

Institution: University of Plymouth

1. Context and mission

The mission of the **University of Plymouth's 2030 strategy** is to *Advance knowledge and transform lives*. Our vision is to deliver excellent interdisciplinary research, experiential education and civic engagement that realizes positive change for society and the economy. This is underpinned by our commitment to financial sustainability that will provide the resource and infrastructure investments needed to deliver our goals over the next 5-10 years.

The University has a proud heritage dating back to the city's School of Navigation in the 19th century. Today, it retains the School's founding commitment **to deliver benefits for its local and regional communities by leveraging its global connectivity and influence**. With more than 18,000 students by headcount, 930 academic and research staff by FTE, and a turnover of £228 million in 2019/20, the University is a broad-based institution operating across 14 Schools, clustered into three Faculties: Arts, Humanities & Business (FoAHB); Health (FoH); and Science and Engineering (FoSE). Staff undertake the majority of their teaching and research activities across two campuses – the City Centre campus and the Northern campus, where our Peninsula Medical and Dental Schools are primarily located along with the Derriford Research Facility and Brain Research and Imaging Centre, adjacent to Plymouth Science Park and the University Hospitals Plymouth NHS Trust.

Since REF2014, the University has focused on **growing critical mass in our primary research areas as well as supporting emerging areas**. We are submitting 440.03 FTE independent researchers, a 29% increase over REF2014, and 59% of all our academic staff are research active. By consolidating our structures into three Faculties we have supported growth around cognate disciplines and achieved a balanced representation in our submission: FoSE – 187.4 FTE; FoAHB – 134.9FTE; and FoH – 117.7 FTE. We are pleased to be able to submit to *UoA18* for the first time.

Plymouth has the highest proportion of manufacturing employment of any city in the south of England, and an economy dominated by SMEs across a diverse range of sectors. Reflecting this, the University focuses on supporting businesses to innovate and grow and attracting inward investment by facilitating industry access to its world class facilities and expertise. The University was **ranked 12th of UK HEIs in 2018-19 for SME income** from the use of its facilities.

The South West region has an ageing population a decade ahead of the national demographic trend, bringing challenges around health, social care, and the provision of services across a large rural geography – all issues that the University's Centre for Health Technology has been established to address. The University's commitment to the health and wellbeing of local communities is highlighted in its public benefit activity with sector-leading initiatives, including the Law Clinic and Peninsula Dental Social Enterprise.

The University constantly reviews and refreshes its academic and support structures to enhance existing research excellence and nurture emerging strengths with potential global reach. To this end, we have streamlined Faculty and School structures since 2016 when we operated with eight thematic and Faculty-based institutes. In 2020, we focused our strategic inter-disciplinary research institutes on our core areas of strength: marine, sustainability and health. Each engages researchers from across the institution, is supported through central funding, and reviewed annually against its four-year strategic plan.

The **Marine Institute** represents one of the broadest communities of marine and maritime expertise in the UK, across research, education and innovation. The Institute brings together traditional and long-standing strengths in coastal and ocean science and conservation, engineering and marine policy and socio-economic assessment with emerging areas around marine and maritime culture and history. Within Plymouth the Institute works closely with the Plymouth Marine Laboratory and the Marine Biological Association to capitalise on one of the

largest agglomerations of marine researchers in the world. An MoU, signed by the three organisations in 2021, seeks to extend and formalise this collaboration to deliver leading edge research and education, dedicated to the advancement of knowledge, technology and understanding of marine environments and economies for societal benefit.

The University is globally recognised for its work on aspects of sustainability and its **Sustainable Earth Institute** focuses on cutting-edge research and innovative approaches that build resilience to global challenges. It actively links diverse research areas across the University including science, engineering, arts, humanities, health, and business; for example, a novel alliance between earth scientists, sociologists and psychologists looking at public responses to geothermal power.

Our **Plymouth Institute of Health and Care Research** draws together the activities of three previous health research units as well as disciplines in engineering, business, law and the arts to promote collaborative relationships across the University with external partners in health and social care, civil society, and industry, nationally and internationally. The institute integrates basic and applied science, transcending barriers between professions and between health and social care.

2. Strategy

The **University's Research Strategy** is to embrace real-world challenges, to advance and translate knowledge, and to drive innovation and enterprise. We prioritise collaboration to complement our strengths across all four REF2021 main panels. Our strategy is to reinforce our position as a research-intensive university by sustaining our existing peaks of excellence in Health, Marine and Maritime Sciences, and Sustainability while growing a critical mass of research in emerging areas such as Agritechology, Antimicrobial resistance, Brain research, Creative economies, and Cybersecurity.

We engage with regional and national research priorities through Board membership of, and contributions to, the three LEPs in the South West and by fostering staff membership of UKRI and national policy committees and peer review colleges. Our **International Strategy** provides the principles by which we identify and select our overseas partners with complementary research strengths, for example, Ocean University China with whom we have a collaborative arrangement for jointly supervised PhD students to receive dual awards. In the European context, we are currently in discussion with University College Cork about the establishment of a partnership focused on our mutual research expertise.

As a proxy indicator of quality, we monitor KPIs annually around research awards, success rates, citations, and international collaboration. Through enhanced research mentoring, a targeted peer review process, and more effective use of data to inform Faculty research strategies, our annual grant capture has risen by 70% over the last two years and at the REF2021 submission date our live awards stand at £55M. This represents a significant return on our strategy to raise ambitions, and is reflected in an increase in median award values and success rates with key funders.

Since the last REF, the University has had national and **international influence on marine policy and legislation** and has been invited to become a tier one member of MarRI-UK. In 2019, we received a Queens Anniversary Higher Education prize (our third) for research and contribution to policy on microplastics. There has also been recognition for individual members of staff including Richard Thompson (OBE in 2018 and FRS in 2020) (*UoA7*) and Deborah Greaves (OBE in 2019 and FREng in 2020) (*UoA12*). The reputation of our early career staff has also been nationally identified with three (returned in *UoAs 4* and *7*) being awarded UKRI Future Leaders Fellowships in 2019/20.

Based on our **socio-economic impact survey**, published by Viewforth consulting in 2018, the University contributes >£900M of output to the UK economy and £474.5m in terms of GDP. An update report will be published in 21/22. University staff are committed to the institution's civic

responsibility not least through the embedding of research expertise. This strategy is exemplified by the establishment of our Law Clinic (described in *UoA18*) and Peninsula Dental Social Enterprise (described in *UoA3*). These award-winning community benefit activities provide vital services to people in Devon and Cornwall. Within Plymouth our *Centre for Health Technology Pop-Up* (*UoA13* lead), funded by a grant from UKRI in 2020, brings together researchers from nursing, computing, design, medicine, and engineering to create a digital and eHealth centre in Stonehouse (one of the most deprived communities in the country).

We work in partnership with Plymouth City Council (PCC) and are committed to collaboration in the capture of investment for the City and driving impact and economic recovery. Examples of success include the major refurbishment of the City museum and gallery The Box (with Arts Council support), the establishment of the first National Marine Park, and our ~£40M refurbishment of Intercity Place as a site for health education and research. The University and PCC jointly own the Plymouth Science Park. This accommodates a community of over 150 businesses focused on aspects of health, marine science, engineering and digital technologies thus providing direct interactions with the University's research, supporting spin-outs and graduate start-ups.

Our commitment to delivering real world impact is underpinned by use of HEIF allocation to support strategic knowledge exchange objectives in the key sectors of marine, health technology and the creative economy. HEIF also supports Proof of Concept funding where we have a clear road map for IP exploitation. During 2019-20, our healthy Spin Out portfolio, working in partnership with Frontier IP Group, received considerable financial investment including £1.5M from Innovate UK to support research on: antimicrobial resistance; novel vaccines; in situ water quality testing; innovative micro-inverter technology; and agricultural robotics. Each exemplifies our commitment to translating our research into real world applications to address global issues.

Our **Impact Strategy** capitalises on the natural connections of staff and supports them to extend and build these to develop long-term strategic collaborations with regional, national or international organisations and communities. GCRF funding has been particularly effective to develop and sustain impactful overseas programmes such as: our Jali Ardhi project (*UoA14* lead), focused on soil erosion and its consequences on food, water and energy security in Tanzania; and the Kupuma Lung Health project (*UoA3* lead), examining damage associated with smoke inhalation in Uganda. Both projects have been shortlisted for a 2020 Green Gown award in the Research with Impact category.

Our strategy seeks to increase the percentage of staff undertaking impactful research, grow our postgraduate and postdoctoral communities, and double our grant income over the next five years. We will focus recruitment in high performing areas and further optimise the reach of our research and knowledge exchange through the establishment of strategic international partnerships.

The University prioritises the value of impact as a research activity and this is formally identified in workload allocations, annual professional development reviews, and promotion processes. **Showcasing impact** is an essential part of building a strong research culture and this occurs through activities such as an annual London showcase, a regional Research Festival, and the ESRC Festival of Social Science. Public engagement with research (PE) is at the heart of our mission to deliver positive economic and societal outcomes, while our Arts Institute acts as a cultural umbrella organisation for the University through its year-round PE programme. Short films on each of our impact case studies will act as legacy outputs and staff development support. Available on the University's website following REF submission these will illustrate how our research benefits individuals, communities, businesses, and other stakeholders.

The University has both an **Open Access policy** and a **Research Data policy**. These are underpinned by interoperable systems, including Symplectic Elements CRIS and a DSpace repository known locally as PEARL, deployed to manage and publish outputs in pursuit of an open research culture. Supporting the integration of policies and system use is a suite of online guidance that maps on to the Vitae Researcher Development Framework. Dedicated Information

Specialists provide discipline-specific advice on a broad spectrum of open research matters, including funder policies, open data, open author profiles and open licensing. Initiatives to consolidate author profiles in SCOPUS and Web of Science, and active engagement with the University Open Access Policy, has grown the self-deposit of open research in the University repository by nearly 400% from 2016 to 2019. PEARL now indexes 4,360 full-text journal articles and conference papers, all publicly accessible, and realised 182,000 downloads during the 2018-19 academic year, a 60% increase on 2017-18. PhD students also deposit their theses in PEARL, and are directed to take the path of open scholarship. In addition, as part of the wider open research environment, all PhD students are required to complete a research data management plan and attend training on open and ethical data management.

UKRI block APC funding supports gold open access publication where appropriate, and the University's Library is preparing for the implementation of Plan S and 'read and publish' agreements. The University is committed to assessment of work on its own merits and not its publication outlet and is aligned with the principles set out in the San Francisco Declaration on Research Assessment (DORA).

The University is committed to maintaining and promoting the highest standards of integrity and probity in its research. An established set of fundamental principles are detailed in its policies to ensure good practice, the integrity of research involving human participants, human tissue, as well as non-human live organisms, and general principles of data confidentiality and access. The University is a signatory to the **UUK Concordat to Support Research Integrity**.

3. People

Our **Staffing and Development Strategy**, led by the Human Resources Directorate in partnership with Faculties, is focused on sustaining critical mass, strengthening the research culture in emerging areas, and providing a collaborative and nurturing research community of the highest quality. We have clear institutional principles relating to workload for 'local' allocation, an institutional sabbatical policy, and an annual Performance Development Review process that enables staff to discuss their research plans with their line managers and evaluate how these can be supported.

The University of Plymouth first achieved the **HR Excellence in Research Award** in 2011, and has successfully renewed this every two years. This is mapped against the **Concordat to Support the Development of Researchers** to ensure that our processes, policies and practice are aligned with best practice. Our Action Plan for the delivery of the Concordat has been informed by participation in the Careers in Research Online Survey. The University's Researcher Forum enables staff to connect and influence policy and practice.

The University has designed a comprehensive and demand-led **Researcher Development and Support Programme** which is open to research staff and students and has been developed in line with the Vitae Researcher Development Framework. Over 2,000 training places are filled each academic year on a voluntary basis. The sessions are complemented by diverse and experienced facilitators and trainers from Plymouth's academic and professional services staff. Much of the Programme has a focus on New and Early Career Researchers, as well as those returning to work after career breaks.

We have recently developed a **Research leadership programme**, which was originally devised and championed by staff submitted to UoA28. It was rolled out across the institution in the summer of 2018 and to-date has been delivered to approximately 50 staff by the external providers Barefoot Training. This year-long programme consists of an intensive three-day summer course, followed by four half-day workshops, and a series of one-to-one phone meetings with the instructors. The University recognises the importance of equipping its staff with the skills and expertise to create and support an inspiring research culture for the future.

Our submission to REF2021 includes 988 PGR completions; an increase of 91% compared with our REF2014 return. The administration and development of PGRs across the University is

supported by the **Doctoral College** which oversees admissions, progression, completions and the research student experience, including their wellbeing. It facilitates mandatory training for supervisors, examiners and chairs, as well as comprehensive support and skills development for research students. It ensures that PGR supervisors have the appropriate skills and competencies to provide excellent supervisory practice from recruitment through to completion. It engages through interactive sessions that create opportunities to discuss the expectations and experiences of supervisors and students, and the issues frequently encountered during the supervisory process.

The University is committed to **Equality, Diversity and Inclusion (EDI)** and our Equality Scheme upholds equality of opportunity, elimination of unlawful discrimination, and the fostering of good relations. The achievement of these goals is mapped annually and reported in an Equality Report, which is published alongside the Gender Pay Gap Report, in March of each year. Our central EDI team work with the University's EDI Committee, the University Executive Group, the University of Plymouth Students' Union and the Board of Governors to monitor the Equality Scheme and implement specific researcher-focused initiatives.

We hold an **Institutional Bronze Athena SWAN** award, and all 14 Schools within the University are on track to have Bronze or Silver awards by 2022. Our Athena SWAN work has particularly enabled us to focus efforts on improved gender equity across the institution with the percentage of women in professorial roles increasing by 50% between 2015 (18%) and 2021 (27%). Furthermore in both 2019 and 2020 the University promoted more females than males both in absolute numbers and as a relative percentage of the academic staff population.

We submit to the **Stonewall Workplace Equality Index** annually, and are committed to signing up to the **Race Equality Charter** by September 2021. These awards recognize our commitment to LGBT+ and race equality within the HE sector. We are currently on track to be recognized as a University of Sanctuary by ensuring barriers are removed for refugees and asylum seekers in accessing higher education. All staff (including those involved in recruitment) are required to complete mandatory Unconscious Bias and Diversity in the workplace training and line managers are required to complete a six-module management essentials course which highlights EDI.

The University has a flexible approach to working hours and this is promoted positively for staff to work around personal commitments such as childcare. Most staff are also able to request remote working on an *ad hoc* basis depending on their role. Line managers are encouraged to discuss flexible working with their teams and all job advertisements include information on flexible working.

The University set up a Steering Group to compile and implement our **REF2021 Code of Practice**. In addition to the monitoring and advice given by the Steering Group, the EDI Team has also completed a REF data Equality Analysis to ensure that the institution is fulfilling its responsibilities in respect of promoting EDI, complying with legislation, and avoiding discrimination. Our submission comprises 60% of staff who identified as men and 40% as women. A REF readiness exercise has been undertaken annually since 2016, ensuring the Equality Analysis is based on evidence and data, and genuinely reflects how the institution has diagnosed and addressed any impacts that policy or practice may have on equality.

The REF readiness exercise has also enabled the submission process to recognise that the status of being an independent researcher may change over time. Indeed a number of staff have been identified as working towards independence and they have been supported to achieve this status within the timescale of the REF 2021 period so that they can be included within our submission.

4. Income, infrastructure and facilities

The **Research and Innovation Directorate** (71 FTE) supports and underpins the institution's research culture and its strategic priorities. Its staff work within three specialist teams:

The **Research and Commercialisation Office** helps staff secure income to support their research. It also assists with the commercialisation of their activities and ensures the protection and exploitation of Intellectual Property through licensing or the establishment of commercial spin out companies. The University has seen considerable success in securing investment in its spin out portfolio, supported by a ten-year partnership with Frontier IP Group Ltd, and over the last four years five of the University spin outs have won Innovate UK funding. The identification of potential spin outs is mediated through a Faculty process and further support is provided through the University of Plymouth Enterprise Limited (UoPEL) our commercial consultancy and contract subsidiary.

Translation of research is underpinned by the **Research Impact and Partnerships Office (RIPO)**, which brokers strategic relationships with business organisations, public sector and community agencies. A sectoral approach ensures that research and knowledge exchange activities align with economic strategy and government priorities. For instance, reflecting the importance of the creative and cultural sector to Plymouth and wider region, the University has developed a bespoke knowledge exchange offer, The Bridge, which is playing a leading role in the development and delivery of the South West Creative Technology Network – a £6.5 million collaborative project, supported by Research England, designed to drive the growth of the regional creative economy. RIPO has also been instrumental in developing the concept of the Plymouth Health Innovation Alliance, a partnership between researchers, private and public sectors, aimed at maximising collaborative R&D and driving the growth of the health tech sector.

The **Research Strategy and Governance** community supports the University and its researchers to fulfil the legal, ethical (including sponsoring studies) and regulatory obligations associated with their activities. This supportive environment allows researchers to work in an efficient and effective way and understand the value and impact of their work to funders and the wider community.

Enabling infrastructure and facilities

Over the past eight years, the University has invested circa £150m in a portfolio of assets that underpin its research and the delivery of impact. Key institutional developments include:

The House (opened 2014) provides world class facilities for experiential research in the performing arts as described in our submission to *UoA33*.

The **Derriford Research Facility** (opened 2018) is a significant institutional commitment (circa £17m) to develop our medical research capabilities described in submissions to *UoA1* and *UoA3*. It has a focus on the development of new therapeutics, diagnostics, interventions and approaches to prevent, diagnose and treat devastating diseases, enhance patient outcomes and improve global healthcare. The facility hosts the University's internationally renowned Brain Tumour Research Centre of Excellence undertaking research into low grade brain tumours.

The Brain Research & Imaging Centre (opening 2021 particularly to support *UoA4* research) will be the most advanced multi-modal brain imaging facility in the South West. Boasting a 3-Tesla MRI scanner, it will enable scientists to undertake more complex forms of research as well as providing improved radiological diagnostics and better patient care for the University Hospitals Plymouth NHS Trust. The facility builds on the strong partnership with the NHS Trust and DDRC Healthcare and is central to our wider aim of delivering rapid improvements to health and wellbeing in the region and beyond.

Housed in the Marine Building, the **COAST (Coastal, Ocean And Sediment Transport) laboratory** (COASTLab) is a unique national research and commercial facility. Led from *UoA12* and also utilised by researchers submitted to *UoA7* and *UoA10* it offers physical model testing at scales appropriate for device testing, array testing, environmental modelling and coastal engineering. It has combined wave, current and wind capabilities, the latter further enhanced by a £1m EPSRC equipment grant in 2020. The two main basins (Ocean Basin and Coast Basin) provide University researchers with links, including through EU-funded projects and UK leadership of the EPSRC Supergen Offshore Renewable Energy hub, to a world-leading network of testing

and research infrastructures with the aim of accelerating the development of offshore renewable energy technologies.

Also housed in the Marine Building, the **Cyber Ship Lab** was established in 2020, with funding from Research England and industrial sources, to build on the University's expertise in maritime cyber security as described in our return to *UoA11*. This £3m development combines leading multidisciplinary research and practical expertise from across the University to address complex and interlinked cyber-security issues. A key element of the project is its extensive collaboration with 18 commercial partners, including ship operators and constructors, as well as companies involved in the supply of hardware and software, and the training and management of personnel who work in the shipping industry globally.

The **Marine Station** is a landmark £4.65m development, opened in 2014, that serves as the base for our marine expeditionary work and our fleet of seven crewed, and one autonomous, research vessels with associated instrumentation. It is located on the shores of Plymouth Sound and supports our research across the breadth of marine biology, environmental science and engineering.

The University has amassed and invested in a range of underpinning core research infrastructure since REF2014, with application across many disciplines, but all with a focus on national and international collaborations. These provide the University research community and partner organisations with instrumentation and expertise that adds to, and improves, research output. These include:

The **Peninsula Clinical Trials Unit (PenCTU)**: a fully registered CTU with expertise in designing, developing, supporting and co-ordinating high quality multi-centred clinical trials that directly influence clinical and healthcare practice. It is led by colleagues returned into *UoA1* and *UoA3*.

Plymouth Electron Microscopy Centre: a multi-user facility with a suite of light microscopes, electron microscopes, imaging processing and analysis software used across a range of disciplines, and by external research organisations and commercial clients. Through successful applications to the European Research Development Fund, the University has been able to introduce cutting-edge capabilities including a Focused Ion Beam SEM which brings 3D capability to support new industrial research collaborations across sectors such as engineering, advanced manufacturing, photonics, geology, and microelectronics.

High Performance Computing Centre: led from *UoA10* and utilised particularly by researchers submitted to *UoA7* and *UoA12* the centre enables supercomputer-based research and provides a platform for nine research groups with expertise in a range of areas.

Consolidated Radio-isotope Facility (CORIF): the ISO-certified facility is a dedicated laboratory for the manipulation and analysis of natural and enhanced radioactive materials and applications of radioactivity in material analysis and has particularly supported the outputs of *UoA6*, *UoA7* and *UoA14*. CORIF offers a wide range of ISO-certified research and consultancy services to external academics, public and private sector clients on a global stage. It has a licence to hold and dispose of alpha, beta and gamma radionuclides, which are used to support many applications in research and consultancy.

Wolfson Nanomaterials Lab: a clean room enabled laboratory for leading-edge research in nano-spintronics, computer memory and data storage technology, nano-functional materials and biosensors. The lab has a wide range of applications in sectors such as communications, defence, aerospace, security and photonic surgery to medical and analytical instrumentation.

Digital Fabrication Lab: opened in 2020, the laboratory supports discipline-spanning research in architecture, design and engineering. It hosts technology for additive manufacturing, laser cutting and scanning, Computer Numerical Control milling and robotics, and plays a key role in teaching and employability projects, research and commercial engagement.

Institutional level environment template (REF5a)

A state of the art **Full Dome Immersive Vision Theatre** for experimental research into VR, AR and XR, a **Public Facing Gallery** for curatorial and arts research projects, and a **Cinema** equipped with matched 35mm, 16mm and digital projection for audio-visual research and public engagement.

The University deploys an annual Strategic Investment Fund (£3m in 2019/20) to enable staff to bid for new or upgraded facilities. Such institutional investment, alongside the annual HE Research Capital allocation, provides a strategic resource overseen by the University's Capital Projects Committee to ensure that established or emerging research areas have access to state-of-the-art facilities. The University also supports strategically the attraction of senior researchers to support leading areas (7 appointments in 2019/20).