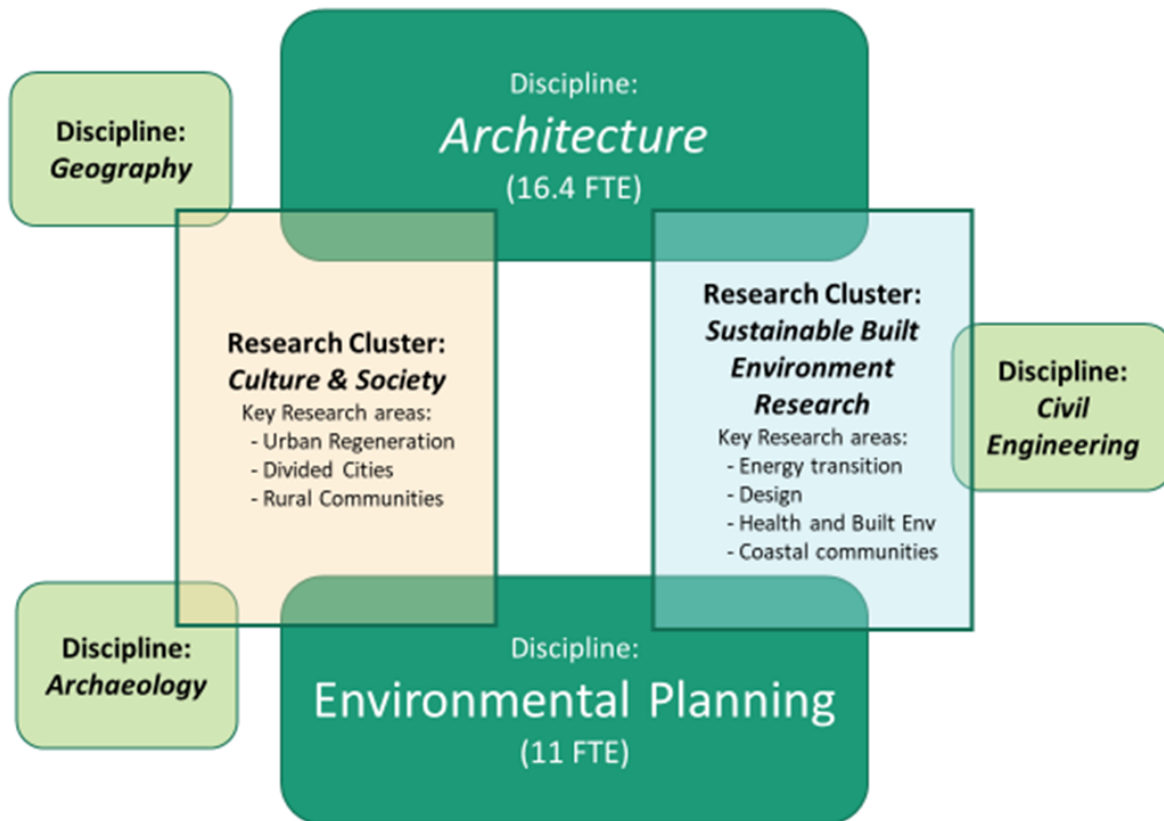


Institution: Queen's University, Belfast
Unit of Assessment: 13 - Architecture, Built Environment and Planning
<p>1. Unit context and structure, research and impact strategy</p> <p><u>Synopsis</u></p> <p>UoA13 at Queen's University Belfast (QUB) is widely recognised as a centre of expertise for architecture and planning for the island of Ireland, with a strong international outlook focused on generating and exchanging new knowledge on the built environment. Having laid a solid platform in its research capacity during REF2014, our strategy for REF2021 has allowed us to attain our key goals: recruiting a new cadre of internationally focused, research-active staff; nearly quadrupling PhD completions; increasing research income by 330%; and leading a series of major competitively-funded projects. By reorganising our structures and reforming the way we support staff, we have created a thriving and inclusive research environment resulting in higher quality outcomes and the reorientation of our research around our strengths of health and the built environment, urban culture, energy transition, good governance and sustainable communities. We have also enhanced our approach to impact, allowing us to create local and international-scale partnerships around policy and legislative advice, public engagement and Knowledge Transfer Partnerships (KTPs). This has created a vibrant and diverse community of researchers with a strong trajectory for the future, and with research now closely aligned to key societal challenges and funding programmes, its sustainability is underpinned by success in attracting, nurturing and rewarding research talent.</p> <p><u>1a. Organisational structure, size and context</u></p> <p>UoA13 consists of two complementary research disciplines (<i>Architecture and Environmental Planning</i>) and two associated Research Clusters (<i>Culture and Society</i> and <i>Sustainable Built Environment</i>), based in the School of the Natural and Built Environment (SNBE) alongside three other disciplines (Civil Engineering, Geography and Archaeology, returned in other UoAs). This provides a vibrant inter-disciplinary environment, spanning the cultural, economic, social, environmental, design, policy and engineering aspects of built environment research (Fig 1). UoA13 comprises of 28 permanent staff (27.4 FTE), 7 PDRAs, 41 registered PhD students and 8 Honorary Professors.</p> <p><i>Architecture (ARC)</i> has 17 research-active staff (16.4 FTE) specializing in areas such as design, architectural history, construction management and low carbon urbanism.</p> <p><i>Environmental Planning (EVP)</i> has 11 research-active staff (11 FTE) specializing in areas such as energy transition, urban regeneration, sustainable rural communities, urban health and marine planning.</p> <p>UoA13 has decreased slightly in size (down 4.3 FTE from 32 in REF2014) and has a staff profile that is now younger, more research-intensive and internationally-engaged (Section 2b). UoA13 benefited positively from the creation of SNBE in 2016, which was part of a wider QUB restructuring. This merged two previous schools (<i>School of Geography and Archaeology</i> and <i>School of Architecture, Planning and Civil Engineering</i>), helping overcome previous structural barriers to cross-disciplinary working. This led to the creation of inter-disciplinary Research Clusters in SNBE, which act as channels for institutional research support, promote collaboration, enhance impact, develop research capacity and facilitate links to wider university structures (Fig 1). The combination of Research Clusters, revised research strategy and changing staff profile, have facilitated a substantial leap in research attainment, consolidating our long-term aim of transitioning from practice-orientated research to attracting substantial competitive funding, publishing in high impact journals and contributing to global debates.</p>

Fig 1: Disciplines and Research Clusters in QUB School of Natural and Built Environment



The [Sustainable Built Environment](#) cluster brings together researchers from EVP (7 staff) and ARC (12 staff) with those from Civil Engineering (6 staff) to research the processes, interactions and technologies required to future-proof human settlements. This has facilitated initiatives that have explored innovative and resilient infrastructure, low-carbon communities and buildings, healthy urban planning, community engagement and sustainable governance. Successful projects emerging from the Cluster have examined the following issues:

- **Energy transition** (including [Architecture and the face of coal: mining and modern Britain](#) led by Boyd funded by Leverhulme Trust, [City-zen](#) led by Keeffe, funded by EU, [Catalyzing and Characterizing Transition](#) led by Ellis, funded by Ireland's EPA, [LiftWEC](#) funded by EU involving Flannery);
- **Sustainability of coastal communities** (including [MOSES](#) and [PERICLES](#), both funded by EU, [SHIP](#), funded by Irish EPA and [FAIRCoast](#) funded by Norwegian Research Council. All led by Flannery);
- **Social economy** (including [ethical community investment](#), led by Murtagh, funded by Innovate, UK and NI government and the Swedish Research Council);
- **Healthy urban environments** (including [HEAL-India](#) led by Adlakha, funded by GCRF).

The cluster has also successfully secured four KTPs (Innovate UK plus match funding):

- **New software technologies for construction**, one with [M Donnelly Electrical](#) and one with [Felix O'Hare](#) contractors (Brooks);
- **Urban Resilience**, partnered with Ove Arup (McKay);
- **Social enterprise and regeneration** partnered with the Ashton Community Trust (Murtagh, Impact Case Study).

The [Culture and Society](#) cluster brings together researchers from EVP (4 staff) and ARC (5 staff) with those from Geography and Archaeology (18 staff combined) to explore past and present connections between cultures and societies at varying spatial scales. This has facilitated research

on issues including urban regeneration, architectural history, legacies of the Troubles and population change. Projects from the Cluster have examined:

- **Community engagement** (including [Streetspace](#), led by Martire, funded through Belfast City Council and NI's Dept of Communities);
- **Sustainable Rural Communities** (including [Stayin\[ng\] Rural](#) project led by Stockdale, funded by ESRC-NWO-DFG);
- **Urban economies** (including [From Plantation to Peace](#), led by Boland and funded by Leverhulme Trust and Waldron's work on [neoliberalisation of housing](#) with Dublin City Council);
- McAllister's GCRF award examining **inclusive streets** in Angola;
- **Disaster recovery** (Sengupta's work on [Durbar Square](#), funded by British Academy and RIBA);
- **Sensory design** ([Hearing Trouble](#), Co-I Lappin, funded by AHRC).

The cluster has also successfully secured two KTPs (Innovate UK plus match funding):

- [Enhancing visualisation of urban environments](#), partnered with Vu-City (Boland)
- [Shared space in divided communities](#) partnered with Todd Architects (Mulholland).

In addition to collaborative opportunities provided within SNBE, our research strategy has also built upon the wider university structures for inter-disciplinary research (*Institutional Statement, 2c*): the [Mitchell Institute for Global Peace, Security and Justice](#) (for which Kacmaz Erk is an Associate Fellow), [Centre for Evidence and Social Innovation](#), CESI, (for which Murtagh acts as lead for the *Sustainable Cities and Communities* theme) and [Centre for Excellence on Public Health](#) (contributed to by Adlakha and Ellis). Effective collaboration has also been further facilitated by the inter-disciplinary Doctoral Training Centres that have been developed during this REF period, including [Northern Bridge](#) (AHRC), [NINE](#) (ESRC) and [Bryden Centre](#) (EU Interreg).

1b. Research and Impact Strategy

We have been pursuing a long-term strategy to evolve our research environment from being traditionally aligned with the delivery of accredited education and professionally-guided projects to one that stimulates rigorous, conceptually-driven, internationally-orientated and inter-disciplinary research. This strategy has driven revised structures, working arrangements and adjustments to our staff profile (Section 2b), which has enabled a virtuous cycle of securing larger, more competitive grants (Section 3a), increasing the number and quality of our PGR students (Section 2e), producing higher quality research outputs that have a greater impact (Section 4) and fostering new areas of research (e.g. marine and health). Such developments have then nurtured a positive atmosphere of intellectual enquiry, research ambition, enhanced collaboration, and an increased focus on contributing to major social challenges. This, in turn, has created opportunities for staff and students to engage internationally and allowed us to attract outstanding PGR/PDRAs, for example in [MISTRAL ITN](#) and partnership with RMIT (Section 2e).

Our future strategy in REF2014 aimed to extend our international collaboration and enhance the quality of our research outputs. This has been successful, largely for the reasons above, which allowed us to take advantage of new avenues of funding such as the Newton Fund (e.g. [HULAP](#)), ESRC/NERC Belmont (e.g. [M-NEX](#)), GCRF (e.g. [HEAL-India](#), [Ageing in the Global South](#)) and existing opportunities such as through the EU (e.g. [City-zen](#), [MOSES](#)). REF2014 also aimed to foster excellence in design, which we took forward through staff investment (Jefferies, Niblock, O'Grady, Turner), high-profile design projects (Moore: [Red Pavillion](#), O'Grady [Built East](#)), the introduction of an [Architecture PhD by Practice](#) partnering with RMIT in Australia (Section 2f) and social engagement around design ([Streetspace](#)).

Our REF2014 statement also noted our ambition to promote impact and social engagement, encourage partnerships with non-academics and increase our focus on complex global challenges, to align with QUB strategic goals. Although our disciplines have had a long tradition

of effective knowledge exchange, this has been further enhanced during this REF period due to our strategy that created dedicated impact roles, new forms of dissemination and knowledge exchange (KTPs, social media) and orientating research to specific [Sustainable Development Goals](#) (SDGs). Our Impact strategy has involved creating an *UoA13 Impact Champion*, who sits on the School Research Committee and Management Board, ensuring that our impact aspirations feed through to SNBE strategic decisions. We have been aided by invigorated University support for impact (*Institutional Statement, 2d*), a new PhD route (Section 2e) and encouragement for staff to take advantage of opportunities such as the NI Assembly's [Knowledge Exchange Seminar Series](#) (section 4c) and Impact Acceleration Awards (Sengupta, Adlakha, Ellis).

We contribute to, and draw inspiration from, the regional context of Northern Ireland, where we have been able to enhance and deepen impact through our commitment to open research (Section 1e) and by using the School's workload model to accommodate service-to-society through applied projects, advocacy and advisory activities. This includes supporting Martire's involvement as Vice-Chair of [Save the Cathedral Quarter](#); Murtagh's work with [Ashton Centre](#); and McAllister's work on autism (with Derry City and Strabane District Council). Our impact strategy has also informed our approach to research-led teaching, involving our students in impact activity (Flood's work with [Public CoLab](#), recognised in a QUB Teaching award) which also help us contribute to the University's [Social Charter](#).

A fundamental part of our strategy has been to combine our aspirations for well-funded research and outputs with those for impact through projects on societal challenges (food-water-energy in [Moveable NEXUS](#), healthy-ageing [HEAL-India/HULAP](#) and rural sustainability, [Stayin\[g\] Rural](#)) and responding to research calls where we feel our expertise can help shape policy ([Holistic Sustainability Performance Assessment of Irish Ports/Harbours](#) commissioned by the Irish EPA and [Environmental Planning after Brexit](#), commissioned by the RTPI). We increasingly use non-academic stakeholders to advise and promote impact in research grants (e.g. Belfast Healthy Cities involvement in [HULAP](#) and Belfast Harbour in [MOSES](#)), which, combined with our KTPs, has helped embed knowledge exchange at the core of our investigations. We also encourage staff to undertake public-good consultancy (Ellis's projects with [Ireland's NESC](#) on energy transition and McIlwain's work with the [World Bank to reform Saudi Arabia's waste management system](#)). We have had success in promoting KTPs, with six partnerships during this REF period (Sections 1a/4b), helping us to strengthen the effectiveness and application of our research.

Our strategic outlook for the 2021-2026 period seeks to consolidate these achievements and take advantage of the opportunities created by QUB's *Research and Innovation Strategy (2020-2030)*, with a key focus around the SDGs. We believe this will allow us to target our research more effectively to where we can make a difference, better align our work with funding opportunities and further catalyse the inter-disciplinary environment we have created. We are also aware that current threats, including COVID-19 restrictions, the impact of Brexit and a potential recession could fundamentally alter the landscape of our research, for which we will have to be ready to respond. Therefore, while we will retain the flexibility to respond to such threats, our priorities for 2021-2026 are to:

- Further **build and sustain research expertise** to continue our high-quality programmes of work, particularly in our strengths in energy transition, health, urban regeneration, marine planning, sustainable rural communities and design; all of which align closely with SDGs;
- Maintain a **recruitment strategy** based on attracting high quality, diverse research talent (Section 2) to match the expected retirements (c.4 staff) to 2026;
- **Continue to support staff** as they consolidate their careers and nurture their research standing (Section 2c) so that a wider range of staff lead successful competitive proposals and enhance both our capacity and performance;
- Consolidate the development of our **PhD programme** and sustain the diverse sources of funding; through further UKRI, DTPs and ITN initiatives (Section 2e);
- Continue to create new areas of **interdisciplinary collaboration** within the School, University and with other HEIs, with an emphasis on the interface between social science and technological development in the built environment;

- Maintain the **growth of our research income** and seek new international opportunities for funding that may emerge from: post-Brexit settlement; responses to COVID-19; and new or established funding sources, such as future City Deals, the Levelling Up Prospectus or from the UK Industrial Strategy;
- Extend the reach of our research by continuing to **invest in knowledge exchange** through appointing further Professors of Practice and encouraging staff to contribute to external bodies and communities through KTPs, secondments and advisory roles;
- Protect the elements of our **Workload model** that facilitate high-end grant capture, impact and unfunded research.

1c. Interdisciplinary research (IDR)

As noted above, we have developed Research Clusters (Fig 1) to enhance our inter-disciplinary research, complemented by links to other centres in and outside the University. The Clusters support this by providing an integrated research management and budget structure, while promoting collaboration between disciplines. Evidence of such outcomes includes GCRF grants on *Healthy and Active Ageing* (a Colombia project involving Adlakha [EVP] and Jefferies [ARC]) and *Investigating the City: Investigando a Cidade* (an Angola project involving McAlister [ARC] and Galway [EVP]); H2020 funded [LiftWEC](#) (involving colleagues from Civil Engineering with Flannery [EVP]) and an Innovate UK-funded project [LowCoPreCon](#) (Mariotti [ARC] with Civil Engineering and colleagues in Malaysia).

As noted in Section 1a, the development of our research has also benefited from our engagement with the wider university ecosystem. Examples of how these have stimulated work in UoA13 include Murtagh's lead on the *Sustainable Cities and Communities* theme in the [Centre for Evidence and Social Innovation](#) (CESI); Adlakha and Ellis have had several successful collaborations with researchers from the [Centre for Excellence in Public Health](#) (ESRC-funded [HULAP](#), MRC-funded [PARC](#)); and Erk leads the interdisciplinary [Cinema and Architecture in the City](#) research group (see output 119720242).

Our increased focus on complex social challenges also stimulates inter-disciplinary collaboration: Keffe's work on the food-water-energy nexus ([Moveable NEXUS](#)) involves trans-disciplinary living labs in six global cities; Jefferies' work on Smart Cities ([CityVerve](#)) has involved a wide range of urban actors; Stockdale's ESRC-NWO-DFG funded [Stayin\[g\] Rural](#) project involves planners, demographers and geographers; Ellis's UKRI-NHMRC funded [Vision for Healthy Urban Design](#) project is bringing together researchers from planning, architecture, public health, and computer science; and [MOSES](#) involves economists, anthropologists, sociologists and planners to foster sustainable blue growth.

1d. Open research

We have benefitted greatly from the wider university arrangements for open research (*Institutional Statement*, 2f) including [open access publishing](#) and [data management](#). This has encouraged open access to peer-reviewed research and ensured data is lodged with QUB's [public repository](#). We encourage public interest in our research through a suite of activities, including free regular research seminars advertised through our social media accounts (Twitter: [@PlanQUB](#), [@QUBArch](#), [@QUBNBE](#)), Blogs (for example [Murtagh](#) with LSE economics) and through a maintained email list of policy, professional and practice contacts. We also seek to reach out to different parts of the non-academic community through our collaborative practice events (Section 4c), such as our popular [Planning the Post-Pandemic City Online Lecture Series](#), which had up to 600 registrations for one talk, and attracted viewers from over 40 countries. We also disseminate our research through channels such as *The Conversation* (e.g. <https://bit.ly/32BirCF>, <https://bit.ly/3lnzb6P>) and encouraging staff to contribute to local and national media (e.g. [BBC Home Ground](#)). This approach to open research has also allowed us to undertake a number of projects that have been built upon community input ([City-zen. Streetspace](#)).

1f. Research integrity and ethics

Our approach to research governance has been extensively restructured over this REF period. A new Faculty Research Ethics Committee has been established, chaired by Murtagh, with representation from UoA13 disciplines. This has facilitated a culture that nurtures an understanding of the ethical implications of built environment research, helping us to align with the [UK Concordat for Research Integrity](#). QUB has also established a new Research Governance and Integrity Committee, with Murtagh as Faculty representative, that ensures a more integrated approach between ethics, standards of conduct, support for PGRs/ECRs and stronger mechanisms for complaints and redress. The expansion of our PGR and PDRA community has also enabled us to scale-up our training, technical support and access to online resources on ethics and data compliance. For example, the EU-funded [MISTRAL](#) operates a systematic training programme on environmental ethics, research ethics, delivering responsible fieldwork, and critical reflection on practice. This involves experts across QUB and the UK as well as site visits to look at particular operational challenges (such as dealing with uncomfortable knowledge in the field, disclosure and consent) and is open to the wider UoA13 research community. There are also strong links to professional codes of practice (RIBA, RTPI and RICS) to underscore the importance of ethics, integrity and standards of conduct. We have developed support systems (direct access to Information Compliance staff, online resources and formal training) that sees ethics, privacy and conduct, not as a regulatory mechanism, but as a vital and creative part of the research process.

2. PeopleSynopsis of the approach to 'People'

UoA13 at QUB is a relatively small, cohesive and diverse group of researchers. Over this REF period, we have used recruitment of high potential ECRs to help achieve the aims of our research and impact strategies (Section 1b), while successfully expanding our PGR community and creating a more vibrant environment for all staff. We have retained a strong cohort of experienced researchers, including international leaders in their field, and a large group of younger staff who are rapidly developing their reputations (Section 4b, best paper awards). We have reinvigorated our mentoring activities to help create a more balanced and integrated staff profile. This has been accompanied by a growth in our PhD programme (our PGR community is more than five times its size in December 2013), many linked to our large competitive grants, such as [NINE](#) and [MISTRAL](#) (Section 3). These changes have been accompanied by an increased emphasis on collaboration and inter-disciplinarity, so we are effectively staffed to deliver on our priorities for 2026 (Section 1b).

2a. Staffing profile and recruitment

As noted in Section 1a, UoA13 has reduced slightly in size from REF2014. Due to five retirements and some staff taking positions in other institutions, only half of those returned in REF2014 are included in REF2021. This turnover has created valuable opportunities to align staffing with our research strategy and we have made thirteen new appointments (including twelve ECRs) and eleven internal promotions since REF2014, as we have sought to nurture future leaders. Our recruitment has also been successful in diversifying our staff: we have increased the proportion of female staff (37% in 2014 to 47% today) and now have a majority of overseas staff (44% in 2014 to 52% today). Some of our appointments were made to enhance our knowledge exchange by recognising the experience of professional practice (McIlwaine, Brooks, Flood, Turner). This has been strengthened by the appointment of our first Honorary Professors of Practice; [John Cole](#) (former Chief Executive Northern Ireland Health Estates Agency), [Angus Kerr](#) (currently Chief Planner of Northern Ireland) and [Paul Roberts](#) (ACDL social enterprise). We also appointed other Honorary Professors; [Julia Barfield](#) (Marks Barfield), [Gary Clarke](#) (HOK), [Hugh Ellis](#) (TCPA), [John McPeake](#) (former CEO of NI Housing Executive and Chair of the NI Federation of Housing

Associations) and [Huw Thomas](#) (Emeritus, Cardiff University) who provide training and mentorship opportunities for our staff and PGR.

This changing profile has accelerated our transition from practice-orientated research and pedagogy to more international, challenge-focussed with a much broader portfolio of knowledge exchange. We have been able to mentor ECRs through probation and beyond, integrating them as CIs on major research projects (Adlakha on ESRC-funded [HULAP](#), Marrotti on Innovate UK-funded [LowCoPreCon](#)). This process is showing evidence of success, as Brooks and Mullholland now lead KTPs, ECRs have taken on PI roles (Adlakha: [HEAL-India](#), [Ageing in the Global South](#)) and have been recognised for their research excellence (Section 4b).

UoA13 staff are managed through a tiered and interlinking structure of leadership that has separate Heads of Discipline for Architecture (Lappin) and Planning (Flannery), who act as line managers for non-professoriate staff, allocate workload and balance teaching with research activities. The School also has Directors of Research overseeing each of the Research Clusters, encouraging inter-disciplinary activity, coordinating major grant-based initiatives and shaping the strategic direction of research. The School Director of PGR (Boland, from UoA13) oversees the PhD programme. We have an Impact Champion for the UoA13 (Ellis) to encourage and coordinate non-academic engagement with our research activities. The Head of School (Keeffe, from UoA13) line manages the Professoriate, provides a key interface with the central University directorates and oversees the School Research Committee, which provides strategic direction for our research activity, including identifying areas for new appointments and other major investments. Other leadership roles include Pathway Directors in Doctoral Training Programmes (Flannery for ESRC-funded [NINE](#)) and a lead for research ethics (Murtagh, Section 1e). All staff in the School attend an annual Research Away Day, complemented by more regular forums at disciplinary and Cluster level that allow all staff to contribute to the development of research strategy, for example, the emergence of the inter-disciplinary clusters after the formation of SNBE in 2016.

2b. Staff development and career progression

Supported by the University's 'People First' strategy (*Institutional Statement, 3a*), SNBE recognises the primacy of staff development and well-being as a critical element of research excellence, so strives to provide an intellectually stimulating, well-resourced and supportive environment for staff at all career stages. The most important way we do this is through fostering a collaborative and open culture in which all staff can engage in the development of the School, communicate their enthusiasm for their research, and be aware of available institutional support (Section 2b). We seek to ensure that all staff, irrespective of grade or other personal circumstance, have equal opportunity to take advantage of training and career progression (Section 2f). The success of our overall support is evidenced by a high proportion of staff that have been promoted: 41% of all UoA13 staff promoted since 2014, 50% male/female, the majority of whom have significant caring responsibilities.

We ensure the needs and aspirations of all staff are addressed through a process of [Personal Development Review](#), which creates a framework for an ongoing conversation on career development, alignment with school priorities and required support, which then feeds into School strategy. The University has several reward/recognition schemes, such as Exceptional Discretionary Awards (Martire 2017 for [StreetSpace](#)), Dean's Prizes (Murtagh in 2018 for his role as Chair of the Faculty Ethics Committee) and an annual Vice Chancellors Research Prizes (Murtagh in 2018 for research impact, ICS).

During this REF period, we have introduced a new Workload Allocation Model (WAM) that not only sought to balance research/administrative/teaching roles, but also align responsibilities with our strategy of securing larger, inter-disciplinary grants, developing new research areas, growing our PGR and enhancing impact (Section 2b). We therefore ensure all research-active staff are allocated 20% of their time as a Personal Research Allowance to cover service-to-society and scholarly activity; a variable Structured Research Allowance that provides 30 days for proposal writing; and a variable allocation according to the level of funded work and PGR/PDRA

supervision. The success of this is evident in our improved income and PGR profile. For more strategic goals, we have a rotating research-leave policy to facilitate ambitious projects; staff can request leave at the rate of one teaching semester per three years' work (or one year per six years), which is usually granted on the basis of an agreed delivery plan. During the REF period, 6 (21%) of academic staff in UoA13 (3 female, 3 male) have had such research leave. This has enabled major grants to be secured (Ellis's successful application for an EU-funded Innovative Training Network, [MISTRAL](#), Flannery's application for [SHIP](#) and [LiftWEC](#) and major publication projects with Erk completing a book in 2020).

We also recognise that staff at all stages of their career benefit from regular skills development, and are encouraged to attend courses offered by the QUB's [Staff Learning and Development Programme](#), covering research techniques, productivity, social engagement, and IT skills. External training is also supported, such as funding staff training on BIM. Female staff are encouraged to take part in the [Advance HE Aurora Leadership Development Programme](#) (Flood and Lappin). The support targeted at ECRs and PGRs is discussed in Sections 2d/2e.

We also seek to create development opportunities at discipline level and embed these in the way we generate cross-fertilisation and vibrancy in our research culture; for example, we encourage staff to invite strategically important researchers and/or potential collaborators from other institutions to take part in our seminar series, use these to discuss collective training needs and aim to address these in disciplinary away days and our Annual School Research Day.

2c. ECRs and post-docs

Our ECRs have made a substantial contribution to this REF submission, which we take as an indicator of success in our recruitment strategy and reflective of the supportive research culture we have nurtured. We recognise this as the most critical component of a sustainable and quality future research environment. We have recruited 12 ECRs since 2014 (92% of recruits and 44% of our FTE); all have been provided with a senior mentor, allocated an initial light teaching load (30 days pa, rather than 70) and required to undertake training (including *Supervising Research Students* and PGCHET) to develop their research, leadership and teaching skills in line with the [Researcher Development Framework](#), the [Concordat to support the Career Development of Researchers](#) and the [European Charter for Researchers](#). ECRs also enjoy priority access to ring-fenced NI Department of Economy PhD studentships (50% of our PGR students have had ECR-supervisors during his REF period), and an informal peer review system to support them to prepare grant proposals. All incoming academic staff are given a £10,000 start-up package to kickstart their research activities.

There are clear indicators that this approach has been successful: all staff recruited during this REF period are still in post, all eligible staff have completed their formal probation period (and two staff completed probation early due to exceptional performance), and of the 8 lecturers returned in REF2014, 75% (n.6) have been promoted during the REF period. Furthermore, the research undertaken by our ECRs are being recognised for excellence through external (see Section 4b) and internal (2c) prizes and awards.

We recognised that we needed to better support our PDRAs and research contract staff, so have established a mentoring programme for them to support skills such as proposal writing, time-management and employability, which complements the University [Post-Doc Mentoring Group](#) and ensures that this group of are represented on key School Committees.

2d. PGR students

The relatively small number of PhD completions reported in REF2014 was seen as an area needing further development, so a key strategy has been to expand and invigorate our PGR community. This has been a challenge as during this period there has been a substantial reduction in core studentships available from NI Department for Economy, so we developed alternative

sources of support from a wider range of sources, including UKRI joint-doctoral training programmes (AHRC [Northern Bridge](#) and ESRC [NINE](#)), EU-Interreg ([Bryden Centre](#)) and led the EU-funded [MISTRAL ITN](#). We have also secured individual studentships through competitive schemes run by the *Irish Environmental Protection Agency* and the *Marine Institute*, as a component of major grants and by attracting larger numbers of overseas students funded by the *Chinese Scholarship Council* and *Conservation International*. In REF2014, 63% of our PhD cohort were directly funded by the NI Government, while in this period it was only 20%. We are continually reviewing how best to attract and support PGR students and are now particularly focused on the consequences of Brexit in the coming years.

As part of our impact strategy, we have also pioneered new approaches to doctoral research and established a [PhD by Practice \(Architecture\)](#) under a joint-degree agreement with RMIT Melbourne, for candidates with an established body of peer-endorsed design practice work. This involves a series of practice research symposia and culminates in a public viva. We currently have 5 registered students, and have had three staff members graduate through RMIT on this pathway.

The creation of better interdisciplinary links across the School has also benefited PGR students and UoA13 staff co-supervise students in other disciplines (in geography, civil engineering, psychology, music and politics) as well as in other institutions (see section 4b). As part of our wider research culture, we regularly host PGR students from other institutions (University of Tours, University of Groningen, Von Thunen Research Institute) and have an annual Joint Planning-Architecture PGR conference with UC Dublin.

We have enhanced the training environment for all our PGR and introduced a *M.Res in Environmental Planning* that provides a research training platform for doctoral study, supported PGR Erasmus placements (e.g. Moon at Radboud University, Nijmegen), introduced work-based secondments for PGR (Miller at the [National Economic and Social Council](#)), summer schools ([MISTRAL](#)) and facilitated other types of external engagement (Hanna elected as Secretary of the Royal Geographical Society Postgraduate Forum). PhD students receive at least 30 days of training over their three years of study, with the [QUB Graduate School](#) providing general skills courses (presentations, software training), supplemented by discipline level specialist training (discourse analysis, GIS, impact, ethics) and career guidance. An annual research-support allowance of at least £500 is available to all students and additional funding for conferences and specialist equipment is channelled through the Research Clusters.

PGR Training is coordinated by the Postgraduate Research Committee and we have a *PGR Student Voice Committee* (chaired by Black, PGR Planning) that facilitates wider conversations about the student experience. Each student has at least two supervisors, and all but the most recently recruited staff have been involved in supervising students during the REF period. Supervision proceeds in line with the University's [Postgraduate Code of Practice](#), supported by a dedicated progress panel for each student, which meets twice in their first year and annually thereafter. The University's [Research Student Lifecycle](#) provides supervisory teams with online visibility of students' progress. All PGR students are encouraged to prepare a Career Development Plan and review this annually with their supervisors, to prepare three-minute thesis video (example [here](#)), and as an intrinsic part of our research community PGR take part in research activities at all levels of the University.

Our PGR strategy has been highly successful. We have had a substantial increase in the number of PhD completions compared to REF2014 (29 completions compared to 8 in REF2014), had 99 registered PGR students over the REF period and have a current active cohort of 42 students (compared to comparison to 8 in December 2013). The shift to a wider range of funding sources has also increased the diversity of PGR students (we had 2 students from outside the UK in 2014 and currently have 15, and our REF2021 cohort has been 52% female) and the competitive nature of these new sources has increased the quality of our candidates, with a higher completion rate. Our success is further underwritten by the trajectory of our recent graduating students going on to full-time positions (Kou at Changsha University of Science & Technology), employed in the School

as researchers (Ferguson, Kelly, McAteer, Cullen, Grounds, Jenkins, Han, Campbell) or academic staff (Moore, Mullholland).

2e. Equality and diversity

QUB is committed to the promotion and development of equality and diversity of staff and students, and the *Institutional Statement*, (3d) reflects wider initiatives that support this, including its Institutional Silver SWAN Award, the Gender Initiative, Disability Action Plan, and other policies such as parental/carer leave. All staff undertake annual mandatory Equality and Diversity training, receive training for interview panel membership, and SWAN Champions sit on promotion panels. Through our Faculty, we have also been part of an EPSRC-Funded SENSE Network partnership on '[Inclusion Matters](#)' that has explored the attitudes of academics towards gender equality initiatives and built training tools aimed at improving their perception in engineering and physical science. We have School-wide policies supporting flexible, family-friendly working arrangements and a healthy work-life balance including a semester free from teaching when returning from maternity/adoption leave, defined core hours and collegial code to uphold SNBE's core values.

We are also committed to fostering a safe, welcoming and inclusive environment and have aimed to diversify our staff through this REF period (Section 2b). We currently have 13 female research-active academics and 15 male staff in UoA13, and 15 international staff (from a wide range of European, Asian and Latin America countries). We have 10 staff at Senior Lecturer/Reader level (5 female and 5 male), and 6 at professorial level (1 female to 5 male). One of our Head of Disciplines is female (Lappin), but the imbalance within the professoriate is a continuing issue. As noted in Section 2e, our PGR community during the REF period has had a good gender balance (52% female, 48% male) as has our PDRAs (60% female, 40% male).

The need to better support the career progression of women has been a particularly important objective during this REF period, and we have used the SWAN process as a key vehicle to continue to deliver this. Although our predecessor school held an Athena SWAN Silver Award (2010-2015), as a new school, we have had to re-apply and submitted an application in December 2020. Our Action Plan focused on encouraging more female staff to apply for leadership roles and the appointment of female staff to positions such as Head of Architecture (Lappin) and PGT Director (Sengupta) highlight the success of this. This has been further supported by encouraging staff to undertake internal and external leadership training (Section 2c). Alongside this, UoA staff lead key 'beacon' roles in industry, holding positions in '[Women in Architecture](#)' panel in the RSUA, (Lappin, Mulholland) and appointed to [Ministerial Advisory Board for Architecture and the Built Environment NI](#) (Mulholland).

3. Income, infrastructure and facilities

3a. Overview of research grants/income and strategies for funding

As noted in Section 1b, our REF2014 submission highlighted a core goal of increasing and diversifying our grant income. We achieved a substantial increase in our research income from £2.13m in REF2014 to £7.02m in REF2021. Thus, our overall income/FTE was £66,600 in REF2014, and £256,193 in REF2021; and annual income/FTE was £13,300 in REF2014 and £36,599 in REF2021. Most of this increase has come from more competitive sources: the value of UKRI, UK Government and EU Government grants have increased threefold, and competitive funding from UK-based charities by nearly nine times; indeed income increased substantially from almost all sources. This has been achieved by reorganising school research structures, increasing staff ambition, providing dedicated time in our workload for developing research proposals and adopting better ways of sharing experience in proposal success (through including ECRs on grant applications, peer review of proposals and mentoring). This has followed QUB's Strategy for increasing research income and has benefitted from the enhanced research support at University level (*Institutional Statement*,4).

The increase in funding has allowed us to lever wider improvements in our research environment, leading to increased quality of outputs, growth in the number of PDRAs, attract higher quality PGR candidates, and improve impact by bringing non-academic partners into our projects (section 2/4). This has been particularly driven by our research strengths, for example:

- **Energy transition:** Major Leverhulme Fellowship (Boyd: [Architecture and the face of coal: mining and modern Britain](#)), EU projects (Keeffe: [City-zen](#), Ellis: [MISTRAL](#)), UKRI ([Moveable NEXUS](#)) and projects funded by government bodies (Irish Environmental Protection Agency; Ellis: [Catalyzing and Characterizing Transition](#)).
- **Design:** Getty Foundation (Boyd: [Keeping it Modern](#)), Irish Arts Council (Boyd: [Making Ireland Modern](#)), RIBA, (Sengupta: [The Language of Disaster](#)), GCRF (McAllister: [Strategies for inclusiveness in Luanda](#)) and NI Government (Morrow: [Street Society](#)) and Flood: [PublicCoLab](#))
- **Health and the Built Environment:** major UKRI grants (Ellis: [HULAP](#), [PARC](#), and [Vision for Healthy Urban Design](#)), philanthropic sources (Murtagh: [Ageing in Place](#)) and GCRF (Adlakha, [HEAL-India](#) and [Ageing in the Global South](#)).
- **Urban regeneration and divided cities:** Leverhulme (Boland: [From Planation to Peace](#)), RICS (Boland, [The New Waterfront](#)) and Social Investment Fund and Innovate UK (Murtagh: [Social Economics and the Politics of Peace](#)); Swedish Research Council (Murtagh: [The Continuation of Conflict-related Violence in Postwar Cities](#)).
- **Sustainable Rural Communities:** ESRC (Stockdale: [Stayin\[g\] Rural](#)).
- **Marine planning and coastal economies:** EU (Flannery: [MOSES](#), [PERICLES](#)), Irish Environmental Protection Agency. (Ellis: [IMMERSE](#), Flannery: [SHIP](#)).

The funding for these research areas also reflects our objective to improve our focus on major societal challenges, which has been further supported by knowledge exchange activities, including our KTPs (Section 4), GCRF and UKRI impact acceleration awards. Our submitted Impact Case Studies have developed from three of these research areas.

We have also encouraged our ECRs to gain experience from managing smaller awards, and which have then provided important platforms for developing wider research ambitions, so during this REF period we have secured small grants from a range of sources including Leverhulme (Sengupta: [Post-Disaster space](#)) and RICS (Adlakha: [All Eyes on Us](#)). We have also used travel awards to strengthen our international collaborations (British Academy: Sengupta for link with researchers in the University of Sao Paulo, British Council: Brooks award with National University of Civil Engineering, Hanoi), and encouraged many of our PGR students to secure travel awards from sources such as the MacQuitty Travel Bursaries and the Marine Institute.

Our ambition for future funding is noted in Section1b, and will be supported through four key actions:

- Enhancing how we use our accumulating experience of successful grant submission to **better mentor ECRs**, further peer review of draft proposals, prioritizing ECR in studentship allocations and pump-prime their initiatives and collaborative networks;
- Further **diversifying and internationalising sources** of funding and overcome post-Brexit barriers to accessing EU funds. We particularly see opportunities in researching long-term responses to COVID-19 and those emerging from future City Deals or the UK Industrial Strategy. We have ambitions in the next REF period to develop proposals for UKRI Research Centre funding around some of our research strengths;
- **Consolidating funding for PGR** by applying for EU-ITNs, embed studentships in research grants and extend our involvement in UKRI Doctoral Training Centres;
- Further **integrating knowledge exchange** into our research and lever additional funds for this by extending our KTP portfolio and appointment of further Professors of Practice to secure partnerships with external bodies to fund research.

3b. Organisational infrastructure and support for research & impact

Our unit has benefited greatly from the enhanced pre- and post-award support provided at the University level (*Institutional Statement, 4b*) and we make extensive use of QUB's [Research and Enterprise Directorate](#), including access to a Central Research Support Fund (for teaching buy-outs and for preparing major grant proposals) and hold a number of Impact Acceleration Accounts that we can use to deepen knowledge exchange. At School level, we have four dedicated administrators that support research and PGR. This is complemented by the support available to individual researchers, that includes:

- A **funding package of £10,000** and personal laptop for new staff recruits;
- A **DfE PhD scholarship** for each ECR;
- **Funded place on PGCHET**;
- **Dedicated budgets** for the Research Clusters for strategic networking, ECR development and training;
- **Personalised Research Time allocation** (of 44 days pa, 20%) for unfunded research and additional 30 days for writing proposals.

3c. Operational infrastructure, facilities and specialist equipment

All UoA13 staff and PGRs are located within the David Keir Building, with some architectural studios being in adjacent buildings. All staff have single occupancy offices, with common facilities, including shared kitchen, coffee areas, meeting spaces and studios. During the REF period we have invested c.£40,000 each year in facilities that directly support our research, including touch tables, five axis milling machine, 3D printing, materials testing and a new architecture studio. There are two dedicated open-plan offices for PGR students in close proximity to staff, facilitating opportunities for formal and informal interactions. Staff and students have access to a full suite of standard and specialised computer hardware/software, including a laser scanner (linked to construction management KTP), GIS Labs and 3D scanning. The University's [McClay Library](#) provides access to an extensive collection of books and journals, access to other materials such as the RIBA catalogue and the Northern Ireland Neighbourhood Information Service ([NINIS](#)). The University also has several specialised collections that support our research, including the collection of NI Area Plans, a map library and has developed the [Planning Architecture Design Database Ireland \(PADDI\)](#), with UC Dublin. We also have access to world class meeting facilities for hosting conferences, guest lectures and other research meetings. This includes a *Mashme* suite enabling external parties to share interactive activities and access to the university's state-of-the-art conference facilities at Riddell Hall.

4. Collaboration and contribution to the research base, economy and societySynopsis of collaboration and wider contribution

Although our disciplines have had a long tradition of engagement with professional practice, policymakers and communities, our shift to a more international, and challenge-focused research has called for new ways of collaborating with non-academic partners (such as KTPs) and new approaches to enhance impact, as set out in Section 1b. Our submitted ICSs provide strong evidence of the success of this, although our engagement activities are much wider than these, undertaken by staff at all grades and encouraged by the way we incentivise and evaluate staff performance, allocate our resources and the type of research that we are undertaking. As a result, our programme of projects increasingly shows indicators of esteem and we now have collaborative networks spanning the globe, challenging how we understand the built environment, and changing the priorities of our research.

4a. Academic collaborations and contribution to wider academic community

Our strategy has lent itself to the development of an increasing array of long-standing and incipient collaborations with researchers and non-academic partners across the world, which continues to nurture our international reputation. This is particularly strong, but not limited to, our reputation as the leading centre of built environment research on the Island of Ireland (Boyd has been Chair of the [All-Ireland Architecture Research Group](#), served on panels for the Irish Arts Council and represented Ireland at the Venice Biennale, and Moore has been the recipient of a number of awards for excellence in design, such as *the Image Awards, Architect of the Year 2019*, Fox-Rogers role on the Council of the Irish Planning Institute) and members of UoA13 are in high demand as PGR examiners in Irish institutions.

We also have very strong international networks, from which have emerged very significant collaborations, including our PhD programme with RMIT (Section 2d) and European-funded projects ([MISTRAL](#), [City-zen](#)). The extent of our networks are evident in the type of partners we have engaged with, ranging from the UK (KTPs, Leverhulme, UKRI), Ireland (EPA), Europe (Research Council of Norway, Danish Council for Strategic Research, Swedish Research Council and three COST Actions) and throughout the world. This is reflected in our co-authorship with scholars based in the USA, Canada, Australia, Germany, Italy, Belgium, Denmark, South Africa, Spain, China, Vietnam, Hong Kong, Brazil, India, Japan, Qatar, Saudi Arabia, the Netherlands and many other institutions in the UK and Ireland. UoA13 staff have given keynote/plenary talks in a wide range of high esteem institutions (Mariotti at Charles University Prague, Ellis at DTU Copenhagen, Adlakha at College of Charleston USA, Sengupta at Indian Institute of Management in Kolkata, Waldron at KU Leuven, Stockdale at James Cook University and University of Vermont, Keffe at TU Delft and University of Sevilla, Lappin at DAAD Berlin and Boyd has given critics lectures for the Architectural Association of Ireland). Staff have held visiting and adjunct positions at University of Oregon (Murtagh), Cornell (Keffe), University of Groningen (Stockdale) and Western Ontario University (Ellis), while hosting many visiting researchers from institutions in countries including Italy, Israel, Romania, Portugal, Denmark, Canada, the Netherlands, Brazil, Germany, Iceland, while our own staff have been able to exploit established networks to gain research experience (Adlakha has held visiting research positions at [Active Living Research](#) and [RMIT Centre for Urban Research](#)).

We hosted the [UK-Ireland Planning Research Conference](#) (2017), the [Standing Conference of Heads of Schools of Architecture](#) (2016) and the [All-Ireland Architecture Research Association](#) (2018). Our seminar series has attracted speakers from UK, European, South American and Asian institutions. Our active involvement in research networks also provides benefits to our PGR community, leading to the creation of UKRI training programmes such as [Northern Bridge](#), [NINE](#) and [MISTRAL](#), while staff jointly supervise PGR students in other institutions (University of Aalborg, University of Groningen, TU Delft, University Institute of Lisbon, Nepal Engineering College, University of Exeter, University of Oxford and IZES in Germany), and are regularly asked to externally examine PhDs in other institutions (Flannery at the University of Tromsø and Södertörn University, Stockdale at Groningen University, Sengupta at Indian Institute of Technology Roorkee, Ellis at Schools of Planning and Architecture at Delhi and Bhopal).

We provide academic leadership to our disciplines through an international profile that includes editorship of leading journals (Stockdale on *Population, Space and Place*, Adlakha on *Cities & Health*, Ellis on *Journal of Environmental Policy and Planning*, Flannery on *ICES Journal of Marine Science*), leading editorial articles (Ellis's founding editorial in *Cities & Health*) and invitations to take part in international research assessment panels (Boyd on the Italian National Agency's Evaluation of University and Research Systems, Waldron's contribution to the Flanders Research Foundation, Mariotti as an expert evaluator for MSCA fellowships, Boyd on judging panel for the Architectural Association of Ireland, Keffe has been reviewer for NWO and the Foundation for Polish Science and both Ellis and Stockdale have been on several panels for Swedish Research Councils). We also support other researchers through our positions on advisory boards for

international projects ([Crowdthermal](#), [Windplan](#), [MATISSE](#), [SESYNC](#) and [Iceland: Migration Patterns & Trends](#)) and leading roles in research bodies (Lappin is the chair of the [Architectural Humanities Research Association](#), and Ellis on the International Advisory Board for [Grand Renewable Energy 2018](#)).

Our research environment, as described above, has contributed to the excellence of our research outputs, as evidence by the distinguished awards for papers by some of our ECRs; Fox-Rogers was awarded the RTPI's 2016 *Award for Excellence in Early Career Research*, Silva won the [Best Article prize for Urban Studies in 2018](#) (output 205458274) and Waldron the [AESOP Best Published Paper Award 2020](#) (output 172312859). We also have some of the top downloaded papers for some journals (e.g. Ellis output 119902763 in [Journal of Environmental Policy and Planning](#), which has been viewed nearly 11,000 times) and most cited papers (Waldron in [GeoForum](#); output 166563423). In terms of our design outputs, O'Grady's [Built East](#) Pavilion was the winning design in a Royal Society of Ulster Architects (RSUA) competition and was the first time this competition resulted in the construction of the winning design.

4b. Engagement with non-academic communities

Our approach to research and impact (Section 1b) has had positive implications for collaboration with non-academic partners including involvement with major consortia projects ([City-zen](#), has 25 partners including Amsterdam Smart City and Siemens; [MISTRAL](#), has 15 partners, including the Sustainable Energy Authority Ireland, EDF and Coillte, [MOSES](#) where we are working with Belfast Harbour, and the [Bryden Centre](#) is a partnership of four HEI's, two local authorities and 15 industrial partners). Opportunities for partnership are embedded in our research projects by having key stakeholders as partners ([Plantation to Peace](#) involved Derry City Council) and through the creation of Impact Advisory Groups for major projects ([HULAP](#), where Belfast Healthy Cities were funded to run the IAG). This also involved attracting dedicated resources for engagement activities, including [Streetspace](#), which has been funded by NI Department of Communities and Belfast City Council, while we have also been successful with GCRF awards that help build our future global partnerships. In addition, we also reserve some of our Research Cluster budget for social engagement, using this to fund initiatives such as [Streetspace](#) and a [Parklets Project](#) with local communities. Staff also promote research through science cafes ([Slugger sessions on Transforming Belfast](#)), [TEDx Talks](#) free online webinars to discuss research findings ([Stakeholder Opinion of Planning in Northern Ireland](#)).

We provide staff with time for advisory roles and in this way contribute to professional bodies (Fox-Rogers is a member of the [Irish Planning Institute Council](#) and Chair of its Policy and Research Committee, Jones is the current [RIBA President](#) and we have undertaken research for the RICS and RTPI), engage with high-esteem initiatives (Boyd was on the British Pavilion panel at the Venice Biennale), provide high-level policy advice (McKay advises the [Irish Planning Regulator](#), Ellis is an independent member of Ireland's [National Economic and Social Council](#), Murtagh advises the NI government on both peace line policy and shared housing, Flannery advises DEFRA stakeholder participation on Highly Protected Marine Areas and Mullholland and Keeffe are members of the [NI Ministerial Advisory Group for Architecture](#)) and support charities and NGOs (Martire is Vice Chair of [Save CQ](#), Ellis was a Board member of [Belfast Healthy Cities](#), Sengupta advises [Occupy Tundikhel](#), Nepal, Murtagh is a Director of the planning aid organisation [Community Places](#)).

QUB has been recognised as a [national leader](#) in its development of KTPs, and we have had six such partnerships with businesses; [Ove Arup](#) (urban resilience), [Vu-City](#) (visualising urban environments), [M Donnelly](#) (virtual and augmented reality), [Felix O'Hare Ltd](#) (BIM models), the [Ashton Trust](#) (procurement systems) and [Todd Architects](#) (shared space). Two of these KTPs were rated as 'outstanding' and resulted in significant outcomes for partners, including new ISO certification, contracts in new areas (BIM) and increase in company turnover, and resulted in research outputs (Brooks outputs 160568699/19044602)

Our partnerships with non-academic communities enriches our research environment by providing a range of benefits in kind, including an agreement with the NI Government's [Land and Property Services](#) (LPS), which provides us with access to spatial data through the [NI Mapping Agreement](#) (worth £250K/year). An example of how this has provided a mutually beneficial arrangement is that spatial data produced under the ESRC-funded [KESUE](#) project mapped footways across NI, which was gifted back to LPS and made publicly available as a new map layer, which was then used as the basis of the Department for Education's model for evaluating eligibility for [Home to School Transport](#).

4c. Wider impact on non-academic world and communities

Our research strategy (Section 1b) has lent itself to more meaningful forms of engaged and participatory impact. Our ICSs illustrate how our wider research environment has stimulated varied forms of impact (on policy, deprived communities and the wider public), but the way we contribute to society also infuses our civic commitment, practice and teaching activities.

This has involved high-level engagement with legislative processes; our research on [Community Asset Transfer](#) and [Stakeholder Opinion of Planning](#) have been used in debates in the NI Assembly; and Waldron's work has been cited by the [Irish Parliament's Committee on Housing and Homelessness \(2016\)](#). Our researchers have addressed MPs in Iceland (Stockdale) and Scotland (Ellis) and called as independent expert witnesses to Parliamentary Inquiries (*NI Assembly Inquiry on [Wind Energy](#)*). The advice provided by McKay to NI's Minister for Infrastructure and Ellis's role on [NESC](#) (which advises the Taoiseach) have also contributed to changing narratives around planning regulation and environmental governance. Four of our staff (McKay, McAreevey, Lappin and Ellis) have addressed MLAs directly at the NI Assembly's [Knowledge Exchange Seminar Series](#) and Keeffe and Jefferies have advised Belfast City Council's Resilience Team.

Our research has influenced a wide range of policy initiatives, including some core planning principles from NI's [Strategic Planning Policy Statement](#) being based on Mullholland's report on [Place -Making in a Divided Society](#), while the [KESUE](#) project also influenced the [NI Public Health Strategy](#) and Belfast City Council's [Active Belfast Strategy](#). McAllister has worked with NI Education Authority to produce guidance on class provision for pupils with autism. Waldron's work on [domestic wastewater](#) has led to the Irish EPA to re-examine its public engagement on risk management. Sengupta's work on housing in the Global South has been reflected in recommendations made by *UN-Habitat, Government of Nepal, the World Bank* and included in the [Delhi Citizen Handbook \(2017\)](#). Flannery's work with the Marine Institute has helped to shape Ireland's system of Marine Spatial Planning.

Our research has also had direct impacts on the development of the built environment, including Martire's influence over future developments in Belfast City Centre via the [SaveCQ](#) organisation, Boyd's work with the Getty Foundation on [St Brendan's Community School](#), Jefferies's [Manchester Plinth](#) (output 228634135) and Keeffe's [The Biospheric Project](#) funded by the Manchester International Festival. [CityZEN](#) also resulted in direct impacts such as Carbon Descent plans for 11 European cities (output 231905433).