparison to the same period in 2017/18. All levels are catered for, with more than 50 classes and programmes delivered each week.

The Sports Centre caters to a wide range of customers all year round and was bustling during the summer months as 1,680 children attended the Trinity Sport Braveheart multi-sport summer camps and 25 teenagers from the local community graduated from the Trinity Sport certified 'Junior Leader Programme'.

Social sport and participation

Increasing participation amongst students continues to be a driving objective for Trinity Sport. Over 6,200 students joined a sports club in 2018/19 and 61% of sports club members continued to engage in active participation throughout the academic year.

There was a full programme of social sports and leagues on campus for students including 3 v 3 basketball, 5-a-side soccer, social running, touch rugby and learn to play gaelic, hockey and squash programmes. The participation side of Trinity Sport activities involved the national Swim for a Mile training programme and event, the Reindeer fun run, Campus 5K run and Healthy Trinity physical activity initiatives.

Sports club performances

Among the highlights for clubs this year, a few stand out: the men's soccer team won the fresher's Spillane Cup, while the men's first team brought back the Duggan Cup. Both the men and women's teams in the Rifle Club became national air rifle champions and there were colours wins for Fencing, Trampoline, Harriers and Athletics Cross Country, Rifle and the boat men's senior 8's.

Elsewhere the Hockey Ladies were winners of the National League Division one, while our fresher GAA footballers won the division 2 league and championship.

The Trinity Rugby men consolidated their position in Division 1A of the All-Ireland League (AIL) by reaching the semi-finals for the first time in its history and claiming the annual colours match against UCD. Upcoming talent was on display when the U20's men's team retained the All-Ireland Fraser McMullen Cup. And intervarsity wins came from Trinity Rowing who were crowned the Irish University Rowing Champions, while Fencing retained an intervarsity win for a 12th consecutive year.

These successes are reflective of the huge strides being made in the development of the sport clubs over the past four years.

This year's sports awards, open to all the university's clubs, were hosted by sports presenter Máire Treasa Ni Cheallaigh and featured Trinity Sport brand ambassadors Mark Pollock and Sinead Lynch. This year saw the addition

LEFT – Trinity women's rowing (DULBC) celebrate their victory at the 2019 Colours on the River Liffey

BELOW – Sports scholars Turlough Hughes (rowing), Anna Lee (fencing), Linda Djougang (rugby), Ronan Hanaphy (association football), Erica Markey (hockey) and Brian Magee (Gaelic football)



of the 'Game Changer of the Year' award which was awarded to student Áine Tucker for her commitment to promoting and organising women's sport. A total of 12 Pinks were awarded in eight different sports with six female and six male recipients.

Scholarships and high performance

Sixty-six Trinity Sport scholars from a variety of sports were unveiled at a ceremony in October 2018. The scholarship programme, supporting talented athletes, is delivered in association with Bank of Ireland. Among the recipients were four Irish U-20 and Leinster rugby players – Jack Kelly, Jack Dunne, Michael Silvester and Ryan Baird; Irish senior cricketer, Lorcan Tucker; Olympic 2020 sailing hopefuls Aisling Keller and Aoife Hopkins; Irish U-21 hockey player, Erica Markey and Irish rugby star, Linda Djougang.

"The support that I have received from Trinity Sport as a sports scholar has been fantastic. They really understand the importance of balancing your sporting and academic commitments and the support has enabled me to excel both on and off the field. The specialist support provided included strength and conditioning, physiology testing, and nutrition support. This has played a pivotal part in my development as player, whilst the financial support has allowed me to focus on my training"

ERICA MARKEY
IRISH U-21 HOCKEY PLAYER

Planning for future sporting excellence

Building on the success of the previous Strategy for Sport, Trinity Sport has propelled into a new phase of development to include facilities infrastructure including the redevelopment of the Iveagh Grounds, a new strategy which links to the Inspiring Generations theme as we engage with more of our sporting alumni, ambassadors, partners and sponsors. Having raised our game, it's time now to play our best game.

→ Over 6,200 students joined a sports club in 2018/19 and 61% of sports club members continued to engage in active participation throughout the academic year.

New Professor Interviews

01 Andrew Murphy

02 Blánaid Daly

03 Ruth Karras



12 Professor Andrew Murphy

Professor of English Literature (1867)

→ “We’re lucky in Trinity - we’re surrounded by resources, so you can send students off to read all kinds of things, including things you haven’t read yourself, and that gets them engaging with primary materials and doing their own research. I also like to get students out of the classroom and, again, we’re lucky in Trinity. For one course I teach, ‘Making Shakespeare’, I take students across to the Old Library to look at the first folio 1623 edition of Shakespeare; it’s the only copy in Ireland.”

“Or we’ll go to Marsh’s Library where the Director, Jason McElligott, will show the students interesting things, such as well-worn old editions of Shakespeare’s plays held in the collection, or old Dublin newspapers with adverts for performances of the plays. Next year, I’m hoping to take students down to Smock Alley to see where the plays were performed in the 18th century.”

Andrew Murphy, recently appointed Professor of English (1867), has just finished his first year. For him, it’s a new role but a return to his alma mater: “I studied English here in the 1980s. Terence Brown and Nicky Grene were wonderful mentors - Terence was doing historicist work in English at Trinity long before it became fashionable and Nicky was a wonderful teacher when it came to Shakespeare. In fact Nicky held the 1867 chair before me, so I feel like I’m very much following in my mentor’s footsteps.”

After graduating, he built his career outside Ireland: “I went to Brandeis University in Boston and did my PhD on the Irish context of early modern literature. One of the writers I worked on was Edmund Spenser, who was one of the great poets of the English Renaissance, and he was also a minor colonial administrator in Ireland, with a castle and lands in Cork, which had previously belonged to the Desmonds. That’s where a lot of *The Faerie Queene* was written; it’s interesting to think of this courtly poem being written in Ireland at time of great conflict, and written in the lands of dispossessed.”

After Brandeis, he was appointed to St Andrew’s University in Scotland, where he worked for twenty years. “I was head of School and also helped set up a new interdisciplinary department to create taught Masters programmes, enabling students to combine different humanities subjects.”



12

He is impressed by the changes he sees in Trinity's approach to pedagogy. "Back here, after three decades, some of it feels very familiar and as I remember it as a student, but there have been lots of changes. The student body is much bigger now and there's greater flexibility within the curriculum, which I think is great. It's something that always struck me favourably about the US undergraduate system - that you start wide and narrow your disciplinary focus as you progress."

His own background and route to university have made him a particular fan of keeping your horizons broad: "My dad was a mechanic and nobody in my family had gone to university before me, so the original idea was that I would become a mechanic, but then I did well in the Inter Cert and the principal of my secondary school in Limerick persuaded my parents to let me stay on. Because I'd done well I was put in the science stream, which was school policy at the time. I was set to study Chemistry in NUIG (UCG in those days), but then I had a crisis of confidence about the whole thing, as I was increasingly interested in literature. So I worked in the public service for five years, in Limerick County Council, and I was 22 before I came to Trinity. They were the best decisions I ever made: the decision not to go straight to university from school and the decision to study English when I finally did go. I'm also glad I had the experience of studying science in school, because I feel it gives you a different way of thinking about how things work."

He has just finished a book on "the rise of literacy in Ireland in the 19th century and how that intersects with the rise of nationalism", *Ireland, Reading and Cultural Nationalism, Bringing the Nation to Book* (Cambridge UP 2018) and is now preparing the second edition of his seminal book, *Shakespeare in Print, a History and Chronology of Shakespeare in Publishing*, first published 2003. "I'm looking to incorporate all the new scholarship that's emerged in the last fifteen years, particularly in relation to digital editions of Shakespeare."

He points out that digitisation and online databases have changed scholarship in English. Putting together the 2003 book required "a lot of legwork" just going around libraries. Now much more of the material is available online on fully searchable databases.

He is exploring putting together a consortium of researchers across Europe and applying for EU grants to create a digital resource on the publishing trade in Shakespeare's time. "There's a lot of material but it's diffuse so there would be huge value in getting it into one resource."

Meantime, he and his wife, who is also Irish, are enjoying settling back in Dublin. He is brushing up on his Irish - "I'm remembering why we all found it so hard at school; it's a phenomenally difficult language!" - and taking in all the changes of the past three decades. "I left Ireland in 1986 in recession. It feels like a much more cosmopolitan city now. In 1986 it felt like a liberation to go to London; now it feels like a liberation going the other direction, and escaping Brexit."

Professor Blánaid Daly

Professor of Special Care Dentistry

→ “In April, the government launched the National Oral Health Policy. It’s ambitious and innovative and it prioritises the needs of vulnerable people. That’s fantastic; the next step is to implement the policy and reduce oral health inequalities across the population, including vulnerable people.”

Blánaid Daly, Professor of Special Care Dentistry, School of Dental Science, has built her career in community special care dentistry and public health. Three years ago, she returned from London, where she worked for 25 years in King’s College, to take up the professorship in her alma mater.

“I graduated from Trinity in 1983 and then worked a few years here in the Dublin Dental Hospital in the department of community dental health & general practice, before moving to London in 1990. The UK, with its great NHS infrastructure, was the place to go for training in community dental settings.”

She was hired by King’s Dental School to set up a community dental clinic for homeless people. “After spending six months talking to doctors, carers and users, to get an idea of the needs and how best to meet them, I set up a small pilot in the crypt of St Martin-in-the-Fields, providing an evening dental clinic. Eventually we got funding to set up in a day centre in Camberwell, where there were community health workers, psychiatric nurses and doctors and a strong re-settlement ethos, to get people back into housing.”

She outlines the oral healthcare needs of homeless people: “There are two levels – first emergency care for toothache, and, second, embedding the practice of regular check-ups. We found that when people are ready for resettlement, they want to improve their teeth. Going for a job, you’re judged on how you look. I remember one man, a drug user, telling me that it was only when he began looking after his teeth that his family believed his promises to get clean.”

After completing her PhD on the oral needs of homeless people, she taught on the masters in dental public health in King’s, and from 2010 was academic lead in special care dentistry, which included training specialists to meet the complex needs of different groups. As she explains, special care dentistry has a broad remit: “Homelessness, dementia, physical or developmental disability – each group has different needs. The priority is to get people the right care, within the community, so that we’re not asking them to travel long distances.”

12

Her interest in improving care for vulnerable people probably has roots in childhood: “My older sister had an intellectual disability and, growing up, I was aware of the fight my parents had to make for her – there were few services available then. Eventually, she got a residential place as an adult, and I saw what a difference that made to her sense of independence.”

The past three years have involved frequent travel for Professor Daly – “my husband and children stayed in London because my younger son was completing his education. My focus, the past few years, was my mother who needed care. I was lucky to have that time with her.”

She is delighted to be back in Trinity, which she finds “much more socially diverse than when I studied here, thanks to the Trinity Access Programme, and I’m really pleased to see programmes to help people with dyslexia and other learning difficulties.”

She appreciates the small group teaching enabled by the Dental School – “we have about fifty students a year who are incredibly smart and hardworking” – and the interdisciplinarity. “I’m working on a really interesting project here with the Department of Microbiology and with St James’s Hospital, exploring the link between gum disease and diabetes. For me, in all my research, it’s about putting the mouth back into the body. The two are integral.”

She is full of praise for her predecessor as Professor of Special Care Dentistry, June Nunn: “She was very innovative and developed the speciality here in Ireland and the training programme; we owe a lot to her.”

Undergraduates in the Dental School are “introduced to the concept of providing care to adults with disabilities and the issue of consent in 2nd year; then in 3rd year they go out to the community and in 4th year they see us treating people in the hospital with a range of disabilities. As general practitioners within the community, they should be confident about making reasonable adjustments to treat people with mild disabilities.”

Professor Daly’s priority for the next five years is to help with the implementation of the National Oral Health Policy by “ensuring that there are clear care pathways and sufficient specialists trained to meet the needs of people with complex disabilities.”

She is on the committee of the Irish Society for Disability and Oral Health, which has carried out comprehensive studies into needs: “We reckon there are just under 13,000 people in Ireland with complex needs who can only be treated by specialists. There are a further 500,000 with mild to moderate needs who could be treated in local general dental practices, given the right adjustments and supports. Currently, the care pathways for people with disabilities aren’t in place and there are only a few specialists, who are coming to the end of their careers. I’ve calculated that we need to train a cadre of thirteen specialists.”

This could be done, she says, in the next five years: “It’s the opportunity of a lifetime to develop the public dental services within the HSE to meet the oral healthcare needs of vulnerable people.”



12 Professor Ruth Karras

Lecky Professor of History (1913)

→ “The module I gave this last year on medieval marriage turned out to be my favourite of all the undergraduate teaching I’ve done in my career. It was a model of research-led teaching. Our small group met all year for three hours a week, and we read a variety of medieval texts around marriage, including legal and ecclesiastical texts, letters and autobiography. It was a lot of fun - the students were very engaged, and it’s a topic I’m really interested in and will probably do as my next book.”

Ruth Karras, Trinity’s new Lecky Professor of History (1913), is enthusiastic after her first year on campus. She plunged straight into teaching and completing her book on King David as a figure of masculinity in medieval Christian and Jewish culture (to be published 2020 by University of Pennsylvania Press).

A graduate of Yale with an M.Phil from Oxford, her career has previously been in the US - in the University of Pennsylvania, Temple University and the University of Minnesota - but as ‘a medievalist who works on European history’, she wanted to come to Europe, and was delighted to be appointed to the Lecky Professorship, a chair established in 1913 and occupied by distinguished historians of Irish and European medieval history.

Professor Karras’ research interests focus on gender and sexuality in medieval Europe and on culture and society;

her PhD, published by Yale University Press, was on *Slavery and Society in Medieval Scandinavia*. She was interested in history from childhood: “My father was a chemist and when I was eleven or twelve years old, he had a year’s sabbatical in Belgium. We did a fair amount of travelling around Europe, and I loved the castles and cathedrals. I knew I wanted to do history but I wasn’t sure which period most interested me; then at Yale I had a teacher who really inspired me with an interest in the medieval.”

Coming to Trinity, she was excited by the Long Room Hub – “when a lot of universities are cutting back on humanities, the idea that Trinity invested in this purpose-built institute for the humanities is very encouraging” – and she has since engaged with the Hub to learn about EU funding opportunities for interdisciplinary, transnational research.



12

"I'd like to put together a network of postdocs looking at the dynamics of mixed marriage across cultural, linguistic, religious and social class lines in the medieval period in European and non-European societies. We'd work in parallel, bouncing ideas off each other and organising conferences to share findings. I'm interested in learning how research questions differ when you're dealing with different societies, and also how to connect to contemporary issues. The question of what happened when medieval people formed pair bonds across cultural lines connects to what's happening now in a multicultural Ireland and Europe."

She's impressed with Trinity's focus on interdisciplinarity and is happy that what were previously two M.Phil programmes – in medieval history and medieval languages and literatures – are now merging into one, with students choosing from three strands: history, literature, and culture and civilisation. This will help create greater linkage between medievalists in the university: "Medieval studies goes across history, history of art, gender, and languages and literature. Under the current structure in Trinity those disciplines are divided between two schools. I think we'd all benefit from greater contact and I'm hoping to help improve communication lines – more frequent meetings and getting together jointly to decide on speakers."

Her own pedagogy involves a strong focus on images – "not just as illustrations but as discussion points because so much of religion is expressed in art" – and on translation

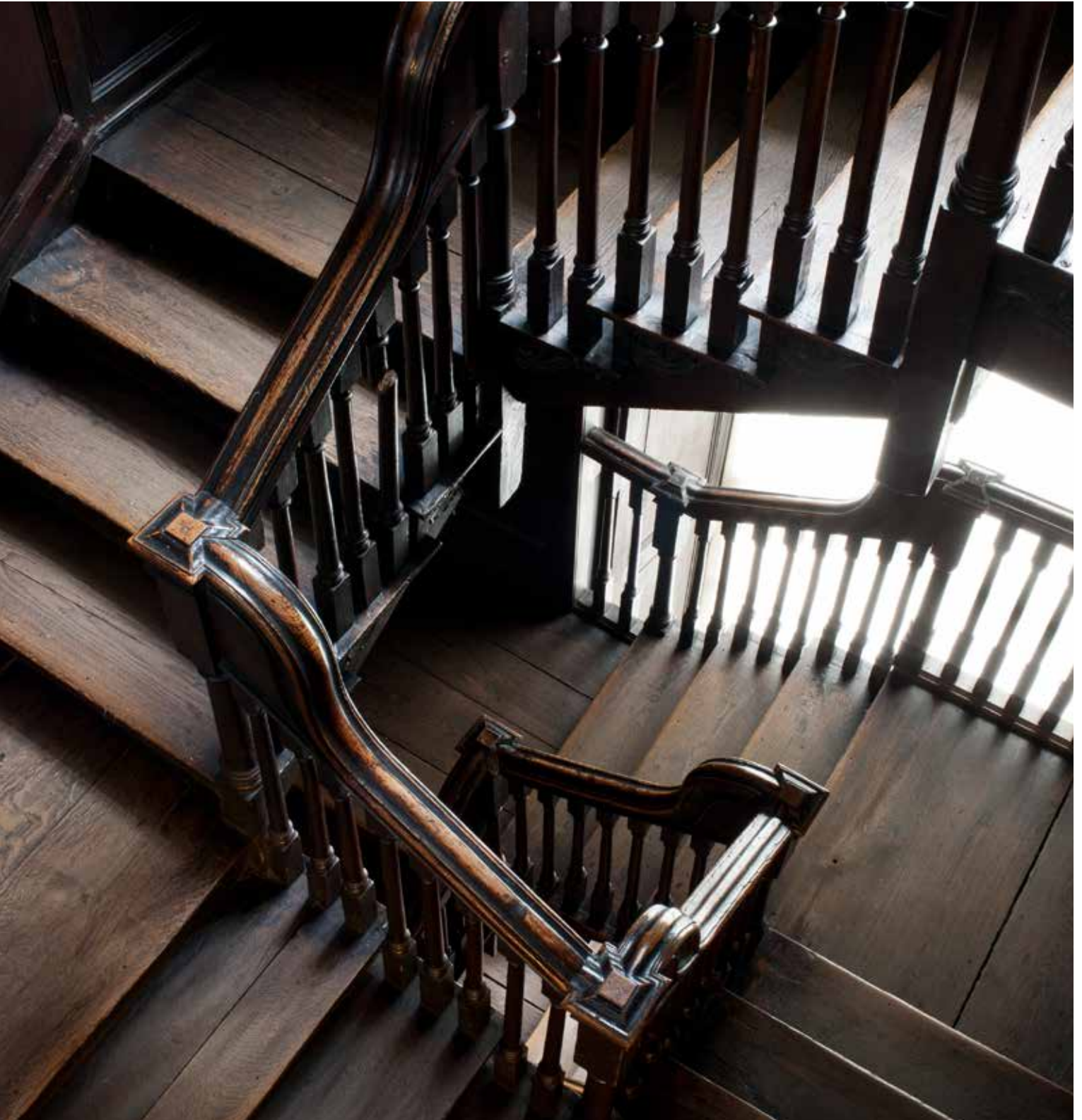
– "teaching on advanced courses involves a close reading of primarily Latin texts. We read the texts in translation but I'll use the Latin text to draw attention to choices that translators make."

One of the things that attracted her to Trinity was the chance to teach more specialised students: "In the US a lot of undergraduate teaching is to students who aren't majoring in the subject. In Trinity, students choose history as their main subject or joint honors." She's looking forward this year to two group projects for second year students – "I'll give both projects on the crusades, which is a really lively field and there's a connection to the history of sexuality, which I'll be exploring."

She's president of the Medieval Academy of America and in March will be giving the presidential address in the University of California, Berkeley – "I might talk about my current book on King David but I'm tempted to explore this new area, for me, of sexuality in the crusades. We'll see!"

She and her husband are now well settled into Dublin, which they love. "I'm a city person and I've never wanted to live in the country, but in Dublin, in some ways, you get both – it's very easy to get out of town and there are parks and sea. So far, we've been away to Kerry, Kilkenny, Cork, Belfast and the Antrim coast. My husband adores the temperate climate here and we now have a dog, an Australian labradoodle. My daughters and grandchildren are very happy to visit us in Ireland."

She is also learning Irish: "I'll never be able to research in it but I want to be able to read signposts and pronounce my students' names."



Trinity's Visitors

Trinity welcomes two million visitors to the campus each year – these include dignitaries on state visits to Dublin; visiting fellows, lecturers and speakers at academic symposia and student societies; tourists and visitors to the Book of Kells, Science Gallery Dublin and other campus attractions; and the few exceptional individuals who are conferred each year with honorary degrees.

At the winter commencements in December 2018, the poet, Thomas Kinsella, the Galway historian, Catherine Corless, and the American physicist Michal Lipson were awarded honorary doctorates.

At the spring commencements in April 2019, six distinguished individuals received honorary degrees: patron of Irish art and architecture Carmel Naughton, wildlife expert and writer, David Cabot, Irish Ambassador to France, Patricia O'Brien, economic historian, Professor Cormac Ó Gráda and architects Yvonne Farrell and Shelley McNamara. Mary Robinson presided over the ceremony for the last time as Chancellor of the University of Dublin, after 21 years in the position.

In May, French philosopher and writer Bernard Henri Levy brought his one-man play, 'Looking for Europe', to the Public Theatre as part of a marathon tour during which he performed in twenty European capitals ahead of the elections to the European Parliament on 24th May. Trinity's Public Theatre was his only Dublin date and the only venue on his whole tour that was not a commercial theatre.

Trinity celebrated its one millionth visitor to the Book of Kells and Old Library Exhibition for 2018 in November. This is the first time that one million visitors have visited the Book of Kells Exhibition in a given year. The one millionth visitor was Cassie Clemans who travelled with her husband Andy from Bend, Oregon, USA to celebrate their 20th wedding anniversary in Ireland.

RIGHT – King Willem-Alexander and Queen Máxima of the Netherlands view an item from the Fagel Collection with Laura Shanahan, Head of Research Collections, Trinity Library



→ Trinity welcomes
two million visitors to
the campus each year...

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Visitors from the US are the largest international group to visit the Book of Kells Exhibition annually, and make up 36% of the total visitor figures.

The Book of Kells Exhibition has seen a continuous growth in figures with total visitor numbers increasing annually. In the last four years alone there has been a 50% increase in visitors.

Trinity's Zoological Museum, a constantly popular educational attraction for tourists, researchers and students alike, maintained Full Accreditation status under the Museum Standards Programme for Ireland and was one of ten recipients to receive an award at a ceremony in Kilkenny Castle in June.

Welcoming dignitaries

The King and Queen of the Netherlands visited Trinity as part of their State visit to Ireland in June. King Willem-Alexander and Queen Maxima were given a special viewing of the Dutch Fagel collection, an 18th century collection built up over five generations by the Fagel family, many of whom held high public office in the Netherlands. It is enormously rich in French, Dutch and English works on politics, religion, economics, sciences, natural history and travel, and reflects the professional concerns of the family. The royal couple also viewed the Book of Kells and other items in the 18th century Old Library building.

The previous month, the King and Queen of Sweden visited Trinity. Her Majesty Queen Silvia of Sweden participated in an idea generation workshop with young people, as part of

mental health and well-being project OPEN MIND in Science Gallery Dublin. Carl XVI Gustaf King of Sweden and the Queen hosted a banquet that evening in Trinity's Dining Hall with the President of Ireland, Michael D. Higgins and the Provost in attendance.

The Nigerian monarch, His Imperial Majesty, The Ooni of Ife, Oba Enitan Babatunde Ogunwusi, Ojaja II, and his royal entourage paid a courtesy call to the Trinity Centre for Literary and Cultural Translation during his visit to Ireland in July, accompanied by the Ambassador of Nigeria to Ireland, H.E. Dr. Uzoma Emenike. Discussions explored how the Centre might develop educational and cultural collaborations with universities and cultural organisations in Nigeria. His Imperial Majesty spoke of his great interest in language and culture and expressed his wish that the relationship between Trinity and Nigerian universities might be further developed.

Other dignitary visits through the year included the Taoiseach, Leo Varadkar, TD; His Excellency Mr Juan Manuel Santos, Former President of Colombia; His Excellency Mr Sergei Aleinik, Ambassador of Belarus; Dr Seong-Min-Yoo of the National Assembly of the Republic of Korea; Mr Tibor Navracsics EU Commissioner of Youth, Sport, Culture and Education; His Excellency Mr Alie Kabba, Minister for Foreign Affairs and International Cooperation of Sierra Leone; Mr Carmelo Abela, Minister of Foreign Affairs, Trade and Promotion of the Republic of Malta; Mr Jan Peumans, Speaker of the Flemish Parliament; and a Parliamentary Delegation from Iran.

LEFT – Carmel Naughton is congratulated by Provost Patrick Prendergast, Chancellor Mary Robinson and Prof Damian McManus on receiving her honorary degree

BELOW – The Nigerian monarch, His Imperial Majesty, The Ooni of Ife, Oba Enitan Babatunde Ogunwusi, Ojaja II at the Trinity Centre for Literary and Cultural Translation

BOTTOM – Thomas Kinsella, major Irish poet, honorary degree recipient



Welcoming speakers

In October poet Paul Muldoon gave the annual Edmund Burke lecture on the place of the artist in society. Other speakers at Trinity Long Room Hub events included actor Stephen Rea and literary critic and author, Adam Mars Jones, inaugural Briana Staunton Visiting Fellow to the School of English.

Co-discoverer of the DNA double helix, James Watson, together with seven Nobel Prize winners were among the glittering guests and speakers at the symposium, *Schrodinger at 75*, held in Trinity and in the National Concert Hall, marking the 75th anniversary since Erwin Schrodinger gave his seminal *What is Life?* lectures in Trinity College in 1943.

EU Commissioner for Competition, Margrethe Vestager received the Gold Medal from the College Historical Society (The Hist) in January, after taking part in a Citizens' Dialogue, and in August the Hist welcomed George R.R. Martin, author of *A Song of Ice and Fire*, which was adapted into the HBO *Game of Thrones* series. Speakers at Trinity's other student debating society, the Philosophical Society (The Phil), included mayor of London, Sadiq Khan, author Sebastian Barry and food writer and television presenter, Mary Berry.



Governance

Trinity College Dublin is committed to maintaining high standards of corporate governance and has put in place the appropriate governance structures consistent with such objectives.

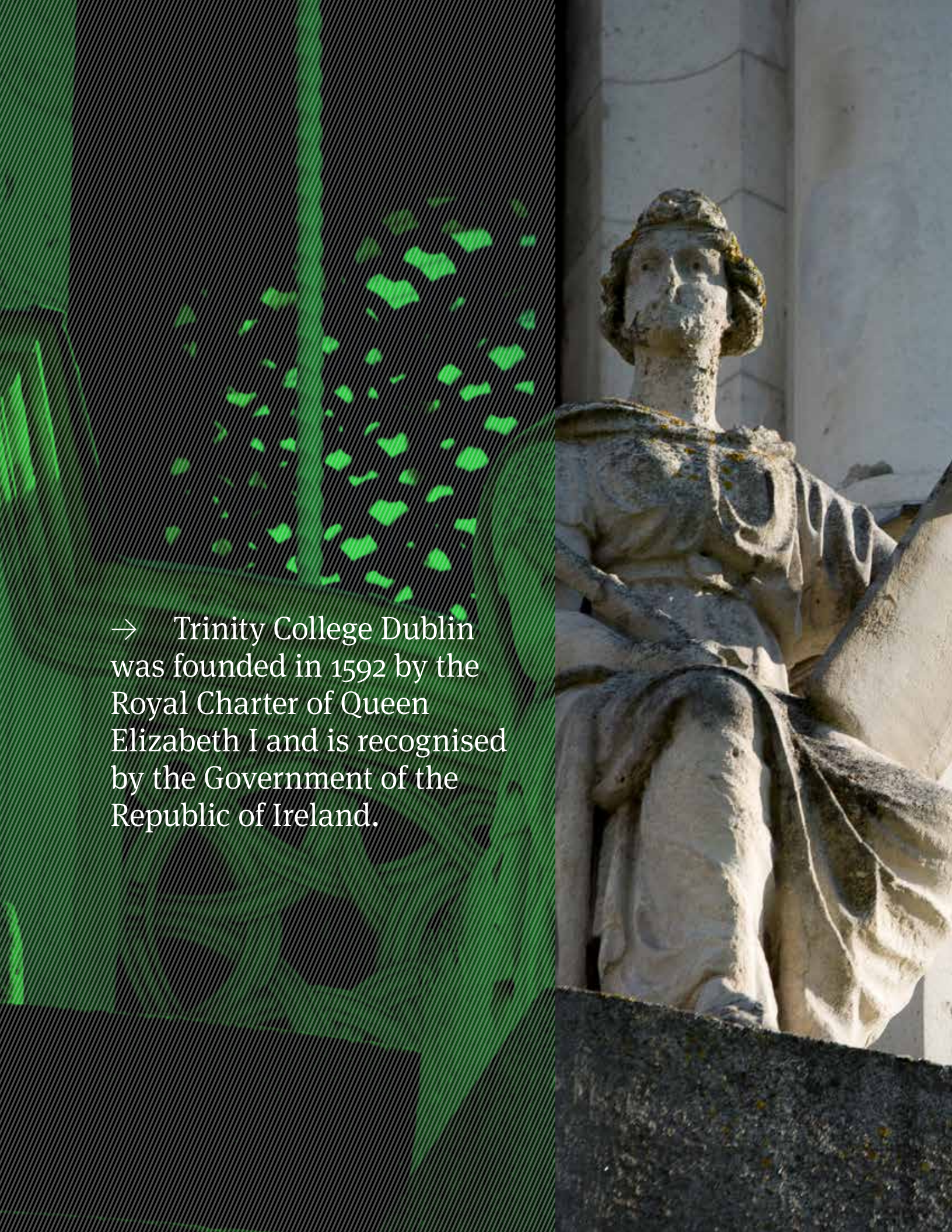
The University is in the process of revising the Trinity College Dublin Code of Governance 2013 (www.tcd.ie/about/content/pdf/TCD_Code_of_Governance_2013.pdf) to align it with the Code of Governance for Irish Universities 2019, as agreed between the Higher Education Authority (HEA) and the Irish Universities Association.

Establishment

Trinity College Dublin was founded in 1592 by the Royal Charter of Queen Elizabeth I and is recognised by the Government of the Republic of Ireland, through its designation under the Higher Education Authority Act, 1971, the Universities Act, 1997 and the Trinity College, Dublin (Charters and Letters Patent Amendment) Act, 2000.

Provost

The Provost is the Chief Officer of the University and a member of the Body Corporate. The role of the Provost is defined in the relevant legislation and in the Statutes (www.tcd.ie/registrar/statutes/) and the Provost is appointed after an election by academic staff and student representatives for a ten year term.



→ Trinity College Dublin was founded in 1592 by the Royal Charter of Queen Elizabeth I and is recognised by the Government of the Republic of Ireland.



14

→ The total number of Board meetings held during the year was 12.

Board

The Board is the governing authority of Trinity College Dublin, the University of Dublin. The Chairperson of Board is the Provost. Information on Board meetings, agendas, minutes, scheduled meetings and membership can be found on the Board website (<https://www.tcd.ie/committeepapers/board/papers/>).

University Council

The University Council is the academic council of the University, and subject to financial constraints, is responsible for College's academic affairs including curriculum development and academic appointments.

Information on Council meetings, agendas, minutes, scheduled meetings and membership can be found on the Council website (<https://www.tcd.ie/committeepapers/council/papers/>).

Major decisions of Board in 2018/19:

Research and Education:

- Drafting of the College Strategic Plan 2019-2024;
- Approval and launch of Research Excellence Strategy and Research Charter;
- Trinity Education Project (TEP) now in its fourth phase, the implementation phase, with all proposals to be mainstreamed by 2020;
- Introduction of a new Timetabling Policy;
- Approval of the Global Relations Strategy 3 (GRS3).

Campus development:

- Approval of a new Estates Strategy;
- The construction of the Trinity Business School is completed and the building was officially launched by An Taoiseach, Mr Leo Varadkar TD on Thursday 23 May 2019;
- Construction on the site for Printing House Square development of Student Accommodation and Student Facilities has made substantial progress;
- Approval of the E3 Learning Foundry business case;
- Updates noted on the plans for Trinity @ Grand Canal Quay;
- Approval of the Law School Development Project business case;
- Update on the Old Library Refurbishment Project presented to the Board.

Governance:

- Establishment of a Working Group to revise Trinity's Code of Governance in line with the new University Code of Governance 2019.
- Frequent revisions of the 2010 Consolidated Statutes;
- Appointment of a Chief Risk Officer;
- Establishment of a Brexit Risk Working Group;
- Approval of revised policies including the Fitness to Study Policy; Fraud Policy; Policy, Practice and Regulations on Intellectual Property; and Gender Identity and Gender Expression Policy;
- Introduction of new policies including the Meeting Hours Policy and a Risk Management Policy;
- On-going oversight of the activity of Trinity's subsidiaries and support for same.

Board meetings

The total number of Board meetings held during the year was 12.

BOARD MEMBER		ATTENDANCE	
EX OFFICIO		ELIGIBLE TO ATTEND	NO. ATTENDED
P.J. PRENDERGAST	PROVOST	12	12
C. MORASH	VICE-PROVOST/CHIEF ACADEMIC OFFICER	12	12
K. MITCHELL	SENIOR LECTURER/DEAN OF UNDERGRADUATE STUDIES	12	11
P. MURPHY	REGISTRAR	12	12
V.A. CAMPBELL	BURSAR/DIRECTOR OF STRATEGIC INNOVATION	12	11
ELECTED/NOMINATED			
D. AHERN	FELLOWS AND FELLOW PROFESSORS	12	12
S. ALYN STACEY	FELLOWS AND FELLOW PROFESSORS	12	11
L. BRENNAN	FELLOWS AND FELLOW PROFESSORS	12	11
A. BURKE	FELLOWS AND FELLOW PROFESSORS	12	12
J. DONOGHUE	EXTERNAL MEMBER (NOMINATED BY IIEA)	12	12
S. M. DRAPER	FELLOWS AND FELLOW PROFESSORS	12	08
S. FARRELL	TECHNICAL, ADMINISTRATIVE AND SUPPORT STAFF	12	09
D. FAYNE	NON-FELLOW ACADEMIC STAFF	12	10
D. GROUSE	TECHNICAL, ADMINISTRATIVE AND SUPPORT STAFF	12	11
J. KEOGH	TECHNICAL, ADMINISTRATIVE AND SUPPORT STAFF	12	10
S. DE RÍS	STUDENT REPRESENTATIVE (PRESIDENT OF THE STUDENTS' UNION)	12	11
VACANT	EXTERNAL MEMBER (NOMINEE OF THE MINISTER FOR EDUCATION AND SKILLS)	12	00
K. MCTIERNAN	NON-FELLOW ACADEMIC STAFF	12	11
A. CONNOLLY	STUDENT REPRESENTATIVE (EDUCATION OFFICER OF THE STUDENTS' UNION)	12	10
B. O'CONNELL	FELLOWS AND FELLOW PROFESSORS	07	04
J. CUNNINGHAM	STUDENT REPRESENTATIVE (WELFARE OFFICER OF THE STUDENTS' UNION)	12	10
R. MOSS	NON-FELLOW ACADEMIC STAFF	12	10
E. O'HALPIN	FELLOWS AND FELLOW PROFESSORS	12	11
D. R. PHELAN	FELLOWS AND FELLOW PROFESSORS	12	10
A. SEERY	NON-FELLOW ACADEMIC STAFF	12	10
F. SHEERIN	NON-FELLOW ACADEMIC STAFF	11	09
R. TIMONEY*	FELLOWS AND FELLOW PROFESSORS	04	02
O. V COULTER	STUDENT REPRESENTATIVE (PRESIDENT OF GRADUATE STUDENTS' UNION)	12	11
IN ATTENDANCE			
I. MATHEWS	TREASURER/CHIEF FINANCIAL OFFICER (IN ATTENDANCE <i>EX OFFICIO</i>)	03	03
P. REYNOLDS	INTERIM TREASURER/CHIEF FINANCIAL OFFICER (IN ATTENDANCE <i>EX OFFICIO</i>)	08	07
J. COMAN	SECRETARY TO THE COLLEGE (IN ATTENDANCE <i>EX OFFICIO</i>)	12	12
G. RUANE	CHIEF OPERATING OFFICER (IN ATTENDANCE, BY INVITATION)	12	11
J. HUSSEY	VICE-PRESIDENT FOR GLOBAL RELATIONS (IN ATTENDANCE, BY INVITATION)	12	08
V. BUTLER	ASSISTANT SECRETARY TO THE COLLEGE (IN ATTENDANCE)	12	12

*Prof Richard Timoney died on 1 January 2019

Financial Elements 2017–18

The financial year 2017/18 saw continued improvement in the financial position of the University with the achievement of a surplus for the first time in many years. Trinity is making steady progress in improving and strengthening its financial position. Given the financial challenges that the University has encountered in recent years, it is satisfying to see that the non-Exchequer income generating strategies (postgraduate and international students, commercialisation, philanthropy, research and industry engagement) continue to deliver results, with the 'block grant' from the State now comprising just 13% of total income.

Whilst our financial performance is strengthening, there are still significant challenges in achieving longer term financial sustainability. The University recognises that maintaining a surplus in the short term will be a significant challenge in the current financial and regulatory environment, when many of the recommendations of the Cassells report have yet to be implemented and when the provision for infrastructure renewal is taken into account. Likewise the consequences for quality of teaching and research reputation are palpable, and it remains the University's view that significant additional funding is required from the State as a key stakeholder in higher education both in recurrent and capital terms to meet anticipated forecasted growth in demographic and participation rates and to maintain the quality of the student experience.

Earnings before interest, tax, depreciation and amortisation (EBITDA) increased by €2.8m (26%) to €13.7m in FY2017/18, which represents a strong performance in the year. However, including net interest payable of €4.0m, the provision for depreciation (net of amortisation) of €15.8m and a taxation charge of €0.1m, the University reported a modest surplus (after other gains and losses) of €0.9m (2016/17: €3.5m deficit).

Consolidated income increased €23m (6.5%) on the prior year reflecting Trinity's continued success in attracting non-EU students, who now comprise 15% of the total student base, and in diversifying its non-Exchequer income. The University revised its policy for recognition of academic fee income which is now fully aligned to the financial year from 1 October to 30 September. As a result of this change Trinity recognised a net additional €1.2m of academic fee income in FY2017/18.

15 Summary Financial Position 2014-18

The Consolidated Financial Statements for the year ended 30 September 2018 were approved by the Board in March 2019 and the summary financial position is set out below.

	2018 €m	2017 €m	2016 €m	2015 €m	2014 €m
State grants	48.7	44.5	44.0	44.5	47.3
Academic fees	149.0	137.3	130.5	128.9	122.2
— EU UG	72.6	71.4	70.8	71.3	70.6
— EU PG	24.0	22.7	22.7	23.1	22.1
— Non EU UG	30.6	24.8	23.5	22.7	21
— Non EU PG	17.0	13.5	8.9	7.4	6.7
— Other	4.8	4.9	4.6	4.4	1.8
Research grants and contracts	99.7	100.1	92.2	85.2	78.0
CRU Income	44.4	42.1	40.6	34.4	29.8
Other income	15.4	11.3	10.0	10.1	21.4
Investment income	7.0	6.0	6.8	7.0	7.0
Donations and endowments	15.0	14.9	11.7	12.9	–
Income (excluding grant amortisation)	379.2	356.2	335.8	323.0	305.7
Staff costs	263.0	245.9	234.7	231.1	225.7
Other operating expenses	102.5	99.4	92.7	94.5	89.4
Total operating expenses	365.5	345.3	327.4	325.6	315.1
Operating (deficit)/surplus before interest costs and net depreciation	13.7	10.9	8.4	-2.6	-9.4
Less:					
Depreciation (net of amortisation)	-15.8	-20.1	-34.4	-19.8	-17.0
Net Interest payable	-4.0	-3.9	-4.6	-3.6	-3.4
Taxation	-0.1	–	–	–	–
Deficit before other gains and losses	-6.2	-13.1	-30.6	-26.0	-29.8
Plus:					
Gain/(loss) on revaluation of investment property	-0.3	4.5	11.6	9.9	7.9
Gain on investments	7.4	5.1	9.6	2.1	–
Deficit for the year	0.9	-3.5	-9.4	-14	-21.9

2017-18 Financial Year

BELOW – Growth in Trinity
Endowment Fund 1996 – 2018

It is notable that the non-Exchequer income generating strategies are continuing to deliver with the University's Exchequer/Non-Exchequer income ratio achieving target of 40:60 compared to 48:52 in 2012/13 and 70:30 in 2007/08.

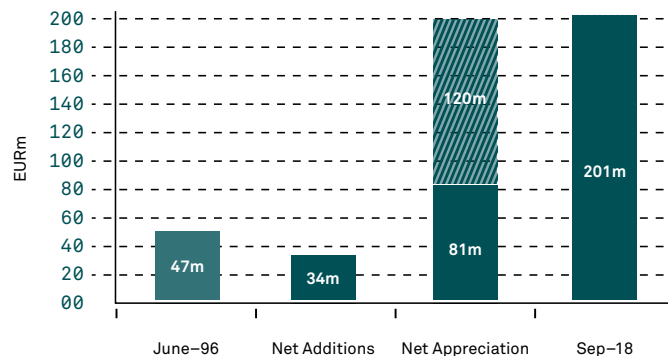
The University has a strong Statement of Financial Position (Balance Sheet) with consolidated net assets of €812.1m at 30 September 2018 (2017: €811.2m). Fixed asset capital additions amounted to €67.6m (2016/17: €35.2m) during the year, reflecting the continued investment in the University's estate, in particular on Trinity Business School and Printing House Square student accommodation. A further €100m loan facility with the European Investment Bank was signed on 5 October 2018.

The total funds held by the Trinity Endowment Fund amounted to €201m at 30 September 2018, well in excess of the €180m target value set out in the University's Strategic Plan 2014-2019. As agreed by the University's Investment Committee, the portfolio divested from Fixed Income assets in September 2018. In line with the approved investment strategy, the University will reinvest these funds into international infrastructure and property assets. The Endowment Fund achieved a net return of 7.5% in 2017/18, resulting in a gross income contribution to the University of €7.0m. In 2017/18, thanks to the continued support of alumni and friends, Trinity Development & Alumni successfully secured new gifts/pledges in excess of €33m.

The level of research income for 2017/18 recorded in the Consolidated Financial Statements (measured on the basis of research expenditure during the year and not grant income received) remained consistent with prior year at c.€100m. The value of new awards secured in the year amounted to €113m (2016/17: €115m). New Awards in 2017/18 included a €4.6m grant from Science Foundation Ireland supporting Smart Grid and Smart City Research and €3.6m from the Health Research Board to support Clinical Research Activity. In 2017/18 the Exchequer: non-Exchequer ratio of research income was 55:45 (2016/17: 59:41).

Trinity's success in attracting EU funding has continued in 2017/18 with the value of new awards funded under the Horizon 2020 programme amounting to €24m (2016/17: €23m). Trinity continues to lead out nationally in H2020 and has now secured a total of €89m in funding since 2014, which exceeds its total drawdown from the previous Framework 7 Programme.

While the research environment remains competitive, the University continues to benefit from the success of its Research Diversification Strategy, which focuses on EU, industry and other non-Exchequer funding.



The relatively low recovery rate of indirect costs achieved in 2017/18 of 17.9% when compared to the Full Economic Cost (FEC) rate of 59% remains a cause for concern. If the University is to continue producing research at a world-class level, this funding gap will need to be addressed.

Conclusion

The University is making steady progress in improving its financial position and welcomes the modest surplus out-turn achieved in 2017/18. Whilst our financial performance is strengthening, there are still significant challenges in achieving longer term financial sustainability given the uncertain outlook for the sector in respect of the Government's commitment to the Cassells report recommendations (which remain outstanding with no timeline to resolution) and the establishment of a long-term funding model. We are particularly cognizant of the need to increase revenues to drive up quality in teaching and research as affects rankings.

Through careful management, the University will continue to focus on income generating strategies and delivering further returns from our ongoing investment in our ambitious capital programme. We are committed to improving the financial position of the University while remaining focused on the University's mission to deliver quality student experience, quality teaching and quality research. We will look to invest strategically in the University's infrastructure to underpin our growth and to drive future success.

DR. PATRICK PRENDERGAST
PROVOST

PETER REYNOLDS
INTERIM CHIEF
FINANCIAL OFFICER

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The following table sets out a summary of key performance indicators (KPIs) and shows performance against the 2019 targets as set out in the University's 5-year Strategic Plan 2014-2019.

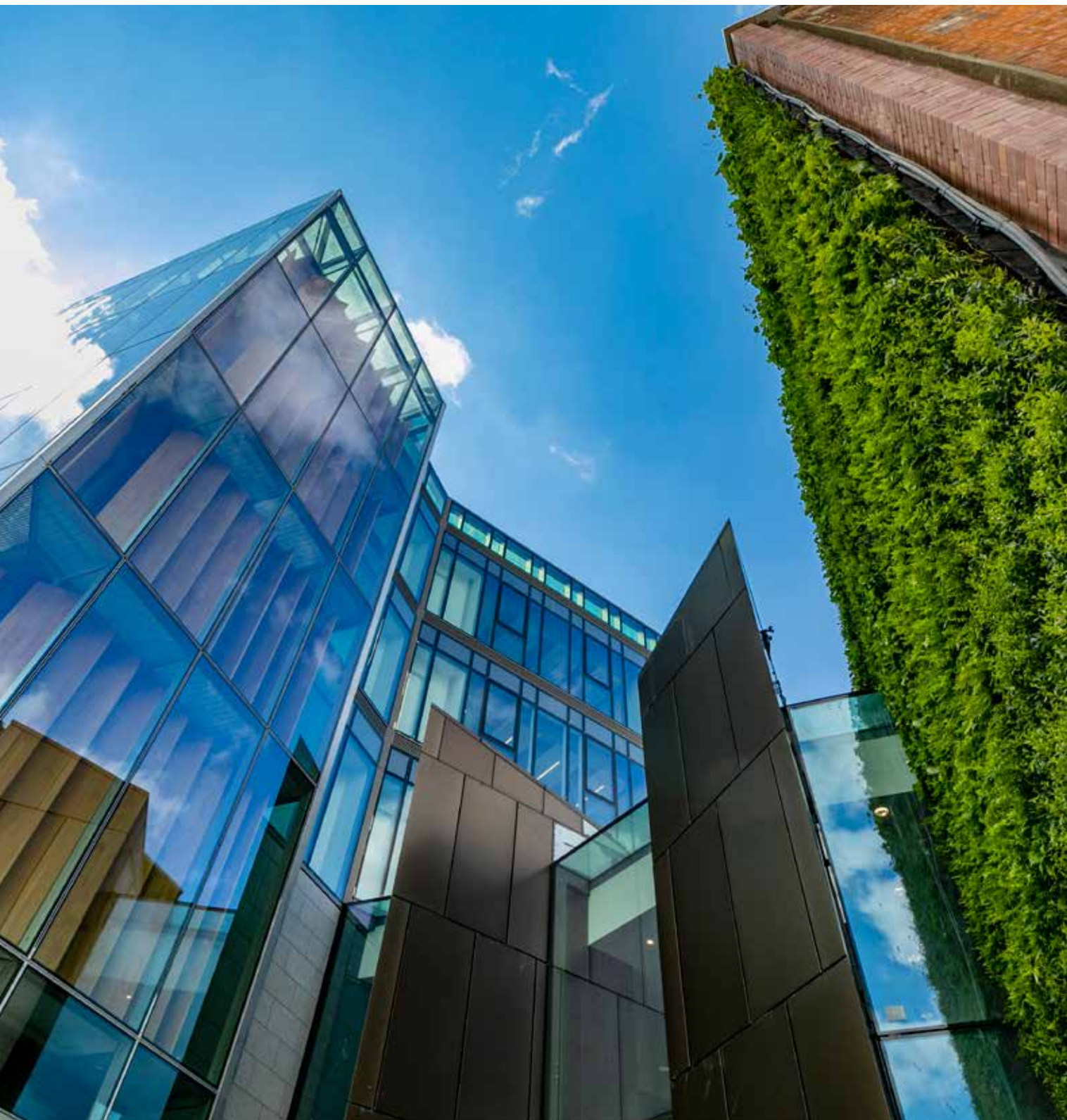
FRS102							Irish GAAP
KPI's	2019 Target	RAG Status	2018	2017 Restated	2016 Restated	2015 Restated	2014
EBITDA ¹ as % of income	6%	A	3.6%	3.1%	2.5%	-0.8%	-3.1%
Total surplus % of income ²	3%	A	0.2%	-1.0%	-2.8%	-4.3%	-7.1%
Exchequer / Non-Exchequer Income ³	40:60	G	40:60	41:59	43:57	44:56	45:55
Pay / Non Pay Ratio ⁴	65:35	A	72:28	71:29	72:28	71:29	72:28
Pay as % of Operating Income	65%	A	69%	69%	69%	72%	74%
Net Assets	€800m	G	€812m	€811m	€805m	€815m	€909m
Endowment Fund Value	€180m	G	€201m	€189m	€181m	€169m	€165m

¹ Earnings before interest, tax, depreciation, once off impairments and amortisation

² Income before unrealised gains/losses and amortisation

³ Excludes State funding for pensions, SUSI payments and amortisation of capital grants (sector agreed)

⁴ Excludes depreciation, once off impairments and interest costs



OFFICE OF THE PROVOST

House 1, Trinity College Dublin
Dublin 2, Ireland

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T + 353 1 896 4362

E provost@tcd.ie

W www.tcd.ie

