

**Institution: University of Hertfordshire****1. Context and mission**

The University of Hertfordshire was established in 1992, building on the legacy of Hatfield Polytechnic. It is a member of the University Alliance group. 24,500 students are taught on two closely connected campuses: over half are female, c.60% come from BAME backgrounds, many are the first members of their family to enter higher education. The University is the only HEI in the county, and acts as an anchor institution for the region.

The 2015-2020 strategic vision was to become internationally renowned as the UK's leading business facing university. This emphasised research and innovation activity that supported business development, regional collaboration and community engagement, underpinned by investment into centres of research excellence and enhancing an inclusive environment that nurtures future researchers.

Outcomes include:

- Ranked 4<sup>th</sup> for institutional research culture and 21<sup>st</sup> overall in the 2019 UK Postgraduate Research Student Experience Survey (PRES)
- 46% increase in average annual number of doctoral awards over REF2014
- 15% increase in average annual research income over REF2014
- £13.0M NIHR funding awarded during REF cycle
- £61.2M new Science Building opened 2016
- Winner, STEM Research Project of the Year, *THE Awards* 2018

The University has 13 designated Centres for Research, each with a Director and dedicated research delivery plan. A further 24 Research Groups are located within 8 academic Schools. QR funding is distributed via the Schools in accordance with previous REF performance. Six cross-cutting Research Themes facilitate interdisciplinary research: Food; Global Economy; Health and Wellbeing; Heritage, Cultures and Communities; Information and Security; Space. Research is overseen by the Pro Vice-Chancellor (Research and Enterprise) (PVC (R&E)).

Twelve units of assessment have been submitted to REF2021, as to REF2014, reflecting the institution's policy of concentrating research into sustainable Units. There is a rough balance across all four Main Panels (A3, A4, A6, B9, B11, B12, C17, C23, D27, D28, D30, D32). The only changes are that Education research will be submitted to REF2021 (as it was in RAE 2008); and the sustainability of Music research (submitted separately in 2014) has been secured through incorporation into D32 Art and Design, enhancing this Unit's vitality. In 2014 separate submissions were made to the Allied Health sub-panel in Nursing and Pharmacy and Pharmacology. A single Unit of 75.91 FTE, the largest in the University, will be submitted to REF2021, the result of greater integration and interdisciplinarity facilitated through the Health and Wellbeing Research Theme.

The submission contains 346 individuals (321.09 FTE) identified as having significant responsibility for self-directed research ( $\geq 0.2$  FTE of workload allocation per FTE) under the University's Code of Practice. This 67.5% increase from 2014 reflects the University's success in nurturing a research-rich environment. The submission is 42.2% female, 22.4% non-white, and 4.6% have a declared disability.

**2. Strategy****Research Strategy**

In 2015, a major review of the University's research structures resulted in the introduction of the six global challenge focused Research Themes: Food; Global Economy; Health and Wellbeing;

Heritage, Cultures and Communities; Information and Security; Space. Champions nurture interdisciplinary research addressing these Themes across the University.

The University's 2015-2020 strategic vision for research was to excel in collaborative, multidisciplinary research that addresses social, economic, cultural, scientific and environmental challenges. This was facilitated through three main strategic objectives:

- Supporting a research-rich environment
- Fostering and strengthening research with global partners
- Creating and developing innovative ideas, products and processes

Enabling policies were introduced to achieve each of these objectives.

#### **Supporting a research-rich environment:**

1. *Operationalisation of Research Themes.* Theme Champions produce operational plans for their own Themes and coordinate joint activities to enhance and develop inter- and multi-disciplinary research. These include networking activities, workshops addressing specific funding opportunities and an annual presentation of theme activity to the research community.
2. *Incorporation of Research Themes into Resource Allocation.* Delivery plans for Centres for Research and Units of Assessment were revised to address the Themes. University resources (including QR funding) were allocated against these plans which are subject to annual review.
3. *Recruitment of ECRs to support Research Themes.* 24 centrally funded Early Career Research Fellowships were awarded to projects aligned to the Research Themes through internal competitions. Fellows were recruited in 2016 and 2017.
4. *Cross-Disciplinary Research Centres.* Four new University approved interdisciplinary Centres for Research were established in the REF cycle. The Centre for Data Innovation Research and Centre for Research in Biodetection Technologies support the Information and Security and Space Research Themes. The Centre for Psychology and Sports Science Research contributes to the Health and Wellbeing Theme and the Centre for Agriculture, Food and Environmental Management Research primarily addresses the Food Theme.

#### **Fostering and strengthening research with global partners:**

1. *Institutional Research Partnerships.* The PVC (R&E) led the development of institutional research partnerships with HEIs across the Asia-Pacific region. Memoranda of Understanding have been signed with Fiji National University, International University of Vietnam National University, Ho Chi Minh City University of Technology and Education and the Multimedia University, Malaysia with a further MoU agreed with Universiti Putra Malaysia.
2. *International Dual Awards.* A doctoral dual award scheme was established with Western Sydney University in 2017. The first 2 recruits in Agriculture are in the final stage of their doctorates, and 4 new students are being recruited in Computer Science.
3. *International Research Programmes.* Research Theme Champions nurture collaborations through the links established by the PVC (R&E). A three-year programme of research conducted by the Centre for Research in Public Health and Community Care and the Faculty of Health Sciences of the University of Technology Sydney, was facilitated through the Health and Wellbeing Theme.
4. *International Funding Opportunities.* The University promotes international research using internal seed corn grants to facilitate initial collaboration. The Research Grants team identify and support applications to international funding schemes: for example, the Newton Fund has supported collaborations with institutions in Colombia, Egypt, India and Thailand.

#### **Creating and developing innovative ideas, products and processes:**

1. *Innovation.* A stand-alone Innovation team was established within the University's Enterprise and Business Development activity supporting the translation of research into innovation and Knowledge Exchange activities. It supports KTPs, oversees KE funding schemes and awards Proof of Concept grants to academics.

2. *Impact*. The Impact team within the Research Office was expanded to enable an Impact Facilitator to support researchers in each of the main panel areas. Competitive grants of £5k are awarded to researchers to develop pathways to impact. The Policy@Herts initiative supported the production of policy briefings and promoted linkages with relevant bodies.

### **Addressing Regional and National Research Priorities**

The introduction of Themes enabled the University to become more agile at aligning its research towards addressing the Foundations of Productivity and Grand Challenges identified in the UK Industrial Strategy.

### **Foundations of Productivity**

The role of the University as an anchor institution for improving productivity within the region is explicitly acknowledged in the Local Industrial Strategy produced by the Hertfordshire LEP. This is reflected in two major strategic initiatives funded through a combination of HEIF, QR and external income.

1. **Hertfordshire Science Partnership:** the Hertfordshire Science Partnership (HSP), launched in 2018, is a £6M collaboration between the University and the LEP supported by UK and EU funding. HSP leverages the University's research facilities and expertise to boost the region's leading role within the UK's agri-technology and life sciences sector. It is particularly targeted at SMEs and developing a new generation of research scientists benefitting both the county and the country. The Partnership is delivered through three elements:
  - i) *Hertfordshire Knowledge Exchange Partnerships (HKEPs)*. An Industrial PhD schedule was introduced under which researchers undertake a one-year industrial placement during which they develop a PhD project that can deliver the fundamental research necessary to attract later stage commercial translational funding for the host company. By July 2020 15 HKEPs had been established in Units of Assessment 3, 4, 6 and 11.
  - ii) *Therapy Accelerator*. £700k awarded to three projects involving collaboration with University researchers to accelerate new therapeutic developments in pancreatic cancer, multiple sclerosis, and asthma and lung disease, using the facilities of the Stevenage Bioscience Catalyst.
  - iii) *Research Hotel and Science Concierge Service*. Companies can hire research facilities or commission the University to undertake short-term research and development projects.
2. **UH Heritage Hub:** Place is identified as a crucial component of productivity within the Industrial Strategy. The Heritage Hub, located within the *Heritage, Cultures and Communities* Research Theme, facilitates place-making within Hertfordshire's diverse and transient populations. It pools the heritage expertise of staff across the University to support external collaborations with public, private, and third sector bodies. Its match-funding scheme supports relationships with community partners, utilising research co-production to generate new knowledge and methodological innovations.

The Heritage Hub hosted the *Everyday Lives in War Centre* (ELIWC), an AHRC funded Co-ordinating Centre for Community Research and Engagement to Commemorate the Centenary of the First World War. ELIWC was awarded over £1.25M external funding between 2014 and 2019. It worked with over 200 community groups and heritage organisations across the UK, created partnerships with researchers based in 15 UK HEIs, and developed collaborations with German and Irish partners.

Productivity is the focus of much research conducted within the *Global Economy* Research Theme. University researchers received circa £800k from European sources to investigate new work practices and structures created by the digital revolution, establishing collaborations across 31 states.

**Grand Challenges**

1. **Ageing Society:** The *Health and Wellbeing Research Theme* includes significant multi-disciplinary work on ageing societies. The Centre for Research into Public Health and Community Care has been awarded over £6.5M for work in this field. Projects include DACHA – Developing research resources and minimum dataset for Care Homes Adoption and Use £2.3M.
2. **Artificial Intelligence and the Data Economy:** The *Information and Security Research Theme* facilitates research into new technologies. The Centre of Data Innovation Research, established in 2019, combines expertise in statistics, image analysis, machine learning and computational neuroscience to pioneer innovative data science techniques and translate these into applications for medicine, defence and agri-technology. The Centre for Computer Science and Informatics Research manages the Robot House 2.0 which received £577k ESPRC funding in 2017 to be developed into a national infrastructure resource.
3. **Clean Growth:** The *Food Research Theme* facilitates international interdisciplinary research into environmental protection and food security through the Centre for Agriculture, Food and Environmental Management Research. New crop pest and disease control strategies research is undertaken with partners in China, India and Egypt, supported by BBSRC, ADHB and the Newton Fund. Three open access agricultural-substance databases (pesticides, biopesticides and veterinary substances) developed at the University receive c.5000+ hits daily.
4. **Climate Change:** Within the *Space Research Theme*, the Centre for Atmospheric and Climate Physics Research focuses on the detection and modelling of air pollution levels, while image analysis algorithms developed by the Centre for Astrophysics Research are used to assess climate damage within both agricultural and coastal landscapes. The Centre for Engineering Research carries out research into smart wind energy systems, ultra-efficient engines, electric and hybrid vehicles; as well as optical, wireless and satellite communications.

**Research Accessibility, Integrity and Engagement**

The Research and Scholarly Communications (RSC) team was established in 2016 to manage infrastructure for the dissemination of University research through a research information system and repository (UHRA). UHRA holds 11,000 full text, open outputs. RSC also provides training and guidance and uses Gold Open Access (OA) funding and research intelligence reporting to help authors maximise the reach and impact of their work. University OA policy mandates Green OA and a 97% REF OA policy compliant submission has been achieved.

The University is a signatory to the Concordat to Support Research Integrity and a full member of the UK Research Integrity Office. The Director of the Doctoral College has oversight of research integrity issues and is the point of contact for whistleblowing. The Ethics Committee must approve studies involving human participants before research commences. The Animal Welfare and Ethical Review Body ensures animal research is scientifically and ethically justified and complies with the Concordat on Openness in Animal Research. The Clinical Trials Support Network has developed standard operating procedures for staff and students conducting clinical trials. The University is a Department of Health approved 'recognised sponsor' of research with the PVC (R&E) as signatory.

The University is a member of the National Co-ordinating Centre for Public Engagement and signatory of its Manifesto for Public Engagement. UH Arts, which manages the University's public exhibition and performance spaces, devotes 33% of programming to work by University staff. Café Scientifique, a monthly programme of off-campus, science and technology talks was established in 2017. The Bayfordbury Astronomical Observatory's extensive outreach programme is complemented by Cosmodrome, the UK's largest mobile planetarium, delivered in 2017, incorporating disabled access. The Centre for STEM Education delivers CPD programmes for educators drawing on University research.

**Future Research Strategy 2020-2025**

The University's strategic vision is to carry out research that powers potential and transforms lives by:

1. **Developing a multidisciplinary whole community research-rich culture that fosters intellectual curiosity:** Research Themes will be flexibly aligned with emerging regional, national and global research priorities. Two new University research centres will be established. *The Centre for Climate Change Research* unites interdisciplinary research into causes, effects and mitigation actions, spanning the Food, Global Economy and Space Research Themes. *The Centre for Future Societies Research* will bring together work within the Information and Security, Heritage, Culture and Communities and Health and Wellbeing themes and underpin participation in the forthcoming University Alliance Doctoral Training Alliance programme.
2. **Developing sustainable global partnerships that address societal and industrial priorities and grow our global research profile:** The PVC (R&E) is already developing new partnerships with the Universities of Sydney and Murdoch, Australia; the University of the South Pacific, Fiji, the Universiti Teknologi MARA, Malaysia and the Industrial University of Ho Chi Minh City, Vietnam. A formal innovation partnership with TWI Hellas, based in Athens, has also been established to improve opportunities to engage in future EU programmes.
3. **Championing a community of learning, thought and knowledge:** Research student recruitment will be increased without compromising the outstanding environment recognised in the PRES results. There has already been a 10.5% increase in numbers enrolled between 31 July and 1 December 2020. Supervisory capacity will be expanded with all staff with significant responsibility for research appointed to at least two supervision teams.
4. **Developing a diverse community of research engaged staff, students and innovators:** A full equalities audit of the REF 2021 staff submission will identify areas for further improvement. All staff will be required to engage in one equality training opportunity per year. Studentships for researchers from BAME backgrounds will be established in Units with significant under-representation of minority communities.
5. **Encouraging research outcomes that are impactful, accessible and widely communicated:** The £12M Enterprise Hub building and £1.1M University Enterprise Zone will enable businesses to benefit from access to the University's research and innovation facilities. Open access repositories will accommodate all output types including open data. School and Unit engagement activities will be complemented by University initiatives such as the Hertfordshire Festival of Ideas and the Powered by Herts podcasts.

**3. People**

People formed the core element in the University's 2015-2020 Strategic Plan. Its objective was to develop world class leaders in education, research, business and the professions by attracting and developing outstanding people, recognising and rewarding excellence, sustaining a culture of respect, engagement and integrity, strengthening diversity and investing in people's health and wellbeing. This was delivered at institutional level through University Policies and Regulations that address *inter alia* flexible and remote working, caring responsibilities, maternity, paternity and adoption leave, part-time and fixed-term careers, bullying and harassment, equality, diversity and inclusivity, and staff wellbeing.

**REF Submission**

1115 (936.7 FTE) academic staff and 135 (119.8 FTE) research staff were employed at the University on 31 July 2020. The standard Teaching and Research contract includes a research and scholarly activity allocation of 22 working days per annum. Job descriptions specify different divisions between learning and teaching, enterprise, and research activities.

346 (321.09 FTE) members of academic and research staff were identified as possessing significant responsibility for research or are independent researchers as defined by the

University's approved REF2021 Code of Practice. In the former case these a) receive a workload allocation for research of at least 0.2 FTE or 20% pro-rata; b) engage in independent research; and c) research is a job expectation. No formal appeals were lodged by staff against exclusion/inclusion.

This 67.5% FTE increase from the REF2014 submission, compared to a sector increase of 43%, underscores the University's commitment to developing a research-rich culture capable of nurturing individuals new, or returning, to research.

### **Staffing Strategy**

140 of the 346 individuals submitted to REF2021 were recruited during this research cycle, 40% of the total. 38% of the new recruits were Early Career Researchers compared with 22% of the total submission. 31% identify as non-white, compared to 24% of the whole submission. These figures reflect the institution's commitment to ensuring sustainability and diversity amongst its research community.

24 centrally funded ECR Fellowships with 0.8 FTE research allocation were appointed to support the new Research Themes. Recruitment is primarily carried out through Schools, with the PVC (R&E) normally chairing all appointments to Professorships based on research.

In 2017 academic promotion procedures were revised. A new title of Associate Professor was introduced, paralleling Reader. Candidates apply for Associate or Full Professorships based on contributions to teaching and learning, enterprise and entrepreneurship, or research. Indicative criteria are published for each of these strands. Staff workshops are organised during the annual promotions round, with special sessions targeting potential BAME and women applicants. All promotion and appointment panels must include at least one woman.

The University has 280 technical staff and was a founding signatory of the Technician Commitment in 2017. Actions from the first Technician Commitment plan have been satisfactorily completed including the introduction of an apprentice Technical Officer career route.

### **Staff Development**

The University has held the Vitae HR Excellence in Research Award since 2010, passing its most recent review in 2020. This recognises the institution's commitment to implementing the Concordat to Support the Career Development of Researchers. The Researcher Development Group, comprised of ECR representatives from each of the Schools, HR and research support representatives, is responsible for delivering the Concordat. Instruments include Skill Up! – a researcher led development scheme meeting requests for bespoke needs-based funding, and a biennial Researcher Development Conference. The University's CROS (Careers in Research Online Survey) results show an increase in staff 'being encouraged to engage in personal career development' from 64% in 2015 to 76% in 2019.

All staff participate in annual appraisals at which they discuss their personal research plan. Support packages are put in place for those wishing to embark on, or return to, research, by undertaking doctoral studies. Study leave is normally granted for up to 5 working days a year with provision for the negotiation of extended leave. Sabbatical schemes are operated by the Schools.

All staff are entitled to enrol on the 100+ training sessions offered under the Researcher Development Programme, designed for staff and students, which are structured to cover the four domains identified in the Researcher Development Framework.

**Research Students**

There were 641 Post-Graduate Research students enrolled in the University Doctoral College on 31 July 2020, a 9.5% increase since July 2013. There were 516 successes within the REF cycle, an average of 73.7 doctoral awards a year, an increase of 45.6% from REF2014.

The University participates biennially in the Postgraduate Research Experience Survey (PRES). In 2019 the response rate was 62%. Rankings achieved across the eight categories are shown below.

University of Hertfordshire position in the PRES 2019 Global Rankings from 103 HEIs			
Overall satisfaction	21 <sup>st</sup>	Progression	12 <sup>th</sup>
Research culture	4 <sup>th</sup>	Development	13 <sup>th</sup>
Responsibilities	7 <sup>th</sup>	Supervision	15 <sup>th</sup>
Research Skills	11 <sup>th</sup>	Resources	41 <sup>st</sup>

The last QAA HE Review in late 2015 cited the University Doctoral College for good practice in nurturing ‘a strong cohort identity ... within a stimulating and supportive research environment’.

Doctoral studies are offered in a wide range of subject areas, including 11 Professional Doctorates. The University is a member of the University Alliance Doctoral Training Alliance (DTA) the largest multi-partner initiative of its kind: it participates in the Applied Biosciences for Health and Energy DTAs. It is also a member of the EPSRC Centre for Doctoral Training in Aerosol Science.

The Doctoral College oversees quality assurance and coordinates research training. Each student is provided with a bespoke plan, established at Registration, that considers their field of study, personal development and future employability. They have full access to the Research Development Programme aligned to the Researcher Development Framework as described above.

Every student is supported to attend at least one external international scientific conference during their studies. Students present their research at internal, multidisciplinary, events organised by the Doctoral College, and participate in networking and social opportunities.

Supervision teams comprise two or more supervisors, with a successful record of a minimum of two successful doctoral awards between them. The Doctoral College approves the appointment of the supervision team and oversees formal annual monitoring of students’ progress managing the student journey through a dedicated on-line system, RSMS, which records all supervision meetings. Training and professional development activities for research supervisors underpin the University’s Code of Good Supervision Practice.

**Equality and Diversity**

At 24%, the proportion of non-white staff within the University submission is well over twice the 10.4% among all academics in the HEI sector (source: Advance HE, 2020). The proportion of women professors, 33.3%, is significantly higher than the 26.7% sector average, and is likely to rise further as 47.2% of current Readers are women.

% submission self-identifying as:	UH REF 2021 Submission (Professors)	UH REF 2014 Submission
Women	42.2 (33.3)	34.9
Non-White	24 (12.5)	24.7
Disability	4.6 (5.6)	n/a

In 2020 the mean gender pay gap across all University employees was 10.45% and the mean ethnicity pay gap was 15.2%. The University holds the Bronze Race Equality Charter Award and has signed up to the Disability Confident Scheme and Stonewall's Diversity Champions programme. It holds an institutional Athena Swan Bronze award, while two Schools hold Silver awards. CROS data demonstrated an increase in awareness of Athena-Swan from 51% in 2015 to 89% in 2019. Women's career aspirations are encouraged by the Network of Women+ Professors, and the Academic Women's Action Group.

The Equality Office coordinates EDI initiatives and training and has established EDI teams within every strategic business unit in the University. It supports independent staff networks addressing BAME, Carers, Disability and Wellbeing, LGBTQ+, Working Parents, Men's Health, and Menopause issues. Each network includes a senior champion from the University's Chief Executive's Group.

#### 4. Income, infrastructure and facilities

##### **Income**

The University generated over £70.7M of research income between August 2013 and July 2020 equating to an annual average of £10.1M, a 14.8% increase on that reported to REF2014. This reflected greater emphasis on capturing large, interdisciplinary grants, facilitated through the Research Themes.

##### *Sources of Research Income Aug 2013-July 2020 (£ Million)*

UK UKRI, Royal Society British Academy	UK Central + Local Govt, Health Authorities	UK National Institute Health Research	UK Other	EU Govt	EU other	Non-EU	Total
16.2	14.2	6.1	10.2	11.8	1.8	10.4	<b>70.7</b>

The three largest contributions by Unit of Assessment came from A3 Allied Health £23.5M, B9 Physics £12.8M, and B12 Engineering £11.6M. Both Allied Health and Engineering have increased their annual average income by over 100% from the 2014 submission.

The largest individual project award was £4,275,896 for GO-AHEAD: Guidance on All-Hazards Enhanced Action Decontamination from the United States Department of Health, Office of Acquisitions Management, Contracts and Grants.

The Research Grants team source and notify funding opportunities, cost bids, deliver training, and provide advice on individual proposals. Applications are submitted via the Research Information System (RIS), ensuring compliance with internal peer review and external demand



management requirements. The Health Research Methods Unit hosts the Research Design Service which advises on the preparation of health and social care grant applications to NIHR and other national programmes. It supported the READY trial – awarded £2.3M by NIHR in February 2020.

### **Infrastructure**

80% of the annual QR allocation is returned to Units of Assessment via their host Schools: distribution reflects performance in the last REF. Units produce a Research Delivery Plan at the start of the REF cycle, against which investment is made. This is monitored by the PVC (R&E) on an annual basis. 20% of QR is retained by the PVC (R&E) to support central research management functions and internal funding awards.

The Research Office is composed of teams supporting Research Grants, Research Impact, and Research Governance and Information. It administers annual competitions for small grant awards (typically up to £5k) to ECRs and for research impact development. It oversees Santander Universities UK awards which facilitate interdisciplinary and international collaborations. The PVC (R&E) allocates institutional GCRF QR funds to support seed corn collaborations and oversees the institutional QR Strategic Priorities Fund supporting policy-focused research activities.

The Research Impact team deliver education and training to researchers at all levels, including PGRs. Projects identified as having strategic potential are supported to develop pathways and evidence the impacts generated. The Research Office collaborates with the Marketing and Communications Office to facilitate researchers reaching a broad audience beyond academia. In 2014, the University became a partner in *The Conversation*, whose professionally curated research-based content can be republished by media outlets. As of 31 July 2020, 150 articles written by 88 University researchers had appeared on the site, garnering over 6 million reads.

The Innovation team located in Enterprise and Business Development offers post-award support in relation to the commercialisation of projects. It administers a Proof of Concept scheme to maximise the exploitable value of research with awards of up to £6k for projects that address the themes and Grand Challenges in the Industrial Strategy. The University is a member of KEEP+ – a regional scheme accessed through 6 HEIs funded through the European Regional Development Fund.

### **Facilities**

The £61.2M Science Building, opened in 2016 exemplifies how research needs are fully factored into major Estates developments. It brings the University's medical, pharmacy and pharmaceutical science facilities under one roof and includes state of the art resources for inhalation simulation pharmaceutical testing; cell culture research; bioanalytical mass spectrometry; and solid oral dosage production.

£2.4M was invested into equipping a secure, off campus, chemical weapons convention compliant facility for toxicological research, creating a globally unique facility for research and development of new protective equipment, detectors and decontamination systems for emergency responders and military personnel responding to CRBN incidents.

The University has invested £11.1M in research facilities and equipment from both University capital and revenue funds. £2.1M was invested into new and existing Engineering laboratory facilities, £1.2M into a bespoke laser laboratory for Lidar-based research in atmospheric physics, and £1.8M into a hardware upgrade to the University's High-Performance Computer.

Information resources including 50,575 journal titles (an 81% increase over 2013-14), c.200 databases, c.417,000 print stock and c.543,000 e-books can be accessed by researchers through the Library and Computing Services infrastructure.