

Institution: University of Nottingham
Unit of Assessment: Geography and Environmental Studies, UoA14
<p>1. Unit context and structure, research and impact strategy</p> <p>1.1. Unit Overview</p> <p>The School is an intellectually vibrant community that has a holistic view of the subject and interdisciplinary expertise. Research spans the discipline and has a long tradition of working at the interface between social, physical and natural science, as well as having long standing interests in the arts and humanities. The School strives to ensure that its environment is inclusive and supportive, enabling all staff to succeed and we are proud of our Athena Swan Silver Award in 2017.</p> <p>The School has a strong record of external funding, which has increased since REF2014 to an annual average of £1.3 million. UKRI funding has also increased to 59% of total. Funding success reflects how the Unit's research encompasses the wide-ranging fields of geography (e.g. AHRC, BBSRC, ESRC, EPSRC, NERC, GCRF, Leverhulme Trust, Newton, EU), and enables impact through engagement with external partners and funders in government, industry and third-party sectors (e.g. Cemex, JBA Trust, Harworth Group PLC, Northumbrian Water, Ordnance Survey, The Arkwright Society, UK Space Agency). The success of our approach is highlighted with over 700 peer-reviewed journal articles published since 2014, 59% with international co-authors from over 1000 HEIs and research institutes.</p> <p>The Unit (45 FTE; 48% female [%F]) consists of 45 staff in the School of Geography and one in the School of Psychology (Spence), who works on environmental psychology and collaborates with Geographers (e.g. Gosling). Since REF2014, the School of Geography has recruited 12 new permanent research and teaching staff (11 Assistant Professor, 1 Associate Professor). Appointments reflect strategic investment in the School's research strategy and the replacement of leavers: these improve our career-stage structure and gender balance (detailed in s2). Career development of new and existing staff is achieved through Institutional and School programmes and mentoring (s2.2), ensuring longer-term continuity and vitality in the School, with development opportunities for new staff including leading Collaborative Research Hubs (s1.3).</p> <p>The School is managed through 6 inclusive committees, with representation from all career stages including PDRA and technical staff (School Management 56%F, Research 58%F, Education and Student Experience 50%F; PGR 75%F; Safety 83%F; Ethics and Integrity 43% F). Strategic decisions are developed with staff input across a range of committees and School-wide staff meetings. Major strategic decisions are made by the School Management Committee, with representation from the EDI Group (69%F; s2.5). Committee chairs feed into Faculty and University committees.</p> <p>Firmly rooted in its local environment yet globally outward looking, the School's strong international presence includes contributing to political, cultural, social and environmental debates and action on the global stage (s4.2). The School is genuinely international in its composition, with 15 staff, additional to staff above, based at campuses in China and Malaysia. These staff are not REF eligible but are integrated into the School's research environment through our Hubs (s1.3), representation on School committees and co-supervision of PGRs, as well as collaboration in funding (e.g. British Council).</p> <p>1.2. Research Strategy, Structure and Implementation</p> <p>The School's purpose is to be a world-leading centre for geographical scholarship that transforms lives, which it achieves by:</p> <ul style="list-style-type: none"> • Providing supportive research structures, infrastructure and processes that encourage collaboration both within and outside the discipline, within and beyond the institution.

- Engaging with a broad range of non-academic audiences within local, national and global contexts, to deliver research that supports communities, businesses, schools, charities and governments.
- Committing to create an inclusive and integral research environment that supports career progression, professional development and disciplinary citizenship.

The School has an overarching strategy and complementary research and teaching strategies. The School's Research Strategy was substantially developed and revised after REF2014 in response to an institutional review and to enhance synergy with the Faculty and Institutional Research Strategies (Institutional Statement [IS]2.1). The School's Research Strategy (2017-22) is a 'live document' that outlines goals and actions that guide the School towards the above achievements. The goals were formulated by the Research Committee: all staff were invited to contribute individually and collectively through Staff Meetings and annual 'Away Days'. The focus of the strategy in the REF period has been on ECR recruitment, principally through internal fellowships and Assistant Professorships; and improvement and refurbishment of existing facilities.

The Research Strategy defines the School's purpose, research structure and vision. The goals and actions fall under 4 headings with mechanisms to foster and monitor progress. Key objectives are to:

- O1. Build upon research excellence by providing a supportive and flexible research environment.
- O2. Grow external research income by expanding focus to challenge-led internal networks and increased involvement in large consortia and GCRF bids.
- O3. Maintain a track record of achieving equality and diversity through recruitment, workload management, and training.
- O4. Enhance collaboration beyond the School by integrating the School into the Institutional research framework and further enhancing Impact activities.

To assist with delivery of the research strategy, the Research Committee includes chairs of Research Themes (s1.3) and oversees the School's research activities, administers School funds for pump-priming research and conference attendance, available to staff regardless of career stage (s3), and manages the REF process (s2.6).

The research objectives remained unchanged during COVID, despite inevitable challenges. School Management Committee met weekly from March 2020 to beyond the end of the REF period. School meetings continued remotely; Theme and School seminars made a virtue of online working, by developing international connections.

1.3. The Research Framework

The School's intellectual agenda is organised around key Research Themes, which have their own seminar series' and incorporate all School staff. They aid the achievement of the School's vision, concentrating on strategic areas where we make distinctive contributions:

- **Cultural and Historical Geography** is recognised as the largest cluster of cultural and historical geographers in the UK (Baker *et al.*, 2019; *RGS Historical Geography Research Group* Publication 46) and has developed world-leading research agendas in understanding cultures of landscape, environment and health, governmentality, internationalism and postcolonialism.
- **Economic Worlds** is recognised as one of only 5 leading clusters in the UK (James *et al.* 2018. doi.org/10.1177/0308518X18764120) and has contributed significantly to the UK's global standing in economic geography through high-impact research on Brexit; financialisation; financial centres and exclusion, and; consumption and value.

- **Environment and Society** has developed original research around pressing concerns of: food security and agri-food systems; health, equity and environment justice; climate risk and resilience; disaster recovery; religion and sustainability; rural land-use and culture; and water resource management.
- **Geosciences** has addressed major issues of climate and environmental change through research in biogeography; environmental reconstruction; informatics and water, including through the use of innovative geospatial and earth observation science and technologies, and; has a unique research and teaching partnership with the British Geological Survey (BGS).

Since REF2014, the School has strongly engaged with the Institutional research ecosystem, catalysing and enhancing interdisciplinary research, with staff involved in 9 of 17 Interdisciplinary Research Clusters (IRCs), 4 of 5 Global Research Themes (GRTs) and 2 of 6 Beacons of Research Excellence, which represent Institutional strategic research priorities (IS-2.1). For example, **Jones** co-leads the Life in Changing Environments IRC, **Metcalf** leads the Developing Sustainable Societies GRT and **Boyd** is Associate Director of the Rights Lab Beacon of Excellence (which represents a £6 million Institutional investment).

Engagement with IRCs, GRTs and Beacons has leveraged c.£850,000 in internal funding for staff in the unit (s3.4). In addition, the School has a central role in the Centre for Environmental Geochemistry, where resources and infrastructure are shared with the BGS. Three BGS staff have honorary roles in the School and 5 School staff hold visiting research associate positions at the BGS (**Swann, McGowan, Panizzo, Jones, Metcalfe**; 60%F). Staff also have leading roles in the University Asia Research Institute (**Legg**; Management Board) and Urban Cultures Network (**Hodder**; Chair), which both aid interdisciplinary networking across the Institution, and **Seymour** is Deputy Director of the Institute for the Study of Slavery, which constitutes a University-wide network of scholars working on slavery and forced labour.

The School responded to the University's research framework by establishing 3 Collaborative Research Hubs in 2018, separate and additional to Research Themes, which map onto Institutional IRCs, GRTs and Beacons, to foster challenge-led, transformative research, where a critical mass of expertise exists in the School (Figure 1). This was driven by a strategic decision to foster engagement of staff on key, interdisciplinary topics. These are: **Health Geography**, **Urban Geography**, and **Environmental Risk**. These inclusive Hubs act as important new foci for the School's investments and comprise staff and PGR students who aim to answer some of the most pressing issues facing society globally. Specific Hubs have a lifetime of 5 years, to enable new Hubs to be identified and respond to changing research landscapes and interests of staff.

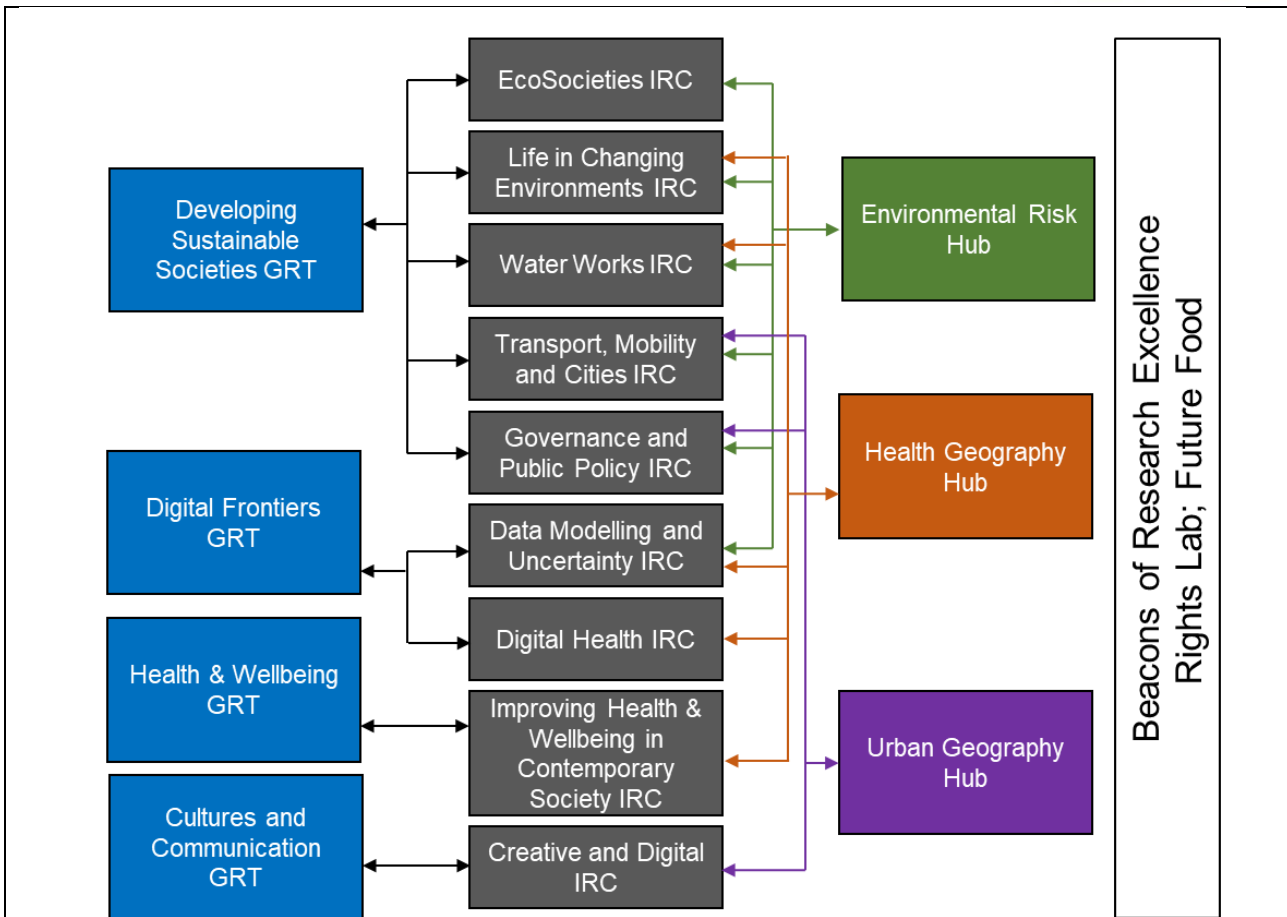


Figure 1: The integration of the School’s Hubs into the institutional research framework, including the IRCs and GRTs. Beacons of Research Excellence link across all Hubs. School Research Themes sit separately.

1.4. Enabling and Facilitating Impact

Enabling and increasing impact is integrated into the School’s Research Strategy as we strongly believe that impact should be embedded within all stages of the research process. To support this, structures to enhance impact have been overhauled since REF2014, including the appointment of an Impact Officer (**Snelling**), who assists with all Impact work in the School, and a School Impact Coordinator (**French**), who oversees the REF Impact submission. This is in addition to the Faculty Impact Officer and Institutional support (IS-2.2). The School’s Impact Roadmap outlines mechanisms to establish, deliver and review impact, including the utilisation of Institutional opportunities such as the Faculty of Social Science ESRC Impact Accelerator Account. To date, 31% of these funds have been won by Geography staff (c.£630,000). In addition, the new Institutional Institute of Policy and Engagement has helped fund pump-priming engagement work (e.g. **Seymour**); fund high-level policy relevant talks (e.g. **Hall** at Asia House and Chatham House) and aid development of policy briefs (e.g. **McGowan** on water management in the Red River, **French** on indebtedness and financial exclusion).

We have enhanced existing and developed new collaborative relationships with diverse research users, beneficiaries and audiences, detailed in s4.1. Impact is diverse, spanning *precedents for international law* (e.g. **Thorne**, ICS-A); *giving voice to vulnerable communities* (e.g. **Boyd**, **Foody** ICS-B; **Seymour’s** collaborative research on Derwent Valley Mills, which contributed to their World Heritage Site visitor centre winning awards in 2016 and 2017); *improving societal wellbeing* (e.g. **O’Donnell**, **Thorne** ICS-C; **Jewitt’s** contribution to UNICEF’s report on menstrual hygiene management); and, *developing novel technologies for public and stakeholder engagement* (e.g. **Priestnall**, ICS-D).

Impact in the School is nurtured from an early stage and funding for impact activities is available based on its potential significance and reach, regardless of when that impact will occur. For example, 3 projects have received Faculty funding (**Thorne, French, Seymour**; 33%F) and 5 have received School funding for impact (**Legg, Seymour, Priestnall, Heffernan, Boyd**; 40 %F), of which 3 went forward to the final REF submission. The breadth of impact in the School is also seen in the pool of 10 draft case studies independently put forward for review, which were contributed by all career stages (10% Assistant; 40% Associate; 50% Professor), from which the final 4 case studies (50%F led) were selected based on multiple School and Institutional reviews. A workload allocation of 75 hours and increase of personal research budget was provided for all 10 draft case studies to support impact activities.

1.5. Open Research Environment

The Research Strategy encourages an open research environment (IS-2.3). This includes an Institutional repository that provides a route to 'green' Open Access publication for School publications. This extends beyond REF outputs, with staff encouraged to make all outputs openly available, with over 400 open access outputs in the review period (148 gold route). In addition, all PhD theses are made openly available through the Institution's library pages (averaging 52 downloads per thesis), the School's extensive map library (s3.1) was recently made searchable and available to individuals beyond the University, and the School is compliant with UKRI open access criteria, and the Concordat on Open Research Data. The effective sharing and management of research data is encouraged and supported by the Institutional Data Management Plan toolbox and interaction with the Institution's Digital Research Team.

School policy encourages staff to publish data, databases and code through journal supplementary materials and websites. For example, **Gosling** is lead author of an open access dataset of global-scale hydrological simulations, with 39 co-authors from 15 global institutions (doi.org/10.5880/PIK.2019.003). The School developed and hosts online, openly accessible maps, including the Blue-Green Cities multiple benefits toolbox (**O'Donnell**) and the 'black presences and the legacies of slavery and colonialism' online map (**Seymour**), and provision of maps for external bodies, including national governments and the UN (ICS-B). We also use our leading role on editorial boards of journals (s4.3) to drive the Open Access agenda internationally; for example, **Field** had a leading role in developing the open data policy of the journal, *Global Ecology and Biogeography* (Impact Factor 6.4).

More broadly, the School prides itself on the diverse open outputs used for dissemination including performances and exhibitions, policy briefs, film, and public events and talks. The School encourages dissemination to public forums through, for example: social media including the GeogBlog to which all PhD students must contribute at least one blog; media coverage (e.g. media articles featuring research on Slavery from Space [**Boyd**] reached 90.8 million people between January 2018 to December 2019), and; popular science articles, including 38 articles in *The Conversation* news outlet by 14 staff in the REF period.

1.6. Research Ethics and Integrity

Research ethics, standards and integrity procedures have been reviewed and revised since REF2014 and are upheld to the highest degree, in line with those required by the Institution and UKRI (IS-2.4). The School adopts the Institution's Code of Research Conduct & Research Ethics and takes guidance from the Concordat to Support Research Integrity. The Ethics Committee reviews all research projects, and feeds back to the University Research Ethics and Integrity Committee via the Faculty. Feedback from the University committee comes directly and via the Faculty representative. There have been no breaches of research integrity or ethics codes during the REF period. The School's Ethics and Integrity Officer (**Foody**) also sits on the Research Committee, providing a clear link to the School's research environment. Similarly, risk assessments are required for all research and are assessed by the Health and Safety Officer, with the overarching intention of maintaining a safe and supportive research culture. All PGR students must undertake a research ethics and integrity professional development course, which

is run by the Researcher Academy and PGR students (as with all staff) are required to develop and complete their own ethics and risk assessment forms, with support from supervisors and officers mentioned above, as part of their research development. All new research and research and teaching staff have a meeting on ethical review as part of their induction process (s2.2).

1.7. Achievements in the Assessment Period

Achievements linked to the Schools strategic goals and associated structural changes, plus delivering aims from REF2014, enhance the Unit's position as a leading centre of international excellence by:

1. An increase in external grant awards from REF2014, with the proportion of UKRI funding also increasing to 59% of total income (from 48% in REF2014). The strategic focus after REF2014 on large bids has yielded success with significant involvement in 2 GCRF Hubs (**Fraser, McGowan, Panizzo**) and major grant successes (e.g. **Boyd, Heffernan, McGowan; Thorne**) (e.g. O1 and O2).
2. Staff taking leading roles in developing interdisciplinary research both externally (e.g. ESRC Smarties Net [**Clarke**]; GCRF Urban Risk Hub [**Fraser**]; NERC DTP [**Metcalfe**]) and within the University (IRC [**Jones**], GRT [**Metcalfe**], Beacons [**Boyd**]), aided by School engagement with the Institutional research framework and interdisciplinary networks (O1, O2, O3).
3. Consistently achieving excellence in research quality, evidenced by publication outlets (e.g. *Nature, Science*), sources of funding (e.g. UKRI), citations received (**Foody, Gosling, Thorne** Web of Science and/or Mendeley top 1% by citations adjusted for field 2019 and 2020), elections to prestigious fellowships (e.g. **Heffernan**) and prizes awarded (e.g. **Daniels, Thorne**) (O1, O2, O3; s4.3).
4. Producing a substantial portfolio of Impact beyond academia covering the breadth of the discipline, and co-production of research with third sector and industry (e.g. ICSSs), as well as diverse publics (e.g. AHRC slave trade legacies [**Seymour**]; s4.2), which has benefited from improvements in administrative support and internal funding increases since REF2014 (O3, O4).
5. Investing £400,000 in the unit's research infrastructure, building on significant investment in the previous REF period (s3.1), including equipment refurbishment and new provision, and refurbishment of infrastructure, including PGR offices and laboratory space (O1).
6. Taking a leading role in promoting open access data, information and publications in the discipline, enabled through the School and Institutional strategy and roles in learned societies and editorial boards (O1).
7. Rebalancing of the School's staff ratio of gender and career stage and strengthening research in key priority areas through strategic appointments associated with the staffing strategy, discussed in s2.1 (O3).

1.8. Future Strategy

Building on the developments arising from the University review of the School, the Unit is ambitious in its strategic planning for the future following REF2021. The Unit has identified 5 key initiatives as strategically important:

1. Establish leading centres for geographical research in urban geography, environmental risk and health geography, following 9 Assistant Professor appointments specifically in these areas in the review period (**Clare, Coen, Danyluk, Davies, Dugdale, Hodder; Ives, Mariani, Panizzo, Schrod, van der Heijden**; 45%F).

2. Build on GCRF successes (**McGowan, Fraser, Panizzo**) and the unit's role in the University's Beacons (**Jones, Metcalfe, Boyd**), as well as work that supports policy and decision-making, to deliver research that improves the lives of people globally.
3. Further enhance the Unit's international profile through leadership roles in international networks and consortia and strengthening links to the international campuses through co-supervision of PhD students and collaborations on grants (e.g. **Chan, Johnson** National Natural Science Foundation of China; **Chan, Gosling, O'Donnell** British Academy).
4. Build on the strong integration of the School in local, national and international communities, to enhance the reach and significance of research impact by identifying potential impact at an early stage and nurturing and developing that impact throughout the research process.
5. Build on the Institution's Plan S to further develop an open access environment that encourages the sharing of research, including datasets, code and applications.

2. People

2.1. Staffing strategy and staff development

The School's staffing policy is to appoint, retain and enable excellent researchers. This is encouraged through a commitment by the School to retain R&T Category A staff on permanent, full-time contracts (and part-time where desired by the individual). This provides sustainability and continuity in research and teaching, allowing new arrivals to plan their research careers into the longer term with the full support of the School. As such, fixed term contracts are used only for externally funded research projects (total 36 in REF period; 77%F) or teaching-only contracts (10; 43%F). The School has no zero-hours contracts. Two permanent staff members are working part-time by choice. The School also has excellent support staff, which is evidenced by their receipt of major awards (e.g., Papin Award, 2017) and their contribution to research is evidenced through the co-authoring of outputs in the REF period.

The School promotes a collegiate and supportive culture through regular School and Research Theme meetings, seminar events, annual away days and shared facilities. All staff, including ECRs, PDRAs and PGRs are linked to Research Themes and can join School Collaborative Research Hubs (s1.3). Staff are free to pursue their own research but share a commitment to research excellence and tackling global issues with an emphasis on societal wellbeing. All staff have equal access to School facilities while research and its dissemination are supported by School and University funding schemes (s3.3). An EDI Group, containing representation from all career stages, UG and PGR students, BAME and disabled staff (68.8%F) oversees EDI considerations and issues, and reviewed data and information for the Athena Swan Silver Award and this statement.

Heads of School are appointed on a 4-year term and mechanisms have been used to help protect their research programmes, with completion of the term of office normally followed by a year's research leave (**Leyshon**). Succession planning of significant School roles is embedded in a Faculty-wide approach to recruitment, shadowing and leadership development. Administrative and management roles are allocated appropriately and fairly, with senior roles normally filled by the professoriate but also offered to mid-career level staff. ECRs have opportunities to take on roles aiding their skills development and career progression (e.g. lead Collaborative Research Hubs; **Coen, Hodder, Mariani**). The success of School staff is evidenced through their leading roles in University management, with Geographers taking the roles of: Pro-VC for Education and Student Experience (**O'Hara**), Associate Pro-VC (Global Engagement) Asia-Pacific (**Clarke**), Faculty Associate Pro-VC for Education and Student Experience (**Crewe**), Faculty Associate Pro-VC for Research and Knowledge Exchange

(**Metcalfe; Leyshon**) and Faculty Digital Learning Director (**Mount**). **Metcalfe** also chairs the University's Facilities and Equipment Management Committee and serves on the Research Strategy Development Planning group.

2.2. Staffing, new appointments and leavers

The Unit's 46 academic staff comprise 22 women and 24 men; 1 School member has the protected characteristic of disability; and 1 is of BAME status. Staffing is a core part of the School's research and impact strategy (e.g. O3, s1.2). Appointments have created a better balance between career stages from REF2014 (Table 1), bringing renewed vibrancy and dynamism. There is a strong tradition of collaboration between human and physical geography in the School and new appointments build on this strength, retaining connectivity across the discipline (e.g. **Fraser, Ives, Davies**).

Table 1: Unit staff breakdown.

Level	REF2014		31 st July 2020	
	% of returned staff	%F	% of returned staff	%F
Fellow	0		4.3	100
Assistant	17.5	16.7	30.4	57.1
Associate	37.5	50.0	26.1	33.3
Professor	45.0	28.6	39.1	44.4

New ECR staff benefit from 150 hours workload allowance in their first year, 100 hours in their second year and 50 hours in their third year, to aid integration into the School and allow time to transition into their new role. On arrival, new staff and PDRAs are integrated into Research Themes and, if they desire, Hubs. All new staff and PDRAs have an induction that introduces them to School procedures, aiding integration into the School and further career development, including a meeting with the EDI Officer (**Foody**) to discuss ethics and integrity and the mentoring process.

Research capacity and excellence is built through the School's commitment to recruiting through early career fellowships (e.g. British Academy [**Mahony**]; Rubicon Fellow [**Burson**]). In particular, the School has benefitted from success with University of Nottingham Research Fellowships and Anne McLaren Fellowships, the latter aimed at female scholars. In the review period, the School has recruited 6 Fellows through these schemes (100%F), with School commitment to full-time appointments after the fellowship period, with 3 now full-time members of staff (**Panizzo, Schrod, van der Heijden**) and the others due to take full-time staff roles in the next 3 years (**Fraser, Lawreniuk, Zieritz**). The total research support package for the 6 staff is £450,000 (plus £5,000 annual taxable childcare costs). In appointing new staff, the School follows the principles of the Concordat to Support the Career Development of Researchers, including only using fixed-term contracts for PDRAs with a funding end date.

There have been 16 staff leavers in the review period, many of whom still contribute to the environment through collaboration at new institutions (e.g. Kender, Cambourne School of Mines at University of Exeter) and through emeritus positions (e.g. Daniels). Honorary and emeritus staff make a substantial contribution to the research environment by fostering direct links to external organisations, including the BGS, Ordnance Survey, Freshwater Biological Association, Clean Rivers Trust, British Geological Survey and Environment Agency.

2.3. Fair opportunities, training and mentoring

School policy is for all staff, including PDRAs and those on fixed-term contracts, to have at least one annual Appraisal and Development Conversation, which for PDRAs is with an individual who is not their project PI. These are formally documented but include no rating outcome and are not linked to staff rewards. They are used to enable and aid career development and progression. In addition, all staff have the opportunity to meet informally with staff within their Research Theme to discuss Personal Research Plans, which are a longer-term vision of

research ambitions and aspirations. All staff have a mentor, with a separate mentoring scheme for Institutional Fellows, and specific mentoring schemes for women and BAME staff (IS-3.1). Support also includes Institutional networks for BAME staff and female Professors.

Staff are encouraged to attend the diverse (over 600) professional development courses provided by the Institution, including research ethics, EDI, various research methods and techniques, policy impact, public engagement, and PGR supervision. Staff are eligible for School funding, which is assessed by the Research Committee based on research excellence and fit to strategic priorities (s3.3). Awards during the REF period were across all career stages (Fellow - 11%, Assistant - 26%, Associate - 34%, Professor - 27%) and genders (40%F), broadly in-line with School representation and demonstrating how the environment meets its aim of working for all staff.

A workload model is used to ensure a fair and transparent distribution of roles. No research metrics are used in any School process, including applications for funding and research leave, following DORA guidance. Staff, including flexible workers, can apply for research leave for one semester in every 8 semesters. In total, 24 staff had one semester leave (46%F), with research leave proposals assessed on their projected programme of research, including impact activities. Additionally, staff have taken 7 periods of maternity leave (average 8.7 months), 5 of paternity leave (average 2 weeks), and 1 period of shared parental leave. The unit supports staff returning from periods of extended leave through personal adjustments to workload and timetables and, for example, by allowing part-time working, if desired. In addition, extended leave does not influence research leave rotas and so returners are not disadvantaged by waiting longer to apply.

2.4. Reviewing and rewarding success and career progression

Following the Concordat to Support the Career Development of Researchers (IS-3.1), staff are encouraged to apply for major fellowships. Successes in the review period include 3 British Academy Mid-career Fellowships (**Hall** 2015-17; **Legg** 2015-16; **Vasudevan** 2016-17); an ESRC Senior Fellowship (**Hall** 2019-22), and; an Independent Social Research Foundation Mid-Career Fellowship (**Legg** 2021-22).

The School actively supports and encourages career progression. Promotion criteria have been revised to take a holistic view of research, teaching, knowledge exchange and academic service, and proactively considers the impact of personal circumstances. There were 18 staff promotions in the review period: 3 to Assistant Professor (33.3%F); 7 to Associate Professor (29%F); 8 to Full Professor (50%F). Promotion success is broadly even between men (84.6%) and women (87.5%), with fewer women promoted to Assistant and Associate Professor at least in part a legacy of past imbalance in gender that is being addressed through new appointments (s2.2). The Nottingham Reward Scheme recognises outstanding contributions of individuals through financial reward and, in addition, staff receive research margin of awards in personal research accounts (3-year running average of 10%, s3). Vice Chancellors Medals are awarded for exceptional achievement (e.g. **Boyd, Daniels, Hodder, Needham, Thorne**).

2.5. Equality, Diversity and Inclusion

Since REF2014 the School was awarded an Athena Swan Silver Award. Currently, salary levels for Assistant and Associate Professors are marginally higher for women than men (mean average pay gap -0.9%). For Professors, salary levels are higher for men than women (mean average pay gap +7.9%), which may be attributed to gender differences in the length of service. Whilst substantial improvements have been made to the balance of career stages and gender since REF2014, we recognise the need to pro-actively encourage more representation with other protected characteristics. To address this, staff on interview panels must undertake unconscious bias training (completed by 89% of staff), EDI has been added as a standing item to all committees and, all new policies and projects must have EDI impact assessments, to identify, respond to, and continue to improve the Unit's research environment.

To encourage inclusivity, seminars and School meetings are normally scheduled between 10am and 3pm to assist those with caring responsibilities. During COVID, staff and committee meetings continued remotely, with all staff having full access to MS Teams for remote working, and where needed, laptops were provided to staff to ensure connectivity. Staff wellbeing is supported through both formal support (e.g. Wellbeing support officers, Mental Health First Aiders; Dignity Advisors; Well Being Hub) and informal activities, such as lunchtime walks, yoga and meditation.

The ability of the School's research environment to enable all researchers to achieve world-leading research, impact and career progression is evidenced by the leading roles women staff members have in major UKRI research networks (e.g. **Clarke** – ESRC Smarties Net; **Metcalfe** – NERC ENVISION; **McGowan** – GCRF Living Deltas Hub), promotion to senior Institutional roles (s2.1) and publishing in top journals (e.g. **Hall** recognised as one of 3 women globally to have published 5 or more times in the highest ranking journals in the field of economic geography between 2002 and 2017 [Rosenmann et al. 2019, doi.org/10.1177/0309132519833453]). Staff also promote EDI internationally through leading roles in learned societies, including **Coen's** role as secretary of the Disability Speciality Group of the Association of American Geographers.

2.6. The REF submission

The School is fully compliant with the University's REF Code of Practice, including unconscious bias training for all staff involved in REF2014 decision-making (IS-3.6). The submission was managed by a three-person team: the Director of Research (**Gosling**) who oversaw the submission and led the outputs submission; the Impact Coordinator (**French**) who oversaw the selection and development of impact case studies, and; the Environment coordinator (**Johnson**) who oversaw the development and writing of the Environment Statement. The final submitted output portfolio was selected based on an iterative review of published work by an internal panel, with chosen submissions based on quality. The submitted outputs broadly mirror the breakdown in School staff (Fellow - 2%; Assistant - 28%, Associate – 19%, Professor – 51%; 39%F). Impact submissions were drawn from an initial pool of 10 case studies (36%F) independently put forward by staff (s1.4), with the final selection based on the reach and significance of impact determined after iterative review. Named authors were 40% women and with representation from ECRs (**O'Donnell**). All staff are encouraged to achieve impact from their work regardless of the REF cycle, making use of support from the School and Faculty Impact Officers, and to apply for School funding for impact activities (s1.4).

The Environment Statement was drafted by **Johnson**, collating data from 3 rounds of staff contribution and specific requests, also aided by Institutional data repositories and administrative staff. The draft was regularly refined by the Unit's REF team based on School and Institutional reviews and REF guidance. Staff had 2 formal opportunities to read and directly contribute to the document, with many also informally contributing throughout the REF period.

2.7. PGRs in the School

On average there are 54 PGR students in the Unit, with an average of 11.7 PhD students (as a fraction of Unit supervision; up from 8.8 in REF2014) graduating per annum (Table 2), with an additional 4.2 MRes students. The PGR community is diverse (Table 3) and international in its composition. 53% of PhD students are funded through UKRI scholarships (40%F). The School also secures funding through other prestigious sources such as the Leverhulme Trust (x3) and has been successful in winning internal awards (12 Vice Chancellors Scholarship for Research Excellence and 2 Sir Francis Hill Scholarships). The School leveraged an additional £1.4 million from the Institution to support 71 PGR full- and co-funded studentships at the UKRI rate. The School has a leading role in the Leverhulme MASS DTC (Management board – **Mount**) and EPSRC Engineering Water Resilience DTP (co-director – **Johnson**). In addition, **Metcalfe** had a central role in establishing Nottingham's involvement in the NERC ENVISION DTP, supporting the development and implementation of its vision and governance structures, and in securing the

second round of funding in 2019. **Boyd** (Co-I) has a leading role in the EPSRC Geospatial Systems DTC via her collaboration with the Nottingham Geospatial Institute, including the development of the EDI policy.

Table 2: Fractional supervision of PhD completions by Geography staff

	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Fractional Completions	17	12.5	10.6	12.1	13.3	13.8	15.2

Table 3: Percentage of fractional completions that self-identify with selected protected characteristics during the review period.

	Percentage
Female	48.6
LGBTQ+	4.9
BAME	29.0
Disabled	13.9
Religious	36.0

The School engages with Government and Industry in PGR supervision, with co-funding by partner organisations (e.g. Environment Agency, Kew Royal Botanic Gardens, National Trust, Salmon and Trout Conservation UK) and in-kind involvement. Our international students are supported by governments and agencies, including Colombia, Indonesia, Ghana, Kazakhstan, Mexico, Nigeria and Saudi Arabia.

PGR candidates are recruited through targeted calls for scholarships and, if they already have a personal scholarship, through direct contact with the University or School. Applicants' research proposals and CVs are examined to determine fit with the School's expertise and research priorities and most are interviewed by potential supervisors. PGR students must also meet English language criteria (IELTS 6.5, with no less than 6.0 in any element), which can be supported by the University's Centre for English Language Education.

2.8. PGR supervision, representation and training

Students are allocated at least 2 supervisors with whom they meet a minimum of 10 times a year (6 times for part-time students), all of which are formally documented (IS-3.3). Each student has an internal assessor who monitors student progress, conducts the student's annual reviews and, together with an independent external examiner, typically acts as examiner for the final thesis. The School's PGR committee, which reports to Research Committee, has separate representatives for home/EU, international, part-time and research Masters students. The School provides training to PGR peer mentors who in turn assist new starters to settle in Nottingham and the School.

PGRs are fully integrated into the Unit's research environment, participating in the Research Themes and Hubs. PhD students must deliver at least 2 seminar presentations to the School, one at the start of their second year as part of the annual Postgraduate Student Research Workshop, which are widely attended by staff and PGR students, and one in their final year as part of their Research Theme's seminar programme. PGRs also produce a poster, presented to the School at the annual PGR poster event.

All PhD students are required to undertake training tailored to their individual needs with compulsory training in research ethics and integrity, and aided by 2 training officers (**Panizzo, Forsyth**). A PGR's portfolio of training is reviewed during their annual review meetings. PGRs enjoy an excellent range of training opportunities which can be accessed through 2 routes. The first involves the Social Science Faculty Researcher Skills Programme, which combines core and optional training courses delivered by the Researcher Academy (IS-3.2). These cover a range of topics including quantitative and qualitative research methods, managing research projects, governance and ethics, networking, communication and training for both non-academic and academic careers. The second avenue is routed in the different DTP/CDT programmes, which briefly includes: the AHRC-funded Midlands4Cities drawing together 8 leading Midlands-based universities to support research skills, professional development and the establishment of both non-academic and academic networks; ESRC advanced research methods offered through the DTC and training with 5 Midlands-based partner universities, and; NERC ENVISION provision of workshops covering networking, impact, research skills, governance and personal effectiveness, with a formal Training Needs Assessment process and access to all NERC-run training courses. PGRs also engage in external training such as the British Society for Geomorphology Postgraduate Workshop, Natural History Museum and Freshwater Biological Association Identification courses, and Infohackit science communication courses.

Additional career-related training includes paid teaching affiliate and demonstrating roles, supported by compulsory Researcher Academy training in 'Preparing to Teach in Higher Education'. 59 PGRs undertook this training (32%F) and 14 (57%F) completed the Teaching and Learning Development Program (UoN's supported route to Associate Fellow of Advance HE) and a further 7 are currently enrolled. PGRs also benefit from placement opportunities, including a co-funded placement by the University to work on the School's map collection in 2019, and with external organisations such as the Environment Agency, British Library and United Nations. The School also provides support and training for visiting PGRs, including those funded by Commonwealth Scholarships, Chinese Scholarship Council, Erasmus Traineeships, Max Planck Institute, Hungarian Foundation and from individual international institutions.

2.9. PGR opportunities and activities beyond the School

All PGR students have dedicated office space, a laptop or desktop computer, and widely used software such as SPSS and ArcGIS. Students undertaking computationally intensive PhDs are offered higher-powered computers and all PGRs have access to Institutional computer facilities (s3.1). All PhD students have a minimum annual research budget of £500 to help with travel or incidental research expenses. PGRs can apply for additional research funds from the School (£1500) and in the review period, PGRs have accessed £11,951 from this fund (shared between 21 students). PhD students can also apply to a range of University sources including the Researcher Academy Support Fund (£1000), Travel Fund (£600) and the Asia Research Institute's PGR research and professional development fund (£4000). Other institutional opportunities exist in collaboration with external partners, such as the Papplewick Pumping Station WET scholarship (administered by **Johnson**) which offers funds towards one PGR student annually to attend an international conference. PGRs have also had success in securing additional funding from external organisations (e.g. British Hydrological Society, JBA Trust, British Phycological Society, Freshwater Biological Association, Lady Meherbai D. Tata Education Trust, Royal Geographical Society).

PGRs work internationally; for example, undertaking research exchanges through Canada Research Exchanges, Interact, and U21 schemes. They are encouraged to submit papers to peer reviewed journals and can submit theses by published works. PGRs make significant contributions beyond the School and are encouraged to present at international conferences, and have won awards, including best papers at the International Spatial Accuracy Research Association; 2nd symposium of the Society for Experimental Biology and Symposium for European Freshwater Sciences 2019. PGRs also join and participate in academic and professional societies (e.g. ECR representatives for the British Phycological Society and Remote Sensing and Photogrammetry Society [RSPsoc]); engage with peer-review and editorial

opportunities (e.g. editor of *The Phycologist*); and conduct impactful research (e.g. Research Fellow at UNESCO [Asia Pacific region], winner of the UoN 'Emerging Star in Policy Impact' award in 2019 and a finalist for the UN Young Champion of the Earth Award for the Asia Pacific region).

The destinations of recent PGR alumni include academia (e.g. York St.John University, UK; University of Birmingham, UK; University for Development Studies, Ghana; University of British Columbia, Canada) and the public and private sector (e.g. Kew Gardens; Centre for Civilians in Conflict), furthering the School's impact and networking at local to international scales.

3. Income, infrastructure and facilities

3.1. Operational and scholarly infrastructure supporting research and impact

All Geography staff and PGRs are housed in the Sir Clive Granger building, on University Park Campus, with Psychology staff housed in the nearby Psychology building. All academic staff have their own office and PDRAs and PGRs have shared offices. There are also offices for the Unit's 10 support staff (head of operations, 5 administrative/clerical staff, a cartographer, 3 technicians), with additional administrative staff and financial officers hosted in central Institutional hubs. All staff and PGRs enjoy the use of a large common room, used widely for coffee breaks as well as informal gatherings. All staff and PGRs have access to the University libraries and online repositories. Staff and PGRs also have unlimited printing and copying provision, although printing is minimised by access to personal 5Tb OneDrive storage and a largely paperless workflow.

Total School laboratory space has increased since REF2014 with a new Digital Research Hub which includes 4 high-specification PCs for processing-intensive modelling and geospatial analysis, for staff and PGRs. Laboratories have also been updated and repurposed to best work for new staff and the changing research focus of the School. For example, a new aquatic ecology laboratory has been established with internal and external funding, benefitting new (**Johnson, Dugdale**) and established (**Algar**) staff. Within the School's space, the unit has 5 laboratories for physical, chemical and biological analysis of sediment, water, algae, invertebrates, palaeo-environmental proxies and other particulate matter. They are DEFRA accredited for receipt, storage and analysis of international samples. The international significance of the unit's analytical facilities is evidenced by the HPLC pigment analytical laboratory, which supported 18 visiting scholars in the REF period working in 11 countries. There are also 3 computing laboratories, including one for advanced visualisation of 3D geospatial datasets (the SPLINT lab) and the new Digital Research Hub, as well as a general resource centre that contains a map library and study space. Laboratory work is supported by 3 permanent technicians, and additional research technicians funded through grant income (x3).

The unit's physical infrastructure has benefited from over £400,000 of Institutional investment, mainly used to refurbish staff and PGR offices, and laboratories. The School has an equipment roadmap, covering all areas of Human and Physical Geography. This details current equipment in the School, together with that required to maintain and expand capabilities in the short- to medium-term. The roadmap is routinely updated, particularly to reflect new staff arrivals and developments in individual research areas. Since 2017, the equipment roadmap has successfully secured funding of £152,633. In the REF period, an additional £45,000 was spent on new laboratory, computer and field equipment from School and Faculty funding and a further £150,000 on general laboratory provisions and equipment maintenance. Institutional investment in equipment has included a new fluorescence microscope, an Ion Chromatography unit, new multi-probes for water quality assessment and a fleet of UAVs with multispectral and thermal imaging capabilities.

Since REF2014, there has been renewed engagement with the School's map library collection, acknowledging its international importance as a repository for over 80,000 maps and documents. It now drives impact and public engagement activities, including a dedicated

webpage, 'map of the month' blog (**Matless**) and open days (e.g. City and County Councils, Charles Close Society). Research into combatting loneliness is also making use of the library with the 'Making with Maps' event (**Beckingham, Coen, Forsyth**), which saw a series of artist-led workshops for the over 60s, to look at heritage and place.

3.2. Research funding and strategies for generating income

The research environment enables the School to maintain a track record in securing research funding, with a diverse, inter-disciplinary portfolio of funders. 121 individual awards were secured over the REF period, with an average annual research income of £1.3 million (£0.9 to £1.7 million), up from £1.2 million in REF2014, with a total of £9.3 million over the review period (Figure 1). The proportion from UKRI grant income has increased to 59% of the total income since REF2014 (48%). Additional in-kind support from UKRI facilities has more than doubled since REF2014, with 34 awards amounting to £784,398, including funding to utilise the NERC Airborne Research Facility, Stable Isotope Facility and Radiocarbon Facility (**Boyd, Jones, McGowan, Metcalfe, Panizzo, Swann**).

An additional, c.£1.96 million of research income was awarded to staff on international campuses, not included in above figures, which contributes to the research environment through collaborative work and internationalisation.

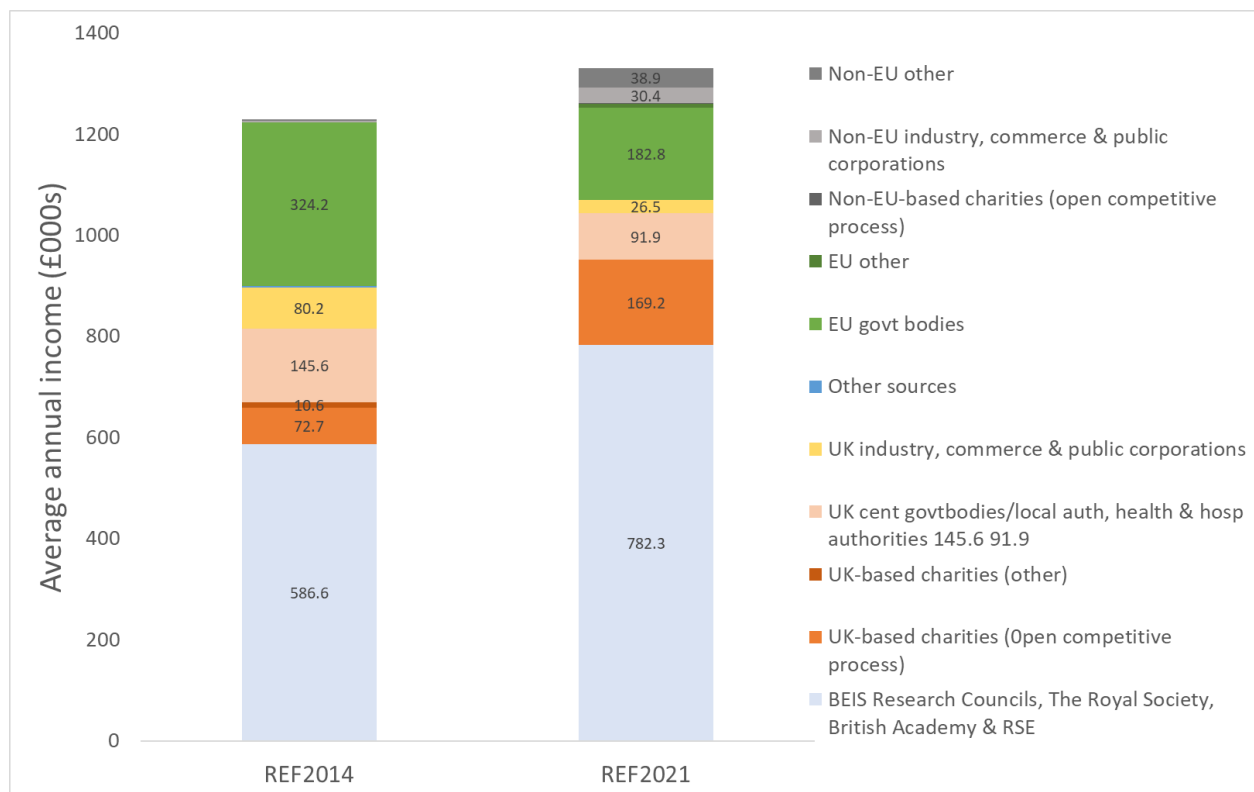


Figure 2: Annual average research income from different sources in REF2014 and REF2021 review periods. Equivalent values for UKRI in-kind contributions were £62,574 and £116,400, respectively.

The increase in income from REF2014 is despite a substantial shift towards more junior staff (s2.2). Leavers in the REF period contributed 43% of research income in 2013-2014, being replaced predominantly with ECRs at Assistant Professor level or on Fellowships. The ability of the School to increase its research income during this restructuring is credit to the supportive research environment and culture that has been generated through staff mentoring, ECR support, internal pump-prime funding, strategic staffing and leading roles in Institutional ventures (e.g. Beacons, GRTs). 60% of UKRI grant success is associated with women, providing further

evidence that the environment works for all; rewarded with promotion to professorships for 4 women (s2.4).

Grant capture has enabled the School to:

- i) Forge transdisciplinary, collaborative projects that address serious global challenges, including grants on urban flood resilience (e.g. EPSRC >£1 million) led by **Thorne** with collaborations from 11 UK HEIs, 3 international HEIs, and 16 international partner organisations (ICS-C), and the Living Delta's Hub (GCRF £1.2 million to Nottingham; **McGowan, Panizzo**) which focuses on socio-ecological systems in major Asian delta regions.
- ii) Embed impact, such as **Seymour's** AHRC research on slave legacies, **Clarke's** ESRC work on SmartCities and **Boyd's** EPSRC work on combating modern slavery using data science (ICS-B).
- iii) Diversify the interdisciplinary reach of the School's partnerships with internal and external collaborators (s3.2 and s4.1).
- iv) Strengthen the School's reputation as a center of research excellence through attracting and developing the next generation of scholars; for example, **Hodder** from AHRC-funded PDRA to permanent School staff; international usage of HPLC facilities (s3.1); and PhD destinations (s2.9).

3.3. Support for acquiring research funding

All staff are encouraged to apply for grant income, with the mentoring process, Research Themes and Hubs, and School pump-priming, all aimed at aiding staff in securing funding and progressing in their career. Staff benefit from a standard annual payment into their individual research accounts, which can be used to support research activity. In addition, staff receive a 3-year running average on personal research margin (10%), to support and incentivise the development of new bids and impact after project end.

Grant applications are supported and costed by administrative support in the Centre for Advanced Studies in the Arts and Social Sciences (CAS), which provides expertise in identifying funding opportunities, developing grant applications, mentoring academics in research project planning and knowledge exchange at all career-stages, fostering collaborations between disciplines and with non-academic partners, and providing an academic peer-review mentoring scheme for funding applications. The CAS team includes a Research Development Manager who sits on Research Committee, Faculty Impact Officer, Digital Research Manager, and Funding Office team who support the development of proposals. There is also additional Institutional review and support for UKRI standard grant applications (supported by Unit staff) and central support for large funding applications.

The resilience and flexibility of the research environment was demonstrated during the COVID pandemic, where research applications still underwent internal peer-review and research support (s3.3). Two UKRI COVID rapid response grants were also awarded in this period (**Davies, Lawreniuk**).

3.4. Institutional and School infrastructure for supporting research and impact

The School uses both internal funds and wider Faculty and University programmes to support a range of career development activities. The School provides 3 different funds for staff, annually: up to £800 for conference attendance (increase from £500 in REF2014), up to £3,000 for networking and capacity building activities, and up to £3,000 to support new research collaborations relevant to the School's Collaborative Research Hubs, new since REF2014. Over the review period, the School has invested over £83,000 in these schemes. Funding is equally available to all career stages and there is a high success rate; for example, 100% of conference attendance applications were successful during the REF period ($n = 69$). Overall, the School supported 98 applications through these schemes (up from 48 in REF2014; 40%F; Fellow – 11%, Assistant – 26%, Associate – 34%, Professor – 27%), directly leading to, for example, the

School's involvement in the Living Delta GCRF Hub (£1.2 million) and **Ziertiz's** Anne McLaren Fellowship.

Grant capture success has been partly enabled through attracting significant competitive Institutional funding; for example, **Jones** is leading a project (c.£1 million) funded by the Future Foods Beacon, Palaeobenchmark Resilient Agricultural Systems (PalaeoRAS), investigating past, present and projected agricultural systems. Successful engagement with Institutional Beacons, GRTs and IRCs has leveraged over £840,000 in direct funding to the School (s1), which has enabled investment in infrastructure (e.g. meteorological stations by Future Foods Beacon), employment of research staff and PGRs (e.g. Rights Lab Beacon Fellowship), and pump-primed major external grant applications. For example, the Rights Lab estimates an investment of £298,679 in 4 School staff (**Boyd, Foody, Ives, Mount**) between 1st October 2017 and 31st July 2020, with those staff successfully attracting £3,340,166 of external income over the same period on research projects associated with the Rights Lab, and with >£10 million in review.

The School benefits from strategic Institutional collaborations such as **Ives'** research on spiritual placement, exploring how religion shapes values for nature through the Birmingham-Nottingham Strategic Collaboration Fund. Donations and bequests to the School from alumni and retired staff have also led to environment improvements. For example, Peter McGuckin (graduated Geography 1977) has made significant donations to the School, most recently in 2018 for the purchase of equipment, and the Osborne Bequest in 2020 to establish up to 2 visiting fellowships annually from academic institutions in eastern Europe.

3.5. Collaborative use and shared infrastructure

The School partners with multiple organisations but, has an especially strong research link with the BGS, combining strengths in the use of geochemistry in research and training. Collaboration focuses around 3 laboratories: The Stable Isotope Facility; Inorganic Geochemistry Facility; and Organic Geochemistry Facility. This has underpinned collaborative grant income, including a £447,000 Newton Research Partnership (NERC-NAFOSTED) assessing human impacts on the Red River system in Vietnam (**McGowan, Panizzo**); co-authored papers and; co-supervision of PhD students.

The School also has a close relationship with Nottingham Lakeside Arts, which includes an archaeological museum, art gallery, performance space and professional service support for public outreach; e.g. the Curator Sylvia Exhibition in December 2018– April 2019 (**Watkins**). The Institution also contributes to the staff and running costs of the public programme of Nottingham Contemporary, an art gallery, with **Hodder** sitting on the management board.

3.6. Funding impact

The increased proportion of UKRI funding since REF2014 reflects our international, impact-driven research. This has enabled significant impact activities, including **Mount's** UKRI research, which involved empowering local people to monitor environmental degradation in Colombia. Engagement with partner organisations also generates international impact such as **Foody's** research as chair of an EU COST Action involving national mapping agencies and industry from 30 countries focused on using citizens as sensors for mapping, and **Jewitt's** work on biogas networks in East Africa supported by Innovate UK.

Impact is also generated through UKRI funding for impact activities, such as an AHRC Impact and Engagement grant (**Seymour**) looking at reparative histories in rural heritage sites and **Hall's** ESRC Senior UKICE Fellowship focused on financial services post-Brexit. The School has also been highly successful through the ESRC Impact Accelerator fund (s1), including **Priestnall's** work with the JBA Trust on visualisation of flooding for improved risk communication (ICS-D), as well as a Hermes Outreach Fellowship (**Priestnall** 2016) and EPSRC Impact Exploration Award (**Priestnall** 2019-20). The development of 3D augmented

relief models and flood visualisation tools by **Priestnall** was enabled through use of the School's SPLINT laboratory.

Investment in our environment has also benefitted our impact and the dissemination of research findings to a wide audience. For example, the School hosts the Nottingham branch of the Geographical Association (**Clare**). **Jones** also used competitive funding from the Life in Changing Environments IRC to lead the creation of the annual Nottingham Environment Conference, co-organised with the Nottinghamshire Wildlife Trust, which in 2019 attracted 170 registered participants from over 30 organisations.

4. Collaboration and contribution to the research base, economy and society

4.1. Interdisciplinary research collaborations

The unit has a strong culture of interdisciplinary and collaborative research and plays a leading role in facilitating inter-institutional academic collaboration internationally and nationally. Interdisciplinary research is explicitly encouraged through the School's Research Strategy and enabled through engagement with, and leading roles in, the Institutional research environment (Figure 1). For example, the School benefits from inter-campus and inter-institutional networks (e.g. Nottingham-Birmingham; Centre for Environmental Geochemistry), collaborative PGR supervision (e.g. AHRC, NERC, EPSRC, Leverhulme DTPs/CDTs) and collaborative research and PhD supervision across other Institutional Units (e.g. Archaeology, Engineering, Mathematics, Bioscience, Life Science, Veterinary School, Nottingham Geospatial Institute). Research in the School is central to a network of collaborators from 79 UK HEIs, and international collaboration with over 1,000 institutes in 109 countries, evidenced through co-authored papers.

New starters have expanded our international reach and bring new collaborations that span: urban change in the context of global economic restructuring in Latin America (**Danyluk**); how climate modes drive fire activity across the Southern Hemisphere (**Mariani**); toxic geographies and environmental justice in the Ukraine and USA (**Davies**); conservation of freshwater biodiversity in south-east Asia (**Zieritz**); thermal imaging and fish behaviour in North America (**Dugdale**), the political economy of Cambodia (**Lawreniuk**); the role of lianas in carbon sequestration in tropical forests (**van der Heijden**); and global patterns in plant functional traits (**Schrodt**); in addition to the continuation of established international links that employ post-doctoral staff, such as **Watkins'** Leverhulme Trust project focused on British amateur topographical art and landscape in Italy, and EU Marie Curie project on the circulation of botanical ideas in the 17th and 18th Centuries.

Research collaborations extend to end users, enabling and enhancing impact, including: third sector organisations (e.g. The Arkwright Society, Game and Wildlife Conservation Trust, London Science Museum, National Trust, Nottingham Citizens, Nottingham Museums and Galleries, River Trusts, Salmon and Trout Conservation UK, Wildlife Trusts), policy making community (e.g. DEFRA, Environment Agency, DG-CLIMA [European Commission], Linking Environment and Farming [LEAF]), research institutes (e.g. BGS, NIAB, Rothamsted Research, EC JRC) and industry (e.g. 1Spatial, Airbus Space, ADAS, Cemex, CGI, Digital Globe, Harworth PLC, JBA Consulting, Ordnance Survey, SOYL). Examples of our involvement in key international debates include: **Legg** and **Heffernan's** AHRC-funded "Conferencing the International" which culminated in an international conference in 2018; the GCRF Living Deltas Hub (**McGowan**; **Panizzo**) including 50 international researchers, focusing on the Mekong, Red River and Ganges-Brahmaputra Deltas, **Spence's** work as part of both Horizon Digital Economy Research and Trustworthy Autonomous Systems Hub, both EPSRC funded centers of excellence; and, **Coen's** work on gender, leading to her being an invited expert on gender to the genEffects project with European institutions and her role in the Cochrane Sex/Gender methods group, which aims to improve considerations of sex/gender in research.

Public engagement is achieved through the Geographical Association and the East Midlands Geological Societies, which are both hosted in the Geography building. Staff also participated in the National Festival of the Humanities - Being Human (sponsored by AHRC, BA and Wellcome Trust – **Matless**) and the ESRC Festival of the Social Sciences (**Morris, Priestnall, Coen**). The School disseminates to publics through engagement with museums, such as producing a commentary on agriculture with the Science Museum, London (**Morris**) and creating a broadcast film at the Science Museum London on agricultural landscapes (**Matless**). Our engagement with end users includes diverse communities; for example, **Seymour** collaborates and co-produces research with Bright Ideas and Belong Nottingham, both BAME-led groups, and has been awarded a series of AHRC and HLF grants to collaborate with the Nottingham Slave Trade Legacies volunteers. **Heffernan** also works with BAME communities as part of the AHRC Hidden Histories of World War One project; **Legg** collaborates with LGBTQ+ and South Asian heritage communities in research on hate crime; and **Boyd** and **Foody's** work engages with NGOs focused on social justice, including Volunteers for Social Justice (India) and G2RED (Greece) (ICS-B).

4.2. Contributions to economy and society

The School prides itself on its strong presence in the local community as a, *force for societal change* (e.g. Nottingham Citizens [**Legg**], Nottingham Slave Trade Legacies [**Seymour**]); *leading partner in educational events and programmes* (e.g. Derwent Valley Mills World Heritage Site [**Seymour**]); *key partner in the management of the local environment* (e.g. Attenborough Nature Reserve Science Group [**McGowan**], Greener Meadows community action steering group [**Spence**]; Trustee of Sherwood Forest [**Watkins**], East Midlands Historic Environment Steering Group [**Metcalfe**]) and; *representation on, and engagement with, local groups and infrastructure* (e.g. Nottingham City Museums and Galleries [**Seymour**]; Derbyshire UNESCO sites steering group [**Seymour**]). **French** made a significant contribution by jointly establishing and chairing the Nottingham Financial Resilience Partnership (NFRP) in 2016. The NFRP is a multi-agency partnership including Advice Nottingham, City Council, Big Issue, Age UK, Nottingham Refugee Forum, Nottingham Credit Union, Diocese of Southwell and Nottingham, Experian and Illegal Money Lender Team (Midlands), and tackles financial vulnerability and indebtedness in Nottingham. Established relationships with local organisations, and a culture of working with a wide range of beneficiaries, has led to international research outputs and external grant income. For example, **Seymour's** involvement with Nottingham City Museum and Galleries led to them partnering on an AHRC grant, *Practising Reparative Histories in Rural Heritage Sites*. Funded work also includes an ESRC Business Boost fund to develop a platform for microfilm distribution in China in partnership with Nottingham firm Hold That Shot (**Leysdon**).

National contributions include key roles in policy development, including **Hall** giving evidence that was cited by the House of Lords Inquiry in 2020 into the future UK-EU relationship on professional and business services and the Scottish Parliament inquiry into the future relationship between the UK and the EU. Staff contribute to expert panels, including the DEFRA model intercomparison (deposition) group (**Metcalfe**) and the joint DEFRA-Natural England expert panel on social science evidence for improving agri-environment outcomes (**Morris**). Contributions also come from being trustees of national charities, including the: Clean Rivers Trust (**Johnson**); Sherwood Forest Trust (**Watkins**); Victoria Country History Trust (**Watkins**); and Wallacea Trust (**Field**). Research by **O'Donnell** and **Thorne** has changed stakeholder opinions of blue-green flood mitigation methods, and has led to the adoption of blue-green infrastructure nationally and internationally (ICS-C).

Our work has shaped international policy; for example, **Gosling's** EU-funded work was used to support the EU's new climate policy, the European Green Deal. **Jewitt** worked with the Water Supply and Sanitation Collaborative Council to develop state-level guidelines for menstrual hygiene management in India. **Swann's** NERC project assessed the impacts of environmental change and pollution on Lake Baikal (Russia), the world's oldest lake and a UNESCO World Heritage Site. Contributions also include **Zieritz** contributing 2 Global Conservation Assessments for the IUCN; expert advisor roles to the Institute on Science for Global Policy,

Austin (**Smallman-Raynor**); and **Fraser's** research as part of a GCRF Hub on multi-hazard urban disasters.

The international significance of funded research utilising remote sensing expertise in the School is notable and includes: measuring modern slavery internationally with partners in India, Bangladesh, Nepal, Pakistan, Mozambique, Democratic Republic of Congo, Uganda and Greece (**Boyd**; EPSRC; **Foody**, British Academy; ICS-B); South-East Asian peatlands (**Boyd**; UKSA IPP2); forest response to drought (**Boyd**; **van der Heijden** NERC/DfiD); ecosystem services of wetlands in Mexico (**Boyd**; Newton); and resilience to extreme weather, also in Mexico (**Metcalfe**; **Boyd** NERC). In addition, **Foody** led a work package of the LandSense Consortium, an EU-funded Horizon project including 17 academic, industrial and charitable partners to develop and use land cover accuracy assessments.

The School's international presence is further evidenced through honorary and invited appointments, including: Professeur Invité, Laboratoire Environnement, Dynamiques et Territoires de la Montagne, Université Savoie France (**Jones**, 2015); Visiting Fellowship in Geography, University of Queensland, Australia (**Jones**, 2015); Resident Fellow, China Policy Institute, University of Nottingham (**Hall**, 2017 - present); and Visiting Scientist at the EC Joint Research Centre in Seville (**Gosling**, 2020).

4.3. Influencing and supporting the discipline

Staff have made notable contributions to the discipline, which extends and transforms disciplinary and interdisciplinary agendas; for example, through leadership as board members of 42 refereed journals, notably including Editor-in-Chief/Deputy Editor-in-Chief of 5 journals (Frontiers in Biogeography [**Field**]; Geoforum [**Hall**]; International Journal of Remote Sensing [**Foody**]; Global Ecology and Biogeography [**Field**]; Remote Sensing Letters [**Foody**]); and associate/corresponding/coordinating editor of a further 12 journals.

Leadership is also evidenced through providing peer-review and leadership to funding bodies by: *chairing UKRI panels* (ESRC Climate Change Panel [**O'Hara**]; NERC Environmental Isotope Facility – review panel A [**Metcalfe**]; NERC Brazilian Biome Resources Panel [**Foody**]), *members of UKRI peer-review colleges* (AHRC [**Legg**, **Smallman-Raynor**, **Watkins**]; ESRC [**Hall**, **Leyshon**]; NERC [**McGowan**, **Swann**]), and; *membership of UKRI and international facilities and advisory boards* (AHRC Strategic reviewers group [**Watkins**], BBSRC Living with Environmental Change [**Foody**], EPSRC Programme Award [**Foody**]; ESRC Impact Prize Panel [**O'Hara**]; NERC CASE studentship Panel C [**McGowan**]; NERC National Strategy Group [**Metcalfe**], NERC Airborne Research and Survey Facility Steering Committee [**Boyd**]; NERC Skills Development Awards Assessment panel [**Foody**], European Research GEOFIN Advisory Panel [**Boyd**], and European Facility for Airborne Research [**Boyd**]).

Staff have contributed to the discipline through the external examining of 64 PhD students at 32 UK institutions and a further 15 internationally. In addition, staff undertake significant roles in 31 learned societies, notably including the Chair or Vice-Chair of the: Society for Landscape Studies (**Watkins**); International Paleolimnological Association (**Panizzo**); British Academy Geography, Section S3 (Anthropology and Geography) (**Heffernan**); triennial International Conference of Historical Geographers, Warsaw (**Heffernan**); and the Secretary, treasurer or executive board of the Council for British Research in the Levant (**Jones**); International Biogeography Society (**Field**); International Society of Biometeorology (**Gosling**); Royal Geographical Society Conference of Heads of Geography in Higher Education (**Leyshon**); International Palaeolimnology Society (**McGowan**); and Micropalaeontological Society (**Swann**). Also, the RSPSoc is housed in the School of Geography and **Boyd** and **Foody** have both served on its Council during the REF period.

These activities enhance the Unit's intellectual environment and sustainability, providing experience and leadership. The environment has enabled staff to win major international academic awards and prizes, including: the Royal Geographical Society Victoria Medal

(**Daniels**, 2015); Royal Geographical Society Back Award (**Thorne**, 2016); David Landgrebe Award 'for outstanding contributions in the field of remote sensing image analysis' (**Foody**, 2019); Elected Fellow of the British Academy (**Heffernan**, 2015); Elected Member of Academia Europaea (**Heffernan**, 2016); Award of Fellow of the Academy of Social Sciences (**Hall**, 2020); 65th Lovatt lecture (**Foody** 2016), the Founder's Award International Spatial Accuracy Research Association (**Foody** 2016), and Newton Prize for international impact (**Clarke**, 2019). Other notable achievements include **Heffernan** serving on a 5-person international panel that oversees and selects the winners for the Prix Vautrin Lud at the Festival International de Géographie in Saint Die.

We are immensely proud of our achievements over the review period, which has been a period of significant restructuring in the Unit. As this statement demonstrates, we remain resolutely committed to the discipline of geography as a diverse project. We believe that our research environment provides an excellent foundation for the continued development of our discipline-spanning work.