Institution: University of Leicester

1. Context and mission

1.1 Mission

The University of Leicester is a comprehensive, research-intensive higher education institution. It was founded in the aftermath of World War One as a beacon of hope for a future in which education and research would change the world for the better.

Since 2014 we have consolidated our world leading position in earth observation and space science, grown our biomedical and clinical research (the latter ranked 20th in the world according to the Shanghai Global rankings), led the global shift to socially transformative museums and heritage, and further strengthened our international reputation for research leading to the protection and preservation of archaeological heritage.

Our mission is to create a culture of equality and diversity and to change lives for the better through transformative research and education. Our core objective is to provide a vibrant, robust, and inclusive research environment that enables high-quality research, delivering cultural, health, economic and social benefits locally and globally. Innovation, enterprise, and knowledge exchange are central to this activity.

We are committed to tackling significant global issues and improving the lives of the world's most disadvantaged people. We rank in the top 3% in the Times Higher Education (THE) World Impact Rankings 2020 and first for our work on the UN's Sustainable Development Goal of 'Life on Land'. Our citations per publication are 9th in the UK and 59th in the world (THE World University Rankings 2021). Our Global Challenges Research Fund strategy was one of three highly commended by Research England (2018).

Nationally, our health-related research is embedded in the NHS through our partnerships with Leicestershire NHS Trusts. With the UK's biggest respiratory health department and world-leading research on ethnic health, we are leading one of the world's largest studies into the long-term health impacts of COVID-19 (Brightling, UoA1).

Regionally, we play a major role in the Midlands economy and culture via our membership of Midlands Innovation, by driving space technology and enterprise, and through the impact of the landmark discovery of Richard III—one of the decade's 'extraordinary archaeological discoveries' (Historic England, 2019).

1.2 Context

Our academics sit within three Colleges: Life Sciences (CLS); Science and Engineering (CSE); and Social Sciences, Arts and Humanities (CSSAH), incorporating 21 schools and departments, 20 subject-focused research centres, and five research institutes. We are returning submissions to 22 UoAs in REF2021:

Life Sciences	Science & Engineering	Social Sciences, Arts & Humanities
1. Clinical Medicine 2. Public Health 4. Psychology & Neuroscience 5. Biological Sciences 24. Sport & Exercise Sciences	7. Earth Systems & Environmental Sciences 8. Chemistry 9. Physics 10. Mathematics 11. Computer Science & Informatics 12. Engineering 14. Geography	15. Archeology 17. Business & Management 18. Law 19. Politics & International Studies 20. Social Policy 21. Sociology 27. English 28. History 34a. Media & Communication 34b. Museum Studies

Our total student population is 23,835 (2019/20: 60% UG; 31% PGT; 9% PGR). Leicester employs 1188.6 FTE permanent academic staff consisting of 674.2 FTE Teaching and Research, 253.9 FTE Teaching-focused, and 465.5 FTE Research-focused. We are submitting all eligible staff to our REF2021 submission:

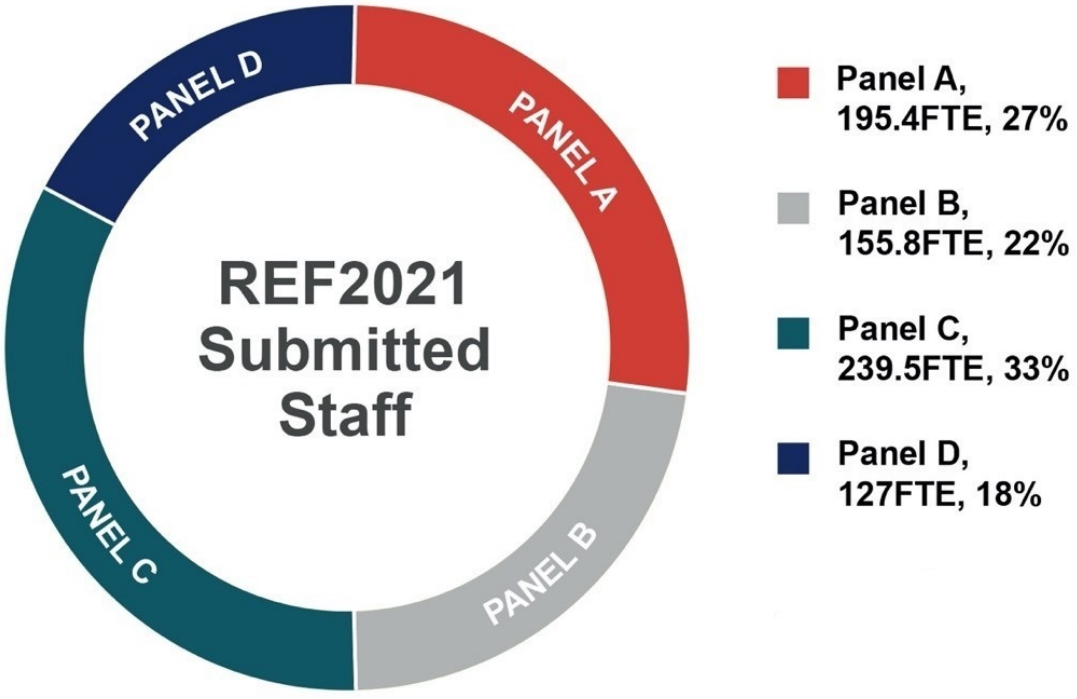

Figure 1: *REF2021 submitted staff FTE per panel*

The city of Leicester is one of the most culturally diverse in the UK, with around half the population identifying as BAME. Many of our leading research initiatives are underpinned by this diversity. From the Centre for BAME Health to the Centre for Hate Studies, much of our research activity engages with our context—a multi-ethnic, multicultural society spanning generations.

2. Strategy

Our Strategic Plan (2015-20) was to drive discovery-led research that saves, improves, and enriches lives. Four strategic objectives underpinned our activities and achievements:

(1) to enhance our national and international position by engaging with emergent priorities and challenges;
(2) to promote and support interdisciplinarity by launching a suite of research institutes and networks;
(3) to increase the reach and significance of our research through strategic impact planning, collaboration, and evaluation; and
(4) to enhance our enterprise culture through knowledge exchange and by developing partnerships to drive innovation and impact.

2.1 International challenges and engagement

We rank in the first quartile of UK universities (THE World University Rankings, 2021) and collaborate with world-leading researchers and professionals. Amongst our top 10 most frequent university co-authors are Harvard, Oxford, Cambridge, UCL, and Imperial. Our top 10 corporate co-authors include Airbus, AstraZeneca, GlaxoSmithKline, Nordisk, and Pfizer (Scival). Over 50% of our outputs have an international co-author.

We address global challenges by driving development-related challenge-led research: for example, fighting tuberculosis in South Africa (Barer, UoA1), understanding mental health issues in Guyana's jails (Anderson, UoA28), and protecting Mongolian rangelands (Upton, UoA14). With over £8M GCRF QR, our collaborative research is improving the lives of people living in chronic disadvantage across the world.

We develop international partnerships to achieve a better future for all; for instance, the Nairobi Alliance—our partnership with the universities of Nairobi, Malawi, Rwanda, and the Witwatersrand—was launched in 2017 as a key enabler for our GCRF strategy. Together, we provide governments and intergovernmental institutions with research on key challenges, such as plastic pollution in Malawi (Gabbott, UoA7). In China, we have several longstanding partnerships which have resulted in collaborative research centres, including manufacturing and materials (NISCO, Dong, UoA12) and pregnancy research (Chongqing University, Baker, UoA1).

2.2 Interdisciplinary research

We have made significant investments in interdisciplinary working, the success of which is evident in many of our Unit returns. In 2016, we established five interdisciplinary Research Institutes centred on areas of key strength: Cultural & Media Economies (CAMEo), Leicester Precision Medicine (LPMI; joint with the NHS), Space and Earth Observation (LISEO), Structural and Chemical Biology (LISCB), and Leicester Institute for Advanced Studies (LIAS).

Over this REF period we have invested over £5M of internal funding into these institutes which have in turn attracted £82M to fund research and impact. For instance, LPMI has supported the development of a new clinical assessment tool for detecting risk of sudden cardiac death (Ng, UoA1, MRC, £0.81M), which won the European Heart Rhythm

Association Inventors Award 2016, while CAMEo contributes to the DigiGen project (Horizon 2020 RIA, €3M), researching how young people are affected by technological transformation (Karatzogianni, UoA34a).

LIAS was established to pioneer new ways of modelling and translating interdisciplinary research. Since its launch in 2017, LIAS has secured £4.5M of external funding, hosted 21 fellows from 17 countries, and funded 21 projects, such as transforming the way digital technology is harnessed for maternity care in the UK, India, Peru, and South Africa (Mackintosh, UoA2). In 2020, LIAS became Chair of the UK-wide Consortium of Institutes of Advanced Studies in recognition of its dynamism and success.

We have won significant external support to enable our interdisciplinary research. We are one of six UK institutions awarded a BHF Accelerator Award (£1M, matched by UoL and UHL) to fund ECRs working on novel crosscutting research in cardiovascular disease. We hold a Wellcome Trust Institutional Strategic Support Fund (WTISSF) award (£1.5M, matched by UoL), commended by the WT as 'one of the best in our ISSF scheme'. This Fund facilitates collaboration between health sciences and humanities and social sciences, resulting in novel and impactful research such as 'Virus Fear: Cultural Resistance to Biophage Therapy' (Clokie, UoA5 and Jones, UoA27).

2.3 Research Impact

Over this REF period, we secured ~£4.2M in external funding to support impact development:

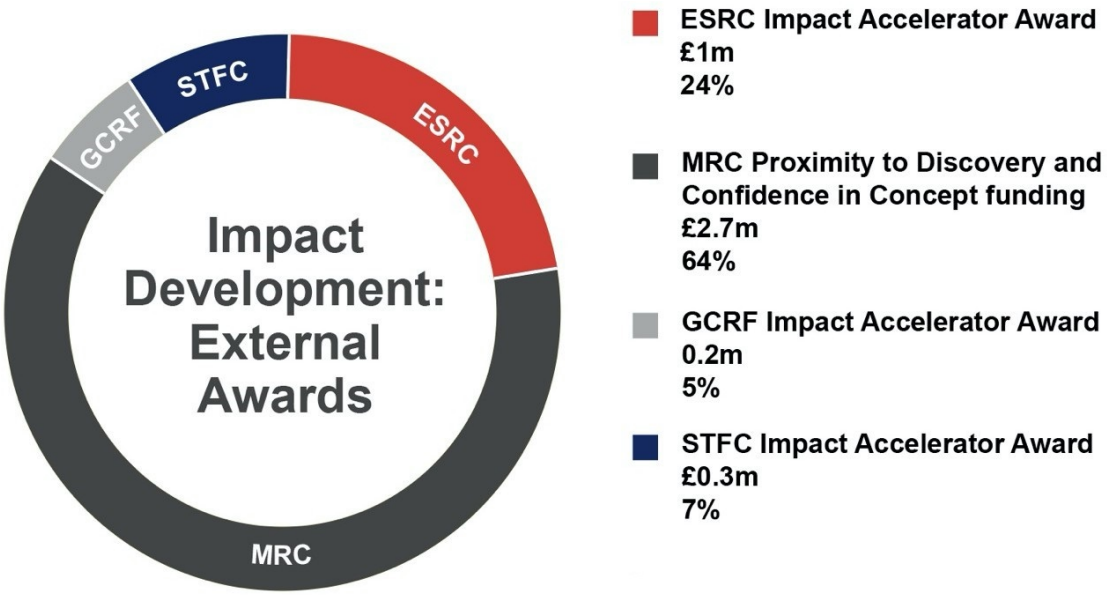

***Figure 2**: Total external funding for impact development over the REF period*

We have invested significantly in impact development via an Impact Development Fund (~£0.5M) and expansion of our Impact Team (1 FTE in 2014 to 8.4 FTE in 2020). This support has enabled us to develop high-impact research, including protecting endangered heritage in the Middle East and North Africa (Mattingly, UoA15, ~£2.6M Arcadia/British Council/AHRC); advancing understanding and representation of BAME and LGBTQ+ history (Fowler & Parker, UoA27; Sandell, UoA34b); and transforming UK hate crime policy (Chakraborti, UoA20).

We support one of the top 20 Clinical Medicine groups in the world (5th in the UK, Shanghai Global rankings 2020). Fundamental to this success is our research at Glenfield Hospital, which ranks 29th in the world and 2nd in the UK (THE Institutes and Hospitals Rankings 2018). Our clinical research has improved the treatment and quality of life of patients both locally and globally with conditions including respiratory diseases (Brightling, UoA1), cardiovascular diseases (Gershlick, Samani, Robinson UoA1), and diabetes (Davies UoA1, Khunti UoA2, Yates UoA24).

Our ranking as first in the world for research on 'Life on Land' (THE World Impact Rankings 2020) is underpinned by our commitment to tackling today's greatest environmental challenges, including preventing the destruction of peatlands (Page, UoA7). We host the NERC National Centre for Earth Observation and are leaders in satellite observations of climate, remote sensing of changing land surface, and atmospheric composition.

2.4 Local, regional, and national priorities

The University contributes £360M annually to Leicester and Leicestershire's economy and £600M annually to the UK, supporting one in every 23 jobs in the city and ~10,000 jobs nationally.

We have worked closely with the city to create the National Space and Richard III Visitor Centres, with the economic impact of the discovery of Richard III assessed as ~£59M (Focus Consultants, 2015). Membership of Midlands Engine, a public and private sector partnership focused on regional economic growth, enables our contribution to the growth of a high-skill, high-tech Midlands economy.

We play a key role in the Leicester and Leicestershire Enterprise Partnership (LLEP), contributing to its Local Industrial Strategy by involvement in two Enterprise Zones. With the LLEP, we launched the UK's first Life Sciences Opportunity Zone (2019, £1.4M ERDF/UoL) to enhance regional Life Science SME growth, activity greatly enhanced by the establishment of the Leicester Academic Health Partnership.

In 2021, we are opening our new £100M+ Space Park Leicester (SPL). SPL will enable cutting-edge end-to-end R&D, skills capability in space, and low-cost satellite manufacturing facilities for space sector leaders and SMEs. The Department of International Trade has designated it a High Potential Opportunity Zone and it will house the European Space Agency's Business Incubation Programme. Once open, SPL will provide a £700M uplift to local GVA (KPMG, 2017).

2.5 Research Enterprise

To optimise the impact of our research, we have developed and strengthened our partnerships. These include: the NHS, the National Trust (one of only two UK universities to have a formal partnership, alongside Oxford), and NTT DATA—a partnering agreement to accelerate the delivery of data, AI insights, and clinical research. Collaborative Research Centres include the NISCO UK Research Centre (with Fosun International and Nanjing Iron and Steel Group) and MatIC Innovation Centre (with The Welding Institute).

Our Higher Education Innovation Fund (HEIF) allocation has more than doubled from ~£1.41M per year during REF2014 to ~£3.14M per year during REF2021:

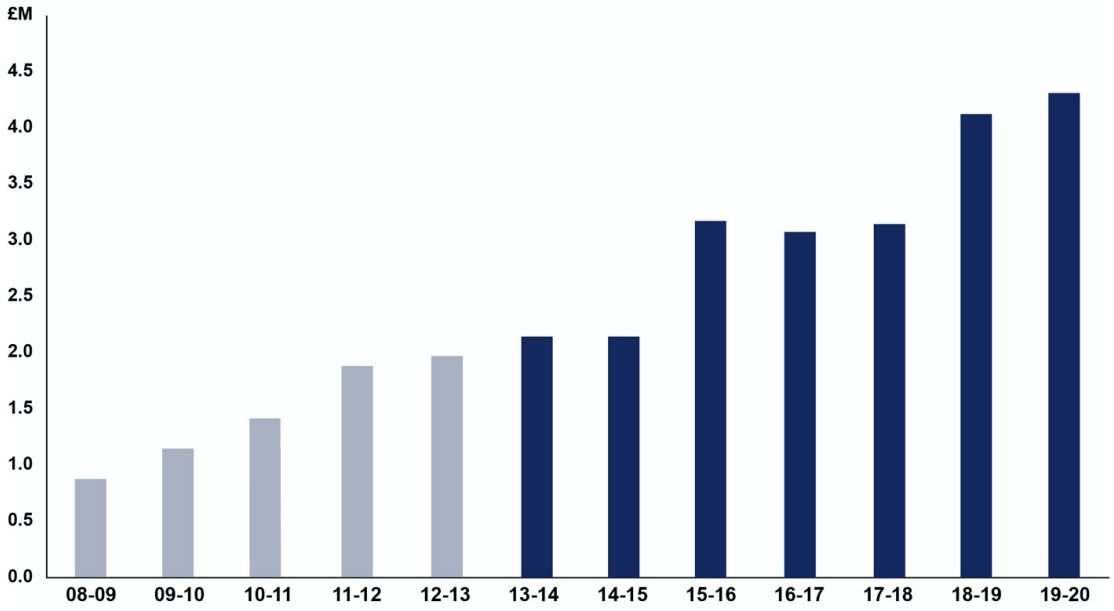

***Figure 3**: HEIF Allocation for REF2014 (faded) and REF2021*

The ~£22M received through HEIF during this REF period was used to pump-prime enterprising and impactful research. The Knowledge Exchange and Enterprise Fund—designed to create and deepen relationships with non-academic partners—has supported 70 projects, including the development of a forensic DNA testing kit used to bring justice for sexual abuse victims in Kenya (Smith UoA20, Jobling UoA5). This project was THE HASS Research Project of the Year 2018.

Our Proof of Concept Fund has supported 75 projects to technological maturation and commercialisation for our intellectual property, including the successful spinout company, EarthSense, which is spearheading innovations in air quality monitoring (Monks UoA8, Leigh UoA9). Our Leicester Innovation Hub, launched in 2017 (£6.5M, ERDF/UoL), supports business incubation through access to facilities, funding, and academic expertise.

2.6 Open Research

Embedding a culture of open research is a strategic priority as we seek to increase global engagement with our research. The Open Research Group, formed in 2017, has driven our open research policies, practices, and services. To support GOLD OA publishing, we

administered ~£1.71M in OA block grants (UKRI and WT/COAF) during the REF period. Our OA Policy requires all academics to deposit their research outputs into our public available Leicester Research Archive (LRA) within three months of acceptance for publication. This platform provides free access to our scholarly outputs and research data, including PhD theses. During the REF period, research outputs in LRA have had 4,874,007 views and outputs have been downloaded in 181 countries.

2.7 Research integrity

We are committed to maintaining the highest standards of rigour and integrity in all aspects of our research, adhering to the requirements of the Concordat to Support Research Integrity. We expect all researchers to observe these standards, promote an ethos of professionalism, and embed good practice in all aspects of their work. Implementation of DORA principles has involved review and modification of policies and procedures for research assessment when hiring and promoting, in accordance with our public Statement of Principles for the Responsible use of Bibliometrics. Our institutional policy for ongoing evaluation of research output quality ensures that peer review underpins research assessment.

2.8 Citizens of Change

Launched in 2020, our new institutional strategy centres on being Citizens of Change. Our mission is to be diverse in our make-up and united in our ambition to change lives through education and research. By providing an ambitious and inclusive research environment, we will deliver world- leading research that transforms lives through our key strengths:

- Space, Earth and Environment;
- Common Diseases and Multimorbidity;
- Social Justice, Diversity and Inclusion;
- Culture and Heritage;
- Structure, Chemistry and Biology of Materials;
- Data Science, Analytics and Modelling.

Our 5 strategic aims over the next decade are to:

(1) foster disciplinary and interdisciplinary research excellence;
(2) optimise the impact of our research;
(3) forge vibrant partnerships and networks of excellence to address complex contemporary challenges;
(4) drive ambitious innovation and enterprise;
(5) nurture the next generation of researchers to become world-leaders in their field.

3. People

In 2014, we committed to Discovering People, a major strategic initiative with six components that ensured that all staff and research students flourished in an inclusive and supportive environment:

(1) attracting the best people at all career stages;
(2) valuing equality and advancing diversity;
(3) nurturing and developing people;
(4) delivering our health and wellbeing programme;
(5) embracing change, innovation, and learning;
(6) celebrating and recognising success.

Our T&R and R-only staff (permanent and contract) have the following characteristics:

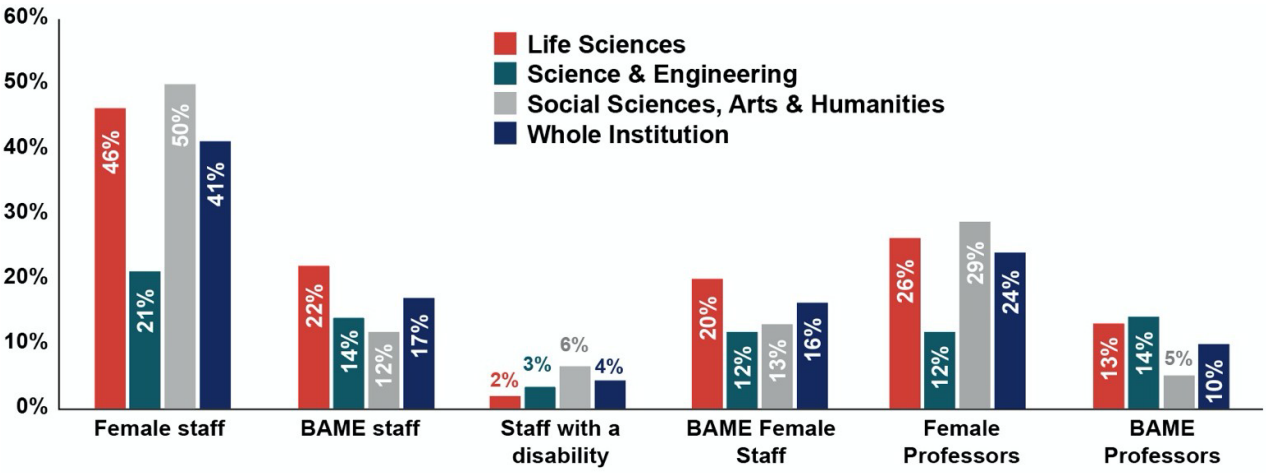

***Figure 4**: Staff characteristics by College*

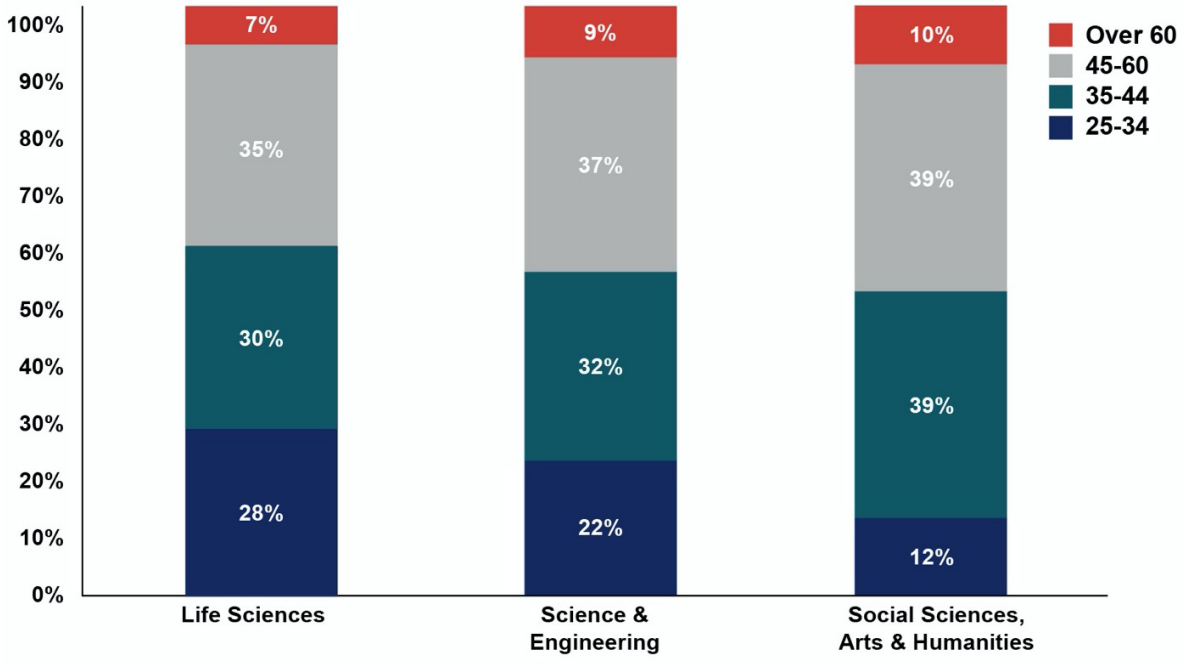

***Figure 5**: Age distribution of REF-eligible staff in each College*

3.1 Equality, Diversity, and Inclusion (EDI)

EDI is fundamental to innovation and high-quality research. In 2017, we launched an EDI strategy outlining our commitment to valuing equality and advancing diversity, in all aspects of our University life. We use EDI data to target activities, recruit and retain an increasingly diverse staff population, and engage with relevant equality charters. Our REF Code of Practice specifies how our return has been compiled with due regard for EDI. Our supportive structures have enabled all staff to produce outputs for REF2021.

To advance gender equality we apply Athena SWAN principles across the University, recognised by our institutional Silver Award (2018), a College-level Silver Award for Life Sciences (2020), and 8 departmental awards (1 Silver, 7 Bronze). We are the only UK university partner in the United Nations' HeForShe global solidarity movement and the first to launch a menopause policy, informed by our research on menopause and the workplace (Davies, UoA17). Since 2017, we have reduced the median gender pay gap by 4.3%. Life Sciences have significantly increased the proportion of female professors to 28% (19% in 2015).

The total number of BAME staff has increased by 19% since 2016 and BAME staff now represent 17% of the University's T&R and R-only population. 16% of our T&R/R-only female staff identify as BAME compared to 7% for the Russell Group and 6.7% for the sector (HESA). As members of the Race Equality Charter we are driving forward race equality initiatives, including a Positive Action in Recruitment Initiative to increase the ethnic diversity of staff and launching BAME PhD scholarships. In 2020, Vice Chancellor Professor Nishan Canagarajah pledged 'to set the standard for diversity and inclusion in higher education…to address the chronic absence of black higher education academic staff'.

We have been a Stonewall Diversity Champion since 2013 and a Stonewall Top 100 Employer (2018 and 2019). In 2020, the University was recognised for advancing disability equality by progressing to Level 2 of the Disability Confident Scheme and attaining Disability Confident Employer status.

3.2 Staff recruitment, development, and support

Our recruitment processes attract a diverse pool of outstanding candidates at all career stages and assessment is undertaken by diverse selection panels adhering to DORA-compliant principles. T&R staff have a workload allocation that recognises a minimum of 40% for research. During this REF period, 62% (448) of REF-eligible staff, including ECRs, have benefitted from research leave. ECRs on T&R contracts receive a lighter teaching load while on probation.

We promote a healthy work-life balance through our Flexible Working and Special Leave Policies and Annual Leave Purchase Scheme. We offer enhanced schemes for maternity, paternity, adoption, parental and compassionate leave. We have a comprehensive Health and Wellbeing programme and, in recognition of the quality of our staff support, we achieved an Armed Forces Covenant Gold Award (2020).

We have held a HR Excellence in Research Award since 2011 (amongst 13 institutions to receive this award in 2016), in recognition of our commitment to implement the principles of the Concordat to Support the Career Development of Researchers. During this REF period, we have promoted 261 REF-eligible staff (41% female), including 168 promotions to Associate Professor (45% female) and 93 promotions to Professor (34% female).

In 2017, we launched a Coaching and Mentoring Academy and a new Academic Career Map promoting diversity in academia by valuing breadth and specialisation across a range of activities, including impact and knowledge exchange. Additionally, we provide our ~456 fixed-term research staff with targeted support, including access to Bridging Funding. Our Fixed-Term Contracts Policy ensures that such staff are treated fairly and, where possible, transferred to open-ended contracts.

In 2017, we launched our Doctoral College (DC) as part of a radical overhaul of the institutional structures to support all research active staff and students. As a result, in this REF period, we have increased our ERC Fellowships by 234% (€17.9M), doubled our ESRC Fellowships (£1.2M), increased Leverhulme Trust Fellowships by 29% (£1.9M), and funded 35 ECR Fellowships through our WTISSF and BHF Accelerator Award.

3.3 Research Students

The initiation of the DC has enhanced the importance of, and support for, PGRs in our research culture. With 2124 doctoral completions, we have had an 84% uplift compared to REF2014—the 9th highest increase for PGR awards amongst Pre-92 HEIs. Of our PGR community ~17% are distance-learners—three times larger than the sector mean—including many located internationally (not captured in HESA data). Over the REF period, 60% of our PGR community were home/EU and 40% were international. Our annual UK BAME population of PGR students has more than doubled since the beginning of REF2014, significantly above the Russell Group mean:

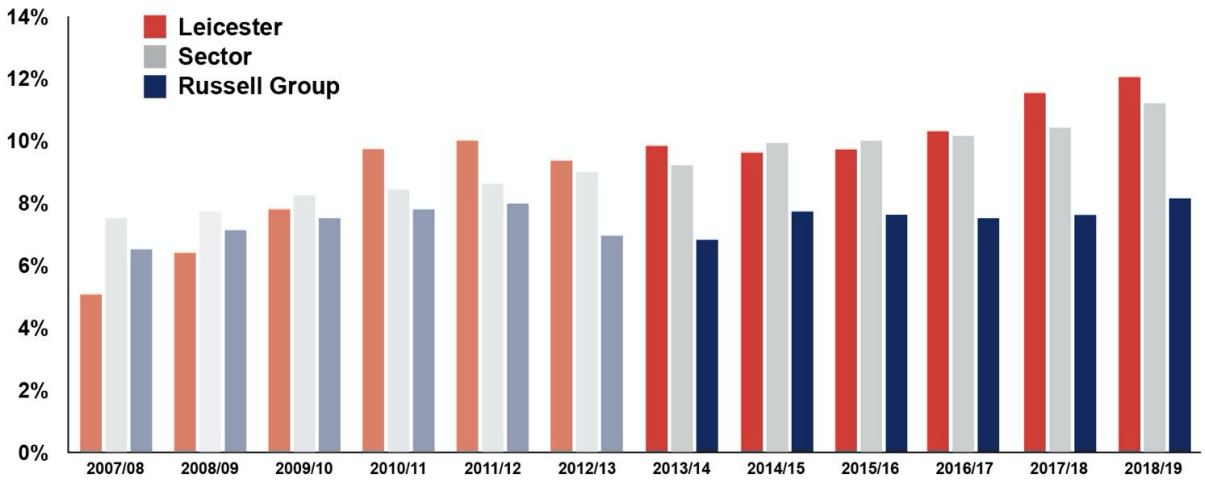

***Figure 6**: Increase of our UK BAME research students compared to sector*

We have been awarded a number of UKRI Doctoral Training Programmes (DTPs). We are leading members of the AHRC Midlands4Cities DTP—the top ranked AHRC DTP bid nationally. This has led to a 97% increase in our AHRC PhD studentships compared to REF2014. Our 2018 NERC- funded DTP was the strongest bid in the UK; we lead an EPSRC IMPACT CDT and are a partner in the ESRC Midlands Graduate School. These have contributed to our UKRI-funded doctoral completions in this REF period: AHRC (69), MRC (62), ESPRC (55), STFC (52), NERC (45), BBSRC (43), and ESRC (7). Since 2014, we have also led Marie Skłodowska-Curie Innovative Training Networks worth €17.1M, awarded 145 institutionally-funded studentships, and increased our industrial/commercial PGR funding by 20% (HESA).

In the 2019 Postgraduate Research Experience Survey, we scored higher than the sector and Russell Group averages in almost all sections, performing particularly well in supervision (89%) and research skills (88%). This success is a result of our excellent departmental provision for PGRs and the DC. The DC is responsible for providing research skills training and support, facilitating initiatives such as doctoral inaugural lectures, careers symposia, and thesis boot camps to support timely submission.

Our thesis completion rate has been consistently above 80% for this REF period and was 94% in 2019/20 for our UKRI funded students, compared to a timely completion rate of 61% for the sector. Since 2014, BAME students' completion rates have increased by 29%, to a percentage close to their white counterparts:

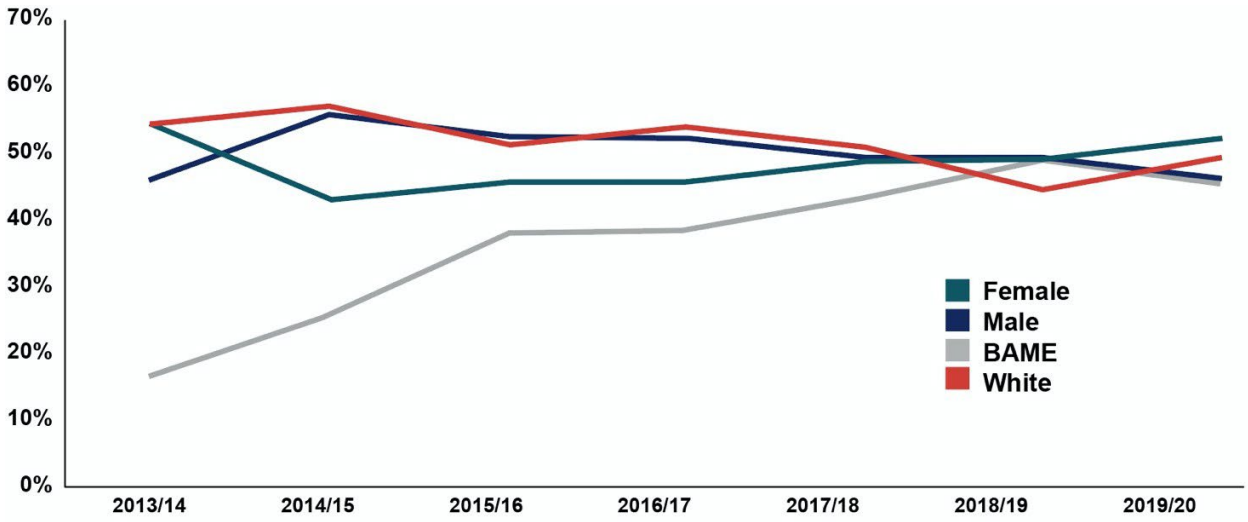

***Figure 7**: % doctoral completions per year by gender/race*

4. Income, infrastructure and facilities

4.1 Research Income

During this REF period, our research income totaled £384.5M, representing a 57% increase on REF2014 (Fig.8), with increases in all three Colleges (CLS 49%, CSE 37%, CSSAH 139%). Institutionally, we have consistently ranked in the top 30 amongst UK HEIs for total research income (HESA).

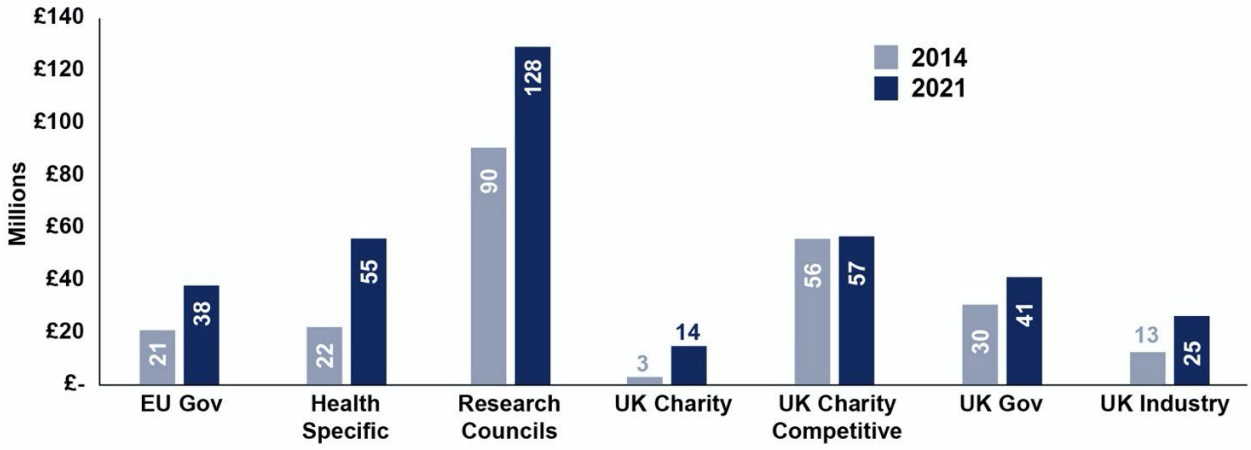

***Figure 8**: Increase in our research income by source since REF2014*

We have been awarded ~£427M in external research funding over the REF period, securing ~£77M in 2019-20, the highest on record at UoL and the third year in a row that we have achieved £70M+ (Fig.9). This increase ensures that we will sustain our income over the next five years.

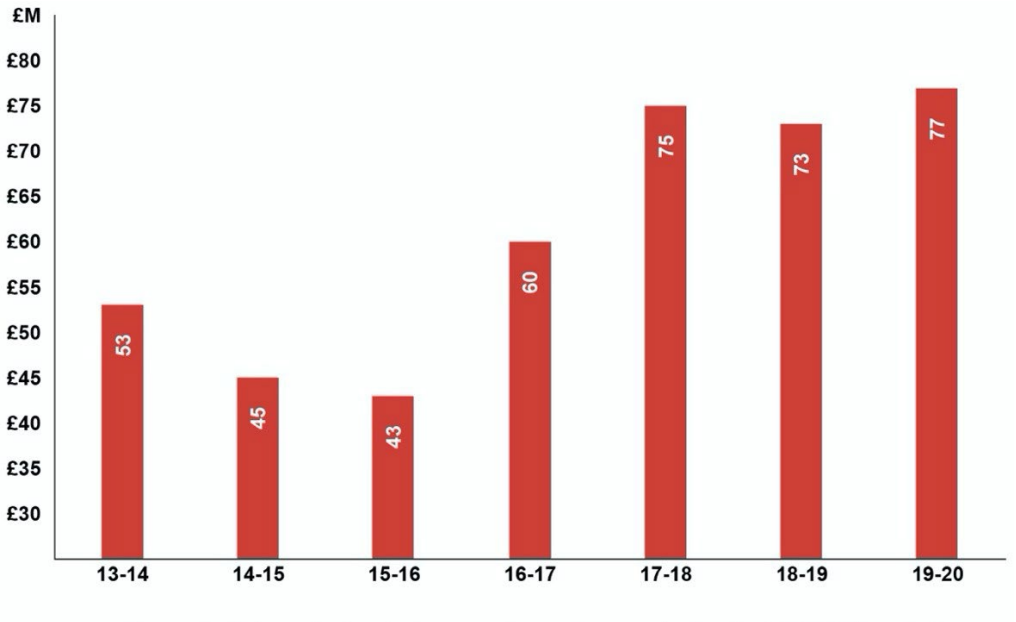

***Figure 9**: Externally funded research grants awarded in the REF2021 period*

We have diversified our funding portfolio, making notable gains in UKRI, health, EU, and industry funding. We received ~£52M of in-kind research income through our extensive use of UK and international facilities, increased our intellectual property income by 539%, and rank 9th nationally for regeneration income (HEBCI 2018/19).

Our Research and Enterprise Division (RED) and Research Institutes provide support for capturing external research awards, from identifying new research initiatives to the preparation of grant applications. We have significantly invested in research support during this period, including increasing RED staff from 30 FTE in 2014 to 85 FTE in 2020.

Our research grant success has led to a 53% increase in research overhead compared to REF2014 (Fig.10). QR is returned directly to Schools and, alongside research overhead, is used to pump-prime research activity. We use research overhead, QR, and HEIF funding to support strategic research and impact priorities, including: our research institutes, investment in new academic positions, building capacity for interdisciplinarity, matched funding for major programmes, and PhD scholarships and fellowships.

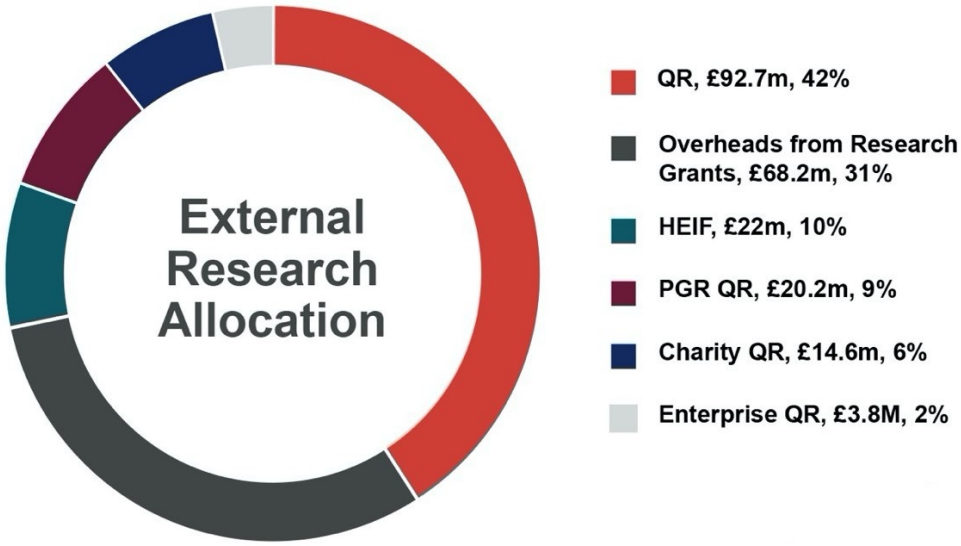

***Figure 10**: External research allocation 2014 – 2021 (£M)*

4.1 Local Infrastructure and Facilities

As a top quartile research-intensive University, our physical and digital infrastructure is fundamental to our research environment. Investment focuses on enabling our research ambitions, delivering capability in areas of existing strength and emergent fields where we have clear potential to make a unique and transformative contribution.

Our infrastructure and facilities are developed and maintained through external research awards and ~£15M of internal investment. Our facilities are supported by 243 FTE technicians, many of whom make substantial contributions to income and output. We were one of the first institutions to sign up to the Science Council Technician's Commitment in 2017, ensuring greater recognition and career development for all technicians.

Opened in 2016, the £42M **George Davies Centre for Medicine** is the largest investment in Applied Health Research and Medical Training in the UK in the last decade. It has

facilitated the co-location and collaboration of Health Science and Psychology researchers, housing applied research at the forefront of improved patient safety and the fight against chronic disease. Recent developments include the establishment of the Centre for Environment, Health and Sustainability (~£10M UoL/ NIHR).

The **Advanced Microscopy Facility (AMF)** supports major analytical research activities across Chemistry, Earth and Environmental Science, Engineering, and Physics. Since 2014, we have invested >£1M in our suite of electron microscopes (EM), valued at ~£4M, providing workhorse and cutting-edge capability across the spectrum of EM imaging and analysis. Our EM capability was essential to our study of material returned from Comet Wild2 and asteroid Itokawa (Stardust and Hayabusa missions) and facilitated our involvement in upcoming sample return missions, including Hayabusa 2 (UoA9).

Our award-winning **David Wilson Library** provides a dedicated space for researchers to study and network. Since 2014, we have invested ~£28M to grow our primary source collections, databases, and e-journals. Archives and Special Collections have supported collaborative research projects, including 'Unlocking our Sound Heritage' with the British Library (Horrocks, UoA28, £0.5M Heritage Lottery Fund). Our nationally-significant Joe Orton Archive has supported a range of publications and public activities, including the 2018 Saboteur Award for a short animation tribute to Orton (Parker, UoA27). The Evelyn Waugh Studies Collection is openly accessible as part of the AHRC 'Complete Works of Evelyn Waugh' project (Stannard, UoA27), which has been described as 'one of the great monuments of twenty-first century literary scholarship' (TLS, 2018).

4.2 Regional and National Research Infrastructure and Facilities

Reflecting the interdisciplinarity and collaboration at the heart of our research strategy, we have delivered substantial investment in regionally- and nationally-significant research infrastructure.

The **Leicester NIHR Biomedical Research Centre (BRC)** is a £11.6M investment (NIHR)—one of only 20 nationally—that enables pioneering medical research (partners are UHL and Loughborough University) providing collaborative clinical research facilities and funding research projects, fellowships, and studentships. Our BRC researchers have led some of the largest international studies identifying the genetic risks of cardiovascular and respiratory diseases (Samani & Tobin, UoA1), developing novel treatments for asthma and stroke (Wardlaw, UoA5), and a range of lifestyle interventions to prevent early stage diabetes (Edwardson & Yates, UoA24; Wain, UoA2). Since 2014, our BRC has recruited 88,337 patients in 901 studies and secured £104M of additional income.

Our **Preclinical Research Facility** is integrated into a regional network of complementary animal facilities. It provides a unique capability to perform Category 3 containment and aerosol delivery capacity, which is fundamental to our respiratory science (Barer, UoA1) and provides state-of-the-art in vivo imaging that underpins our cancer (Pritchard, UoA1; Fry, UoA5) cardiovascular (Samani, UoA1; Webb, UoA5) and neuroscience (Rodrigo, UoA4) research.

We host the NERC **National Centre for Earth Observation (NCEO)**, which leads national research capability in Earth Observation using international satellite systems in space (partnerships with 12 HEIs and 3 research laboratories). In addition to a £12.6M investment (NERC), NCEO has attracted £35M in external awards over the census period, enabling novel satellites to be utilised in the most pressing environmental science challenges

including data for climate, next generation Earth system models, and environmental forecasting systems. We undertake research into measurement of carbon dioxide and methane concentrations in complex regimes, such as wetlands, and drive new satellite systems for the global stock take mandated in the Paris agreement (Boesch, UoA7). Our contributions to the Copernicus land surface temperature monitoring mission are globally significant (Ghent/Remedios, UoA7&9).

We are renowned for the provision of high-quality **High Performance Computing (HPC).** In addition to two local HPC clusters, provision of HPC has been significantly enhanced by STFC funding (£9M) for the Distributed Research Utilising Advanced Computing (DiRAC) Facility. DiRAC provides essential support for the delivery of STFC research programmes via services at four host universities, of which Leicester is the leading member. Our HPC is an essential tool for the interpretation and exploitation of observational and experimental data. This includes building and testing detailed computational models to understand the processes that shape planetary systems (Alexander, UoA9) and performing calculations of planetary spectra to match ground- and space-based observations of planet atmospheres in our Solar System (Fletcher, UoA9).

LISCB leads the **Midlands Cryo-Electron Microscopy Facility** (£3.7M MRC, Leicester £1.8M). The facility generates 3D structures of biomolecules in exquisite detail, revealing the mechanisms through which molecular machines in our cells perform the key functions of life. We are one of six organisations in the UK to have this capability. The facility has attracted international researchers and industrial users, including UCB, Sanofi, Evotec, and Emphasis. CryoEM has significantly advanced understanding of the regulation of embryonic development (Schwabe, UoA5).

4.3 Current Investment in Future Infrastructure

Investment in **Space Park, Leicester (SPL)** of £13.8M through the UK Research Partnership Investment Fund has leveraged an additional £50M from the University and business to support the Manufacturing, Engineering, Technology and Earth Observation Research Centre (METEOR). METEOR will revolutionise the design, operation, and production of satellites. We have secured £2.3M from the LLEP, combined with £2.4M of institutional support, to establish the Space Technology Applications for Research Accelerator, which will provide support to SMEs designing and developing products. A further £0.5M investment (Wolfson) in a new Deep Space Centre will enable the development of smaller lower cost spacecraft, as part of a new generation of space exploration. Industry partners with a presence at SPL will include space sector leaders (Thales Alenia Space, Lockheed Martin, Airbus), computing giants (HPE and AWS), as well as a range of SMEs.

In 2019, we allocated £632k to develop the **Forensic and Ancient Biomolecules clean laboratory** to advance the institution as an international leader in forensic and ancient biomolecule research. The facility will build on discoveries such as the identification of Richard III (UoA5, UoA15, UoA28), forensic DNA research (Jobling, UoA5), and further understanding of the health impact of tobacco consumption in post-medieval Europe (Inskip, UoA15, UKRI FLF, £1.2M).

4.4 A University of Change

Over the REF period, we have created a vibrant and sustainable environment that allows our staff and research students to flourish. We have increased research income by 57% and doctoral completions by 83%, secured investment for nationally-significant infrastructure and facilities, and enhanced our national and international position by driving research that addresses emergent priorities and challenges. By putting equality and diversity at the heart of our mission, and supporting interdisciplinarity and knowledge exchange, we have developed world-leading and world-changing research. Through our strengths in Lifestyle Diseases, Space and the Environment, and Heritage and Society, we are improving lives.