Institution: University of Oxford
Unit of Assessment: Geography
a. Overview

Oxford's School of Geography and the Environment provides an intellectually vibrant, interdisciplinary research environment which combines natural and social science interests and skills, underpinned by Geography's tradition of working across differing research cultures. The School advances this vision by joint appointments and a research apprenticeship approach that supports staff at all levels, by promoting interdisciplinary research centres and clusters, and by championing wider engagements within and beyond the academy, particularly in the field of policy. The School has grown since RAE 2008 with, on the REF census date, 56 Category A staff (54.1 FTE), 53 other researchers (mainly working on specific externally-funded projects), and over 150 graduate research students.

The School comprises the academic unit of Geography and three affiliated **research centres**: the Environmental Change Institute (ECI), the Transport Studies Unit (TSU), and the Smith School for Enterprise and Environment (SSEE). The ECI (established 1991) and TSU (established 1973) are key parts of the School, with core staff, including centre Directors, holding established academic positions. These centres are integrated into the School's research clusters and play a role in major University-wide research and networking initiatives (e.g. in climate, energy, transport and water). Because of the success in engaging the centres with the academic unit of Geography we now use the title School of Geography and the Environment, rather than Oxford University Centre for the Environment (OUCE) as in RAE 2008. In 2013 we formally affiliated the Smith School for Enterprise and Environment (SSEE) (established in 2007 with £10 million raised by a philanthropic donation to the School), and appointed a new Director from our professorial staff. This consolidates the School as the distinctive centre for interdisciplinary environmental research in Oxford.

The School's **research clusters** provide linkages between staff in Geography and the research centres, between established and early career staff and graduate students, and between the School and its academic visitors. The five current clusters are Biodiversity, Ecosystems and Conservation; Climate Systems and Policy; Landscape Dynamics; Technological Natures: Materialities, Mobilities and Politics; and Transformations: Economy, Society and Place (Figure 1).

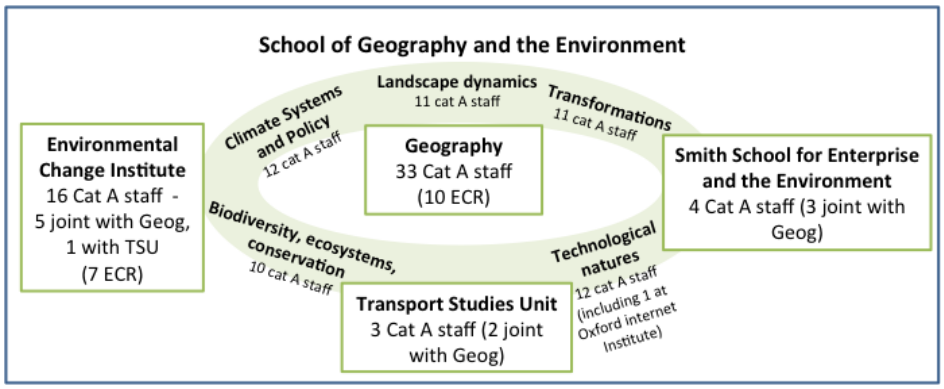

Figure 1: Shape and size of the School of Geography and the Environment showing staff and research links between Geography and the research centres (boxes) and the integrative role of the research clusters (encircling band).

Postdoctoral researchers and graduate students are an integral part of the School's research culture, supported by our **research apprenticeship** approach. The International Graduate School (IGS) continues to be one of the largest graduate schools in Geography and Environment internationally and plays a key role in developing and sustaining the discipline. Doctoral and MPhil research students are supported directly, or indirectly, by the School's four MSc programmes, each providing specialist teaching and training in different aspects of nature-society relations.

b. Research Strategy

Supporting a successful, sustainable School of Geography and the Environment

In the five years since RAE 2008 the School has continued to build on its claim to be a world-leader in the discipline for i) theoretical and methodological innovation in human geography, ii) global change research in physical geography, and iii) being a proponent of interdisciplinary environmental research combining natural and social sciences. In our 2008 RAE5a document we identified four foci to sustain and enhance our international research strengths. In summary these foci were to a) retain core staff and make additional strategic staff appointments, b) intensify the impact of our research clusters and International Graduate School (IGS), c) continue to strengthen research opportunities and the career development of postgraduates and early/ mid-career academic staff and d) further develop national and international research linkages through investment in visitor programmes, international activities and institutional affiliations.

Table 1 illustrates how the School has succeeded in enhancing our international research strengths since RAE 2008. We have almost doubled the number of Cat A staff and increased the number of Cat A early career researchers. The number of doctorates awarded per year has increased by 50%, and the School's annual average research income has trebled.

Table 1: Strategic growth in the School since RAE 2008

	RAE 2008	REF 2014
Cat A staff (FTE)	28.5	54.1
Cat A early career researchers	10	17
Other researchers	45.63	53
PhD degrees awarded (av per year)	16	24
PhD degrees awarded (total)	114	121
Research income (whole period)	£13.2 million	£31.60 million
Research income (av per year)	£2,018,649	£6,321,723

Our strategic aims and evidence of their achievement

In 2010 the vision presented in our RAE 2008 submission was formally developed into a new School research strategy through dialogue between staff and researchers at all levels during a series of away-days. These led to policy proposals adopted by the School Committee that prioritise six strategic aims that seek to provide a world-class research environment for its researchers.

Aim 1. Play a leading role in shaping the international research agenda by increasing the proportion of our research and scholarship that is recognised as 'world-class'. Evidence of the attainment of this aim comes from the production of many influential books and papers in top international journals (see REF 2 outputs), many of which are highly cited, and the research advances made by each research cluster (see pages 4-5).

Aim 2. Recruit and retain the very best researchers across the spectrum of work undertaken in Geography and the centres, at all levels from professors and lecturers to early career researchers. We aim to strengthen the connections between these constituencies, developing a supportive research environment in terms of knowledge exchange, mentoring and collaboration. Evidence of realising this aim includes securing three new senior posts and five new career development posts, and introducing annual career development reviews for all research staff.

Aim 3. Attract excellent national and international research students, fostering a commitment to 'research apprenticeship' as a key aspect of our research culture, strengthening the involvement of research students in the School's research community. Evidence of meeting this aim includes success in gaining prestigious doctoral funding (79 competitive awards and scholarships since 2008), 117 papers published since 2008 with, and by, doctoral students, and 25 postgraduates continuing as postdoctoral researchers in the School.

Aim 4. Sustain and enhance the resource base for communal research activities and for individual researchers and scholars, improve the support for external funding bids and provide internal support for seed-corn funding, enhance development-fundraising activity and develop a workload model that enables us to support major project bid/management activities. Evidence of attaining this aim is seen in the expansion of the School's research-support team; University investment in the refurbishment of research space to accommodate SSEE; the

receipt of 45 'pump-priming' awards from the Oxford University John Fell Fund and a 'Bridging the Gaps' award from EPSRC; and the trebling of the annual average research grant income from £2 million (RAE 2008) to £6.3 million in the current assessment period.

Aim 5. Encourage national, international and interdisciplinary research collaborations, aiming to enhance the School's attractiveness and effectiveness as a 'research hub' through organising international research events, engagement with the University Scheme of Visiting Professors, and development of the School-wide programme of Visiting Research Associates, (VRAs) Distinguished Scientists and Scholars. Examples of attaining this aim include the success of our first flagship 'Big Event' on 'Geographies of the Future' in 2012; a lecture series by Visiting Professor Norman Foster in 2010 and 2011; a Mellon Foundation award to fund a prestigious Sawyer seminar series on 'human creativity' (with Archaeology); and the appointment of 14 visiting professors and 115 VRAs in the past five years.

Aim 6. Promote the impact of our 'world-class' research, by enhancing distinctive strengths across the School in policy work with governmental and non-governmental organisations, public engagement research practices and methods, and research communications and events promotion. Evidence for the attainment of this aim includes hosting an international conference on Water Security, Risk and Society attended by a government minister and the Government Chief Scientific Advisor, and the evidence in REF3a and REF 3b case studies.

Developing, implementing and monitoring the strategy

Research activities are co-ordinated by the Research Committee (chaired by the School's Director of Research, and comprising the Head of School (HoS), research cluster coordinators, centre Directors, researcher and postgraduate representatives, and research and development support staff). The Committee discusses research strategy, monitors research cluster activities, sets priorities for cross-cutting research themes, promotes research opportunities within and beyond the university, and administers two funds, one to support new cluster initiatives and activities (£12k a year - £2k per cluster plus £2k cross-cutting) and another to support staff participation in conferences and other external research activities (£10k a year). Postgraduate research activities, including a competitive conference and fieldwork fund (£18k a year), are co-ordinated by the IGS Committee (chaired by the Director of Graduate Studies, and comprising the HoS, staff and student representatives, and the academic administrator). Our Postgraduate Consultative Committee discusses issues raised by postgraduate research (PGR) and MSc students, and reports termly to the IGS Committee. Laboratory, Equipment and IT Sub-Committees are responsible for proposing research investment in their respective areas. The Directors of Research and Graduate Studies, as well as the three centre Directors and the Director of Undergraduate Studies form the Executive Committee that advises the HoS on strategy, policy and other key issues. All committees report to the School Committee (chaired by the HoS and comprising all members of academic staff; centre Directors and Programme Leaders; MSc Course Directors and Departmental Research Lecturers and postdoctoral and student representatives).

To strengthen our research apprenticeship philosophy we have established mentoring policies and practices to support new academic staff, and a personal development programme for contract research staff. Additionally, we have created a new career development staffing category – five year Departmental Research Lectureships (DRLs) appointed jointly between Geography and one of the research centres. The role of the research centres in developing and implementing the School research strategy has been further strengthened by the negotiation and agreement of a common Memorandum of Understanding (MOU) on structural, staffing and financial arrangements between the constituent parts of the School (updated 2013).

Structuring our research environment to deliver our research strategy

The structure of the School's research environment and the wide range of activities that it has facilitated demonstrate how we are meeting the six strategic aims documented above. Here we outline first the structure and goals of our three research centres, followed by those of the research clusters that have been cornerstones of the collective research environment, to illustrate how the School is meeting **Aim 1** of the research strategy.

Research centres: The **Environmental Change Institute** is an interdisciplinary centre for research on the complex processes of global environmental change, the exploration of sustainable solutions and the promotion of change for the better through partnership and education. Over 55 postdoctoral and research staff contribute to the ECI's major research themes of climate, ecosystems and energy, to the UK Climate Impacts Programme (UKCIP, embedded in the ECI), and to a series of cross-cutting initiatives (e.g. sociocultural contexts of environmental change, climate decisions). The **Transport Studies Unit** seeks to advance innovative approaches to the study of 'transport futures' over time and space drawing on relevant, state-of-the art developments in Geography, environmental and transport studies, economics, sociology, psychology and the engineering sciences. With nine research staff the TSU's three major research themes address transport issues through different lenses: energy, environment and climate change, mobility, society and culture, and planning economics and governance. **The Smith School of Enterprise and the Environment** is an international centre focused on teaching, research, and engagement with enterprise on climate change and long-term environmental sustainability. Currently with four research staff, it works with social enterprises, corporations and governments to encourage innovative solutions to the challenges facing humanity. Berry, Eyre, James, Layberry, A. Otto (né Lorenz, ECI), Brand (ECI/TSU), and Hahn (SSEE) hold sole appointments in these centres. The strengthening integration between the Centres and the School is indicated by 14 jointly appointed Category A staff, including three DRLs appointed as part of the MoU revision in 2013. Joint appointments are Allen, Anderson, Doughty (DRL), Garrick, Girardin, Hall, Malhi, Moore, F. Otto, Riutta (ECI); Banister, Schwanen (DRL) (TSU); Clark, Hepburn, Hope (DRL) (SSEE).

Research clusters: As in RAE 2008, the School has five research clusters with the aim of providing a supportive, interdisciplinary research environment for all researchers. These clusters are active and dynamic entities, each with a small organising group comprising core academic and research staff, and two graduate students (contributing to our 'research apprenticeship' commitment in **Aim 3**). They arrange seminars, reading groups, peer mentoring and training opportunities. Researchers may join more than one cluster. Clusters have experienced thematic evolution reflecting new staff, developing research interests and synergies, and external drivers. The Arid cluster has been renamed Landscape Dynamics reflecting broadening interests and funding successes, and the Biodiversity cluster has added Ecosystems and Conservation to its core themes reflecting new staffing strengths and collaborations. The Climate Systems and Policy cluster has grown rapidly, particularly in its physical science capabilities and in association with Oxford's new partnership with the Meteorological Office, including a new Met Office research facility ('home duty station') based in the School. The Technological Natures cluster has strengthened work on mobility, and developed regional expertise in China and India. The Transformations cluster has strengthened work on global youth and diasporic populations, regional expertise in India and new work on inequalities in the UK.

Biodiversity, Ecosystems and Conservation addresses scientific and social science dimensions of ecological and biogeographical systems functioning, with principal interests in macroecology, island biogeography, diversity theory, ecosystem dynamics, conservation biogeography, conservation governance, biodiversity and climate adaptation and conservation and traditional ecological knowledge. Cat A staff are Malhi, Whittaker (Profs); Anderson, Girardin, Moore, Root-Bernstein (ECRs); Berry, Doughty, Grenyer, Riutta; there are also five PDRAs and 19 doctoral students. Several ECI researchers play key roles in the cluster, and many cluster members are also associates of Oxford University's new Biodiversity Institute. Key current activities include research on the resilience of tropical rainforests under future climate change (NERC funded); global ecosystems monitoring and trait study (GEM-TRAIT funded by an ERC Advanced Investigator grant); and biodiversity and ecosystems services (Besafe, EU funded).

Climate Systems and Policy focuses on three areas: physical climate and biogeochemical processes; impacts and adaptation to climate change; and mitigation policy and science. Cat A staff are Allen, Hall, Hepburn, New, Washington (Profs); James, Otto, A, Otto, F, (ECRs); Brand, Engelstaedter, Eyre, Layberry. There are also 12 PDRAs and 33 doctoral students. Major current activities include research on enhancing risk management partnerships for catastrophic natural disasters (EU); changes in urbanisation and its effects on water quantity and quality (NERC); the Saharan climate system (Fennec project, NERC) and the Oxford Martin Programme on Resource Stewardship. Key research achievements over the past five years include understanding transient

climate response and its policy relevance; observation and evidence of the role of dust in global climate; and development of risk-based approaches to the analysis of climate impacts and decision-making. The cluster has grown to become a focal point for very large ensemble downscale climate simulations since Allen and his group migrated from the Physics Department in 2010, linking to existing interests in local climate processes, impacts, risks and decisions.

Landscape Dynamics focuses on landscape processes and long-term dynamics, dryland environments and human-landscape interactions. It hosts the Oxford Luminescence Dating Laboratory and the Oxford Rock Breakdown Laboratory. Cat A staff are Thomas, Viles (Profs); Burrough, Coombes, Durcan, King, Sternberg (ECRs); Bailey, Bull, Dadson, Wiggs. There are also three PDRAs and 12 doctoral students. Several cluster members are also Biodiversity Institute associates. Current major activities include research on dust emission hotspots (DO4 Models, (NERC, also with Climate cluster staff), environmental dynamics in the Upper Zambezi (Leverhulme), and changes in urbanisation and its effects on water quantity and quality from local to regional scale (NERC). Major research achievements include linking field, laboratory and modelling approaches to identify complex dryland hydrological responses and local system feedbacks to global changes over 10^1-10^4 year timescales; applied technical advances in geomorphology; and identifying the role of small scale variability in moisture and organisms in weathering and in turbulent flow and surface parameters in aeolian processes and emissions.

Technological Natures: Materialities, mobilities, politics develops new understandings of society, politics and publics by examining how the ecologies of social life, even those that appear most 'natural', are articulated through forceful events, material arrangements and bodily experiences. Cat A staff are Banister, Whatmore (Profs); Barua, Garrett, Garrick (ECRs); Graham, Hope, Lora-Wainwright, Lorimer, McCormack, Powell, Schwanen. There are also five PDRAs and 28 doctoral students. The cluster has strong links with the Oxford Internet Institute (OII) as well as the University's Schools of Interdisciplinary Area Studies (SIAS) and Archaeology. Key activities include research on innovation and energy demand (EPSRC), living with pollution in rural China (Leverhulme), human creativity (Mellon Foundation), knowledge controversies in flood risk management (RELU), smart water systems (DfiD), biogeographies of European rewilding (ESRC), Indian elephant management (Elephant Foundation), and bodies on the move (ESRC).

Transformations: Economy, Society and Place seeks to better understand contemporary economic, social and political changes, at multiple spatial scales, from the household to the global economy. Research foci include institutional and life-cycle change; inter-generational equity; new class and gender divisions; and mobilities expressed in the geography of economic, social and cultural processes in and beyond the UK, including in India and parts of Africa. Cat A staff are Clark, Dorling, Hahn, Jeffries, McDowell, Pallot (Profs); Hennig, Klinke (ECRs), Daley, Waters, Wojcik. There are also eight PDRAs and 54 doctoral students. The cluster has major links with the University's Institute of Ageing, and the Centre on Migration Policy and Society (COMPAS). Recent activities include research on: the politics of unemployed youth (ESRC); mapping the global securities industry (ESRC); modelling relationships between transport poverty and social disadvantage (ESRC); Asian women's political activism (AHRC), and the consequences of austerity for young men (Leverhulme Trust). The cluster has also convened a Keywords in Geography seminar series (2012) and a conference on the Geographical Canon (2012).

Our 2010 research strategy also identified five 'cross-cutting themes' (governance, measurement, mobilities, nature of change, and temporalities) to facilitate interactions between research clusters, the constituent parts of the School, and the natural and social sciences to address **Aim 5**. Collaborative activities ('Big Events' based around one of these themes) showcase research, facilitate engagement with the wider community, and promote 'blue skies' thinking. The School is also an active participant in the new University-wide Oxford Networks for the Environment initiative (ONE), bringing together research expertise in biodiversity, climate, energy, food and water.

Our research strategy for the next five years

Our priority development goals for the next five years include consolidating our position as the 'hub' for interdisciplinary research on nature-society relations, enhancing our contributions to the development of geographical theory and practice, and advancing knowledge of, and responses to, interdependent processes of global environmental change. Progress towards all these goals will be facilitated by continuing our staffing strategy (see section c), developing our 'research

apprenticeships' to support early career researchers, and maintaining our funding base through development activities and winning competitive external funding. We plan to build on the progress made in the last five years by developing our strengths in environmental social science research and its policy impact and growing our academic staff numbers in this area. Our expertise in global regions will be strengthened by focusing on opportunities for joint appointments with SIAS, and by utilising fieldwork in our regions of strength to fill scientifically-pressing and policy-relevant gaps in knowledge. In addition, we plan to expand our computational expertise and 'big data' capabilities through strategic links with the Oxford E-Research Centre. Achieving these goals will continue to foster the relationship between the research centres and Geography, as well as strengthening research linkages between the School and other organisations (e.g. the Met Office).

c. People, including:

I. Staffing strategy and staff development

Staffing is a core element of the research strategy (see **Aim 2**), and since 2001 has been key to the reestablishment of Oxford as an internationally-leading geography department. We have successfully increased staff numbers in financially testing times, using our strategic research priorities to guide appointments. We have attracted excellent new staff, as well as developing 'home-grown' talent through research apprenticeships and promotions.

We aim to retain and recruit the best researchers throughout the School. This is evidenced in the current assessment period by almost no staff departures since RAE 2008 and the excellence of new appointees, whether senior academics with international reputations (e.g. Allen, Hall, Dorling) or outstanding early-career researchers who we will encourage to become the outstanding academics of the future (e.g. Durcan – recently awarded PhD (Aberystwyth), papers in *PNAS* and *Geology*; Garrett – recently awarded PhD (RHUL), papers in *Transactions* and *Environment & Planning D*). Furthermore, we have several examples of in-house career development: doctoral students becoming early career researchers in the School (Barua – papers in *Transactions* and *Environment & Planning A*; Girardin – papers in *Global Change Biology* and *Plant Ecology & Diversity*), and doctoral students transferring as PDRAs and then independent researchers (Brand, Burrough and Engelstaedter). The following staff have been promoted since RAE 2008: Wiggs (Reader), Barry, Jeffrey, New, Pallot, Viles, Washington (Prof). Our strategy for academic staffing excellence is not focused simply on immediate needs. Great importance is placed on building for the future and succession planning, through the maintenance of a career structure that has created a flourishing, sustainable, research environment. On-going appointments include McConnell as permanent University Lecturer (UL) subject to probationary requirements (starting December 2013) and two additional ULs to be advertised in early 2014.

The School has used a number of strategic opportunities to develop the staff profile and increase the quality and quantity of research including:

- Enhancing links between the School and its centres through new joint appointments (Hall as ECI Director; Clark as SSEE Director; Allen to a new Chair of Geosystem Science linking ECI and the School).
- Enhancing priority research areas through appointments following retirements or moves to other institutions: Powell (replacing Lemon), Lora-Wainwright (Buck) to strengthen our environmental humanities profile; Jeffrey (Langton) and McConnell (Barry, from December 2013) to strengthen links to SIAS; Dadson (replacing New who retains a 0.2 FTE research contract) to strengthen water science capability; Grenyer (replacing Willis, who moved to the Biodiversity Institute) to strengthen our links with biological conservation.
- Strengthening our research profile through newly created ULs (McCormack and Lorimer – both holding fixed term posts at the time of RAE 2008). Lorimer's post links human geography and biodiversity research.
- Supporting the development of research clusters through increasing the number of core-funded, fixed-term development posts for early career postdoctoral researchers (Durcan, Garrett, James, Klinke, A. Otto, Root-Bernstein) in Geography, when in 2008 there were only two (Currah and Lorimer).

- Further linking our research centres into the School research community through the new jointly-funded early career DRLs (Doughty, Hope, Schwanen).
- Winning prestigious external fellowships (eg Jeffrey and Sternberg, British Academy; Lora-Wainwright, Leverhulme; and Lucas (ESRC – now Reader at Leeds).
- Encouraging and mentoring postdoctoral researchers to develop independent research profiles and sustainable career trajectories (e.g. Anderson, Coombes, Girardin, Moore, Schwanen).

Staffing has been closely linked with the goal of developing the department as an interdisciplinary research 'hub', building collaborations within the University, as well as nationally and internationally. Lora-Wainwright has a 0.5 FTE joint appointment with SIAS. Waters has a 0.25 FTE joint appointment with Continuing Education. Allen retains a 0.35 FTE position in the University's Physics Department until 2016. Hepburn has a 0.3 FTE appointment with the Oxford Martin School. These examples indicate the role Geography plays in the connectivity of social and environmental research in Oxford. Recent evidence of the distinction of our staff at all levels includes Lora-Wainwright, Phillip Leverhulme Prize; Malhi, ERC Advanced Investigator award; McDowell, FBA and RGS-IBG Victoria Medal; Powell RGS-IBG Busk Award; Thomas, Geological Society of America El Baz Award.

The School has an active policy of career development and capacity building, including staff mentoring and appraisal systems. These benefit both new and established staff, with early career mentoring following the University's Code of Practice for the Employment and Career Development of Research Staff, introduced in 2008 as the implementation of the National Concordat to Support the Career Development of Researchers. The University gained the European Commission's HR Excellence in Research Award in 2012 for its systems and practices to support researchers' career and professional development. All School staff are encouraged to participate in training and specialist courses organised by the Oxford Learning Institute (e.g. introduction to project management, and career management for research staff). New and early career appointments are especially encouraged to identify training and skills needs at the outset of their employment, and to build a structured programme of career development activities. New lecturers also gain remission from standard teaching loads in the first three years of appointment, in acknowledgement of the extra time required to develop a teaching portfolio and in order to ensure they have sufficient time to focus on research. To help the career development of PDRAs we have developed an improved Personal Development Plan process supported by a training budget.

We strive for equality of opportunity for all staff, recognising that everyone can experience significant pressures from teaching and administrative loads in Oxford colleges, the School, and the wider University. We have used University reviews of School activities to remodel our UG and PGT teaching provision, ensuring both enhanced student learning opportunities and realistic teaching loads. Managing balanced workloads and sabbatical leave entitlements for academic staff is the responsibility of the HoS, in consultation with the Academic Administrator and Directors of Graduate and Undergraduate Studies. In order to protect research time, the workload model seeks to ensure a minimum of 40% time for research for all academic staff across a five-year period. We are working towards increasing this to 50%, through co-ordinated management of the School's aggregate teaching commitments as well as that of individual staff. All ULs and Professors are entitled to seek sabbatical leave for research purposes (one term accrued every seven terms). Between 2008 and 2013, 22 staff took a total of 43 terms of sabbatical leave. Staff are also encouraged to seek funded teaching buy-outs within the terms of major research grants. Within the assessment period Jeffrey and Lora-Wainwright benefitted from such buy-outs, with two fixed-term DLs being employed. The department has also funded six buy-outs from college teaching in the past five years to protect the research time of staff undertaking major administrative activities. In order to avoid overloading staff with administration, the academic directors of MScs rotate amongst established staff, and there are deputies for Directors of Graduate and Undergraduate Studies and of Research. Equal opportunity is also promoted by encouraging female staff to participate in the University's Springboard and Academic Leadership Development Programmes.

In the next five years we will seek continued growth in academic staff numbers at all levels, as well as retaining staff and replacing those who move to posts elsewhere or retire. We will continue our

policy of making staff appointments within our priority research areas, as well as through joint interdisciplinary appointments that will foster links with other departments. Two new ULs (one physical and one human) will be advertised in 2014. Three additional DRL appointments linking Geography and the research centres will be made in environmental social sciences. Building on our expertise in African societies and environments, a joint lectureship with African Studies is anticipated, complementing a similar joint appointment already made with Chinese Studies (Lora-Wainwright). Joint appointments with Law in the field of environmental law and with Statistics in the field of GIS are also being explored. We will continue to seek appointments of excellent early career researchers both to fixed-term career development posts (DRLs) and to work on specific projects, as both provide springboards to permanent appointments in Oxford and elsewhere.

c. II. Research students

Our International Graduate School (IGS) continues to be one of the largest graduate schools in geography and environment internationally. As evidence of success in meeting **Aim 3**, there is a close relationship between students on the four MSc courses (average intake 2008-2013 112 per year); those doing research degrees (MPhil and doctorates, called DPhil in Oxford, average annual intake 2008-2013 MPhil 7, DPhil 33); and our research clusters and centres, where engagement and interaction with graduate students is a central dynamic. Since 2008 we have developed the 2-year MPhil programme (2013 intake 11), as a result of rising demand from talented students who wish to gain research experience beyond a one year MSc. Many convert to the doctoral programme. The high quality of IGS students is illustrated by the many prestigious awards and scholarships they have won (e.g. ESRC - 2 studentships per year as part of Oxford's Doctoral Training Programme, NERC – 2 per year and now part of Oxford's new Environmental Science Doctoral Training Programme, AHRC, EPSRC, SSHRC, Carnegie, Commonwealth, Marshall, Rhodes). The IGS has also had great success with the University's Clarendon funding scheme - 25 awards in six years. During the assessment period, 165 doctoral and 37 MPhil students from 50 countries joined the IGS, with 103 DPhils and 30 MPhils awarded to date.

A goal of the IGS is to provide PGR students with excellent research training and engagement with the wider research environment, to create the research leaders and academics of the future. This is achieved by a strong process of supervision, progress monitoring, and numerous activities linking graduate students with research in the School. These include dedicated doctoral training programmes, poster-sessions, reading groups, and workshops in which postgraduates are centrally involved both as participants and organisers. The School has a fund of £18k p.a. to support 2nd and 3rd year PGR presentations at international conferences, and colleges also offer support to encourage conference participation. PGRs are closely involved with running the research clusters. We are a key participant in the Social Science Division's doctoral training programme which has ESRC recognition (2011-16). Its Management Board (of which McDowell is a member) sets standards for student training and supervision. PGR students all participate in the Social Science Division's 'Graduate Skills Toolkits' programme, a joint activity of the Bodleian Libraries and University Computing and Careers Services. PGR students undertake advanced training in information skills and online resources in the Bodleian 'Graduate Search Clinics' programme, which received an Oxford University Teaching Award in 2010. In addition, students are encouraged to attend relevant workshops in the Bodleian Libraries' 'WISER' programme (187 of our PGR students attended WISER, Toolkit, and ArcGIS workshops in 2012/13). The Radcliffe Science Library, part of the Bodleian, runs additional training activities targeted at our students and focussing on environmental and science themes. PGR students also have opportunities to teach at undergraduate and masters levels within the School, and we run dedicated training courses for them on tutorial teaching and running masters' reading groups.

All PGR students are supervised by at least one member of the established academic staff and, where appropriate, research staff may contribute to supervision. The University protocol requires termly reports (by supervisors and students) via an online system, monitored by the IGS Director. All PGR students have to upgrade from probationary research student status to full doctoral level within their first year and a formal confirmation of status takes place before thesis submission. Both stages involve submission of written work and presentations to a review panel of two academics who are not part of the supervisory team. Doctoral students may submit a traditional thesis or one

embedding four papers submitted to international peer-reviewed journals: the latter is increasingly favoured and engages students further in the culture of research, helping them develop a strong track record of publication in leading international journals (e.g. papers since 2008 in *Antipode*, *Environment & Planning A*, *Geology*, *Global Policy*, *International Journal of Urban and Regional Research, Nature, Nature Climate Change, Nature Geoscience, Science, Transactions IBG*).

d. Income, infrastructure and facilities

The School Research Office, established in 2004, plays a vital role in supporting staff in gaining funding, administering and reporting research projects, and is integral to **Aim 4** of sustaining and enhancing our research base. The research officer provides information and support at the early stages of preparing funding applications (often putting applicants in touch with those who have successfully obtained funding from specific schemes to provide peer support). Undoubtedly this has contributed to an outstanding track record in the School of securing major competitive research funding to support activities, embracing all the research clusters, centres, and staff at differing career stages.

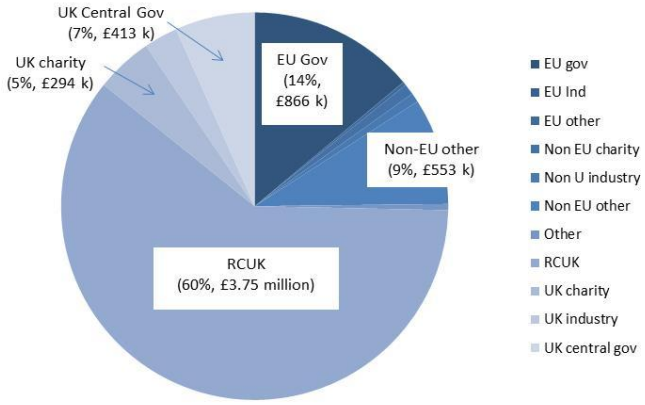

Figure 2: Research funding sources, 2012-2013, % by HESA categories

As shown in Figure 2, funding sources include RCUK (AHRC, ESRC, EPSRC, NERC), ERC, EU, and several Trusts and Foundations (including Leverhulme, Mellon, and Wellcome). In 2012-13 60% of the total research income of over £6.2 million came from RCUK. As well as grants won by individuals, there is a significant culture of collaborative grant-winning: within centres and clusters, between established and early-career staff, and across the university where a significant competitive advantage is gained by pooling expertise. Examples include collaboration between climate and landscape clusters on a major NERC-funded project linking terrestrial dust sources to atmospheric science and climate modelling (Washington, Wiggs, Thomas), and between Geography and Archaeology where Whatmore and Gosden (Archaeology) won funding from the Mellon Foundation for a Sawyer seminar series spanning the sciences and humanities on 'Human creativity: ecologies and practices of invention'. Research inputs are only as good as the outputs generated, and we strive to ensure that we meet the goals of external funders and projects. That we do so is shown by the quality of our research outputs, assessments of end of project reports and other indicators of achievement, for example Whatmore's ESRC/NERC-funded RELU project won the Programme's overall award for 'best example of interdisciplinary methodology and scientific innovation' for its findings, outputs and public engagement.

We strongly encourage staff at all levels to pursue new and innovative research opportunities that may ultimately lead to larger projects and disciplinary innovations and advances. The University's competitive Fell Fund supports novel and early-career applications to this end, and 45 departmental successes (total value £1.35 million) have included pump-priming for innovative research ideas from Hall (water security networks), Lora-Wainwright (China environments), Thomas (dating rainfall events in deserts), Viles (novel approaches to heritage conservation), and early career researchers including Burrough (tropical pollen analyses), Grenyer (reptile biogeography), Powell (archival research on Greenland and environmental theories) and Sternberg (climate hazards in Asian drylands).

Infrastructure and facilities

The large refurbished building, into which the School moved in 2005, has benefited from continual improvements and adaptations to meet our evolving research needs. Recent changes have included laboratory refurbishment and reconfiguration (forming the integrated Geolabs) to meet the changing needs of physical geographers in geomorphology, ecosystems, rock breakdown and OSL dating research; the creation of new high-quality spaces for the TSU and for doctoral research students (replacing several smaller rooms); and the creation of a new large climate science space to meet the growing needs of activities in Geography and ECI in this field. A further two-year, £3.3 million investment by the University in the building started in June 2013. The aim is to improve and reconfigure graduate teaching facilities and research centre accommodation, including refitting a new area to enable the SSEE to relocate from a distant and isolated site and join the School in a single facility that encourages intellectual interactions and research collaborations.

High-quality IT provision for all staff and research groups continues as a priority for investment, managed by the IT Committee. IT support staff numbers have increased from 3 in 2008 to 5 in 2013, including much strengthened Linux and GIS expertise. The range of equipment in our Geolabs (including specialised rock breakdown and luminescence dating laboratories, and general facilities) has been considerably expanded since RAE 2008, and laboratory activities are now supported by three staff with greater levels of expertise, all clearly embedded within the Landscape Dynamics research cluster and who all contribute directly to research publications.

All researchers benefit from the Oxford University Libraries Service, the UK's largest academic collection, holding 11 million volumes, with annual acquisitions of 240,000 volumes and 110,000 periodicals, and 50,000 journal E-subscriptions. The Geography subject collection of over 100,000 volumes, the largest in the UK, is housed in the nearby Radcliffe Science Library (RSL) and there is also a large specialist Social Sciences Library used by human geographers. In 2012 a new research facility - The Hive – was opened in the RSL, offering a range of online tools and applications including mapping & GIS programmes, which are now regularly used to support our research in addition to the facilities provided by the School.

e. Collaboration and contribution to the discipline or research base

Aim 5 focuses on the place of the School as a research hub in the University and as a leading contributor to national and international agendas in the discipline and across the wider social and environmental sciences. The School has played a leading role in the last 4 years in the University's efforts to create institution-wide collaborations in the critical science and policy fields of climate change, biodiversity, energy and water. As well as contributing to creating a critical mass that is greater than the sum of individual departmental parts, we have been able to develop our role in leading research agendas in these fields, and contribute to creating the interdisciplinary capacity to respond to policy challenges. The School is at the forefront of these networking initiatives, based on its outstanding research track records in the relevant fields. We play a central role in the University's ONE initiative Climate Network (Allen, coordinator, with Physics, Earth Science, Engineering and others) and Water Securities Network (via a major University Fell Fund award to Hall in collaboration with engineering). The School also plays a major role in several interdisciplinary Oxford Martin School initiatives, such as the Oxford Centre for Tropical Forests, the Resource Stewardship programme, the Institute for Carbon and Energy Reduction in Transport, and the Biodiversity Institute. The ECI leads the energy demand theme in the NERC-funded UK Energy Research Centre as well as hosting the UKERC 'meeting place' function. Other cross-cutting initiatives include the Leverhulme Diaspora programme (between Geography, COMPAS, History and Politics, McDowell).

The School has many research collaborations with other universities and external organisations that contribute to national and international agenda-setting research. In the assessment period major collaborations include RELU's 'Understanding environmental knowledge controversies' project (Whatmore PI, collaborating with Durham, Newcastle and UEA); NERC-funded Do4Models (Washington PI, Wiggs, Thomas Co-Is, collaborating with Sheffield, Imperial, Met Office, and U Cape Town); McDowell's AHRC Diaspora, Migration and Identity Programme (with Pearson at Leeds, Sundari at Lincoln); and many others. Several international and national programmes have

been led through the School, including EPSRC's UK Infrastructure Transitions Research Consortium (Hall, PI), and www.climateprediction.net (Allen, leader). Links beyond academia include the Met Office Academic Partnership, which provides strategic links to our climate modelling and climate impacts work; and longstanding, steadily growing links with CEH Wallingford (e.g. via Dadson's Changing Water Cycle projects, Allen's flood event attribution, and Hall's work as part of the UK Infrastructure Transitions Research Consortium (ITRC) on national hydrological modelling). For further information on non-academic partnerships and other ways we are meeting **Aim 6** see REF 3a.

There is also substantial engagement in major research-led policy dialogues by School researchers, including Hall as a member of the Adaptation Sub-Committee of the Independent Committee on Climate Change; Hall and Thomas acting as 'Lead Experts' in two UK Government Foresight projects (on Flooding and Environmental drivers of migration); Whatmore being appointed a member of the Defra/DECC Social Science Expert Panel; Viles on the panel developing the National Heritage Science Strategy for the next 25 years; and various contributions to the IPCCC 5th assessment from Allen, Banister, Hall, Thomas and Washington. The School has also organised and hosted several important conferences in themes cognate with its research ambitions and expertise including two Oxford Desert Conferences (2010, 2012), the Allianz Pensions Conference (2012), 4 Degrees and Beyond Conference (2009), ECI Conference on Deforestation and the Fate of the African Rainforest (2012) and the Water Network Conference on Water Security, Risk and Society (2012).

We continue to contribute significantly to professional associations and learned societies, including playing roles in developing their new research strategies. In the current assessment period for example, Whittaker has been Chair of the International Biogeography Society, Viles is Chair of the British Society for Geomorphology, Thomas sits on the RGS Council and Research subcommittee and is now Vice President for Research and Higher Education, Viles was Vice President for Fieldwork and co-convened the Society's Research Strategy process, Clark is on the British Academy Social Science Committee and McDowell chairs the British Academy Research Committee and is a member of Council. McDowell is a member of the Leverhulme Trust Research Awards Committee, Banister was a member of the ESRC Professorial Fellows Committee 2010 and Vice Chair 2007-12 of the EU European Research Centre – Advanced Investigators Grants panel, Whatmore is on the Leverhulme Trust's Philip Leverhulme Prizes Committee, Jeffrey and New sit on ESRC and NERC Committees. McDowell chairs the Foundation for Urban and Regional Studies, and Hall sits on the Policy Committee of the Royal Academy of Engineering.

Several staff edit important research journals in their subfields: Banister edits both *Transport Reviews* and *Built Environment*; Thomas co-edits *Aeolian Research* and *J. Arid Environments*; Whatmore co-edits *Environment and Planning A*; Whittaker is Editor in Chief of *J. Biogeography*; McDowell co-edits *Cambridge Journal of Regions, Economy and Society*; Schwanen is Editor in Chief of *Transport Geography*. Staff have also given journal-sponsored and other major lectures: Clark (the Roepke Lecture for *Economic Geography* in 2013); McDowell (the annual *Transactions* lecture, in 2010); Whatmore (the annual *Progress in Human Geography* lecture, 2008); and Dorling (the 2012 Beveridge Memorial Lecture, Royal Statistical Society).

The School's international standing and connections are demonstrated by staff also holding visiting positions at leading overseas institutions in recognition of their contributions to the discipline (Clark, Monash University, Jeffrey, University of Washington, Malhi, UCLA, Thomas, Universities of Cape Town and the Witwatersrand, Whittaker, University of Copenhagen), as well as Banister being the first Benelux BIVEC-GIBET Transport Chair (2012-2013). Our contribution to the development of the discipline nationally and internationally is also shown by the number of doctoral students and early career researchers moving to lectureships or equivalent posts elsewhere: Abrahamsson (Amsterdam), Arnall (Reading, Agriculture), Ashley (City, Business), Bhagwat (Open), Buckley, Markovich and Eckers (Toronto), Bumpus (Melbourne), Dixon (Bristol), Foxall (Queen's Belfast), Hari (York, Canada), James (Stockholm), Monk (Stanford); Munk (National Technical University, Copenhagen), Ramadan (Birmingham), Richardson (Durban), Rootham (NUS), Sallu (Leeds Earth Science), Telfer (Plymouth).