

Institution: University of Kent
Unit of Assessment: 14: Geography and Environmental Studies
<p>1. Unit context and structure, research and impact strategy</p> <p>Context and Structure</p> <p>The present submission encompasses the Geography, Environmental Social Science, and Conservation sections of the School of Anthropology and Conservation (SAC) at Kent, reflecting the research excellence of staff members and the inclusive spirit of the School. In 2015, the School's mission was renewed under the heading 'Understanding a Changing World', pursued from ecological, geographical, social, and evolutionary vantage points. This progressive new research strategy has enabled our staff to pursue world-class, outward-looking research. Individual curiosity and expertise are supported by a research environment that provides facilities – alongside forums for collaboration and critical exchange – creating knowledge and understanding with impact. Through this strategy, staff are supported in developing their own and the School's standing and visibility within the academy and beyond.</p> <p>Founded on disciplinary excellence from across the social and natural sciences, and committed to interdisciplinary working, the Unit includes two research groups: Conservation Science (8.15 FTE) and Geography and Environmental Social Science (4 FTE). This structure balances specialist excellence within two complementary research and practice paradigms. Our School-wide strategy has led to significant developments across our research groups, demonstrating the vibrancy of our research environment. Research productivity has intensified significantly since 2014. The number and value of awards has doubled, denoting intellectual maturity translating into complex, high-reward projects.</p> <p>Conservation Science. This research group develops innovative science that underpins effective conservation policy and action. Combining biological, environmental and social sciences for impactful solutions is a top priority. This builds upon an internationally renowned research centre, the Durrell Institute of Conservation and Ecology (DICE), which won the Queen's Anniversary Prize 2019 and secured over £7 million in research income in the REF2021 period (up from £4 million for the previous REF period). Significant funding has come from European and UK governments: 'RELATE Environmental space and the feel-good factor: relating subjective human wellbeing to biodiversity' (PI: Davies; ERC Consolidator, £1.6 million); 'Biodiversity and ecosystem processes in human modified tropical forests' (Co-I: Struebig and Davies; Oxford-led NERC consortium, £500k). Researchers lead community-embedded conservation projects (Darwin Initiative, totalling £1.4 million): eco-tourism and land-use planning, Maputaland (Smith); CITES in Madagascar (Griffiths); community land-rights in Borneo (Struebig); poverty alleviation and conservation in Kenya (Groombridge); and translocating conservation skills in Indian Ocean islands (Groombridge). Human-wildlife conflict is a growing research focus, e.g. tigers in Sumatra (PI: Struebig; Leverhulme Trust, £226k) and chimpanzees in Guinea (PI: Humle; Arcus Foundation, £76k), as is conservation planning, supported by Natural England (Smith and Davies, £138k) and NERC (Struebig, £415k). The group's research features extensively in leading journals (e.g. <i>Nature Sustainability</i>, <i>Conservation Letters</i>, <i>Global Environmental Change</i>).</p> <p>Geography and Environmental Social Science. This research group explores the complexity of interactions between people, place, and environment, and their governance. Enabled by the University's Kent Interdisciplinary Centre for Spatial Studies (KISS), their research is distinguished by significant capacity in the critical and applied social sciences and spatial analysis. The group has seen ~£600k of collaborations funded, including 'Reviving socio-ecological landscapes for biodiversity conservation and climate change adaptation' with Indian partner Applied Environmental Research Foundation (MacMillan; Darwin Initiative, £171k); the 'Low-input farming and territories' research project (Tzanopoulos; European Commission, £148k); 'Migrant Mobility and Access to Public Urban Resources' (Rock Rokem; ESRC, £50k; European consortium, £208k); 'Catchment Futures' for Southern Water (Fish, Tzanopoulos, £262k) and natural capital</p>

assessments in British Overseas Territories for the Joint Nature Conservation Committee (Fish, £52k). Fish also coordinates the NERC-led 'Valuing Nature' programme and leads a Knowledge Exchange programme for Defra's 'Sustainable Intensification Research Platform'.

Research Strategy 2014-20

For REF2014, SAC presented a research focus based on two overall objectives:

1. To engage in world-leading interdisciplinary research, including interactions between the Unit's sections, while consolidating our core areas of uniqueness and strength, including particular regional specialisms;
2. To support leading-edge research that establishes research agendas, and sets and/or responds to emerging trends and theoretical orientations.

We have successfully met these complementary aims: the first through strategic recruitment and our outstanding research centres; the second through an open series of collaborative research events alongside targeted support for our researchers. This involved specifically:

1. *Strategic recruitment of world-class staff in key areas.* In Conservation Science, the appointment of Bicknell (initially PDRA, then Lecturer in 2019) consolidated strengths in tropical ecology, expanding our regional expertise to the Northern Amazon, while the appointment of Bull (2017) grew our strength in the area of private sector biodiversity conservation and regionally in Central Asia. We have appointed to expand strategically towards human geography and environmental social science: adding Fish (2015) and Hampton (2017; 0.5 FTE; returned in another unit) at Reader level, and Rock Rokem (2019) and Haque (2020, to start in September 2020) at Lecturer level. Longstanding thematic foci – on economic (MacMillan) and spatial (Tzanopoulos) dimensions of agricultural land use and environmental change – have thus broadened to include: social-cultural and participatory approaches to environmental decision-making (Fish); tourism geographies and economic development (Hampton); urban and political geographies (Rock Rokem); and development geographies and gender (Haque).
2. *Research centres.* Our research centres provide forums for cross-School collaboration, whilst substantially enhancing the School's external research profile. DICE, with its 32 academic members, 20 associate and honorary members, 14 advisory board members and more than 1,300 alumni, reaches considerably beyond what could be expected from a unit of only 13 staff members. Of notable importance during this period has been the creation of a new research centre: the Kent Interdisciplinary Centre for Spatial Studies (KISS). These centres organise high-profile events, such as the NERC-funded 'Valuing Nature and Participatory Decision-Making' conference led by KISS in 2016. They also conduct capacity-building activities, such as DICE's major 2014 joint symposium with the British Ecological Society, 'Considering the Future of Conservation'. Importantly, they respond dynamically to research users in a diversity of knowledge exchange interactions, such as KISS's work on catchment management with Southern Water, and DICE's work with police and UK border control on the illegal wildlife trade.
3. *Research seminars and other events.* Fostering engagement with emerging research, our research groups convene annual seminar series, bringing together students, postdoctoral researchers, staff, visitors, and affiliates – hosting more than 200 seminars since 2014. The high-profile DICE and KISS annual lectures celebrate our vibrant research culture, attracting hundreds of people. Our seminar series enrich the research environment, encouraging cross-disciplinary interaction. Examples include three international symposia: 'Anthropocene and Planetary Crisis' (2017); 'Cities Against Nationalism?' (2019); and 'Cities and Nationalism: Comparing Conflict across Geopolitical Faultlines' (2020). Adapting to circumstances, DICE organised an online Twitter conference in 2020, reaching more than 1.3 million unique users. Multiple reading groups have also emerged during the

assessment period, including the Human Ecology Reading Group and the SAC-led University reading group on the Anthropocene.

4. *Support for our researchers.* We enhanced our Director of Research role and created a Research Development Officer post. Together, they developed the Shared Practice in Research training programme and a Research Support Framework, including: planning and vetting of proposals; an annual staff survey about research challenges; tactical use of sabbaticals; a research mentoring scheme; and the allocation of generous overheads to principal investigators. This led to an unprecedented increase in the number and value of funding applications (21 and £8.4 million, respectively). Research income has consistently risen since REF2014 (almost £5 million cumulative), to record levels in 2018-19 (£1.38 million). Furthermore, 90% of our staff applied for external funding in the REF period, with 71% in receipt (compared to 65% in the previous cycle). We have had a balance of major and smaller grants, awarded from a diversity of funders, and been successful in attracting postdoctoral researchers annually.

As a result of these measures, our 13 staff have produced just over 350 peer-reviewed articles in influential journals, including the *Nature* family, *Conservation Letters*, *Global Environmental Change*, and *Political Geography*. We have cultivated global research agendas, responsive to emerging trends at the interface of people and the environment, through a variety of high-profile projects, for instance on: invasive species (Groombridge); sustainable water management (Fish, Tzanopoulos); wellbeing and biodiversity (Davies, Fish); deforestation (Struebig); wildlife trade (Roberts); and environmental DNA (Griffiths).

Research Strategy 2021-26

Over the next five years, we will develop nascent research areas whilst promoting existing strengths – through tailored in-house project support, strategic recruitment, research centre expansion, and generous support to events – maintaining the Unit's distinctive profile. A particular focus is growing our Geography and Environmental Social Science group, alongside our historic strengths in Conservation. However, we will continue to engage with, and support, other intellectual opportunities, not least through existing mechanisms for academic discourse (e.g. seminar series). Wider support, including practical funding advice and resources for targeted workshops, will be provided by the School to enable capacity-building and publication in promising new research areas. Encouraged by our trajectory in attracting research funding since 2014, especially relative to our size, we will continue to submit large and small grant applications across research groups, and enhance funding for research students and postdoctoral researchers. We also plan to build substantially on DICE's growing international reputation.

The Conservation Science research group will:

- Grow its portfolio of innovative and applied research projects, responding to global challenges (e.g. biodiversity conservation alongside agricultural expansion);
- Continue building on core expertise in natural and social conservation sciences, expanding strengths in multidisciplinary research, building marine conservation capabilities to match those terrestrial capabilities;
- Inform conservation solutions with real-world impact, through government and corporate policy-decision support, and NGO engagement;
- Play an increasingly important role in UK conservation policy and practice by introducing new approaches and methods developed through our international work;
- Help develop effective approaches to achieving the post-2020 Convention on Biological Diversity targets, working with our international networks and using our expertise in co-developing research with government, civil society, and the private sector.

The Geography and Environmental Social Science group will:

- Continue to grow and diversify our research specialisms in geographical knowledge production to complement the existing environment, political, urban, and development geography focus;
- Alongside UKRI funding, build on existing partnerships for research innovations with regional and other research funders, focusing on innovation in spatial analysis, land-use planning, and urban mobility;
- Create a vibrant taught masters and PhD research community that can further bind together our nascent teaching and research culture in spatial studies;
- Strengthen KISS's role as an enabler of research and its impact, capitalising upon University-wide interests in space, place, and landscape.

At the University level, the recently launched Signature Research Themes will build capacity for work in the complementary area of Environment, Food Systems, and Natural Resources, while the new Division of Human and Social Sciences – which incorporates SAC with the Schools of Psychology, Politics and International Relations, and Economics – will embed our research groups in a new context for cross-disciplinary research collaboration.

Impact Strategy

Our research is conducted in close conjunction with users across the public, private, and third sectors, and thus has a strong element of co-production to it. Although global in reach, our work is also highly sensitive to locality and context. More generally, we actively link research to public dissemination, debate, and scrutiny, and influence political debate about issues that define our research and its wider relevance. We have long-term relationships with a variety of non-academic users and beneficiaries, including government departments, regulatory bodies, international organisations, NGOs, zoos, community groups, schools, and the private sector. Our research impacts these audiences via: a) provision of expert advice (e.g. applying and testing decision-support tools for realising strategic conservation resource management goals, delivered through contracted consultancy reports, invited briefings, and training courses); and b) interviews, articles, and dissemination via non-academic media outlets, alongside outreach.

We achieve impact by embedding users throughout the research process. This includes: co-production of methodologies with potential users early in research development; disseminating findings to users as research unfolds; translating outputs into formats for users outside academia; and extending research into the public domain. There are many examples of impact realised through contracted research, with staff commissioned directly by a government department, company, or charity; shaping policy debates and even changing organisational policies. For example, Humle's assessment of mining impacts on chimpanzees (Rio Tinto, Guinea, West Africa) resulted in the redesign of operational plans. Fish and Tzanopoulos developed the 'catchments capabilities approach', supporting Southern Water in their planning of the water environment (South East England). Griffiths and Tzanopoulos advanced innovations in Great Crested Newt distribution modelling for Defra, influencing how legal obligations are met for this protected species. Davies and Struebig investigated the relationship between forest vertebrates and carbon, informing WWF activities. Roberts provided expert opinion to Defra on using stable isotopes and trace elements to identify tropical hardwood timber origins. Others have attracted attention from a broad range of stakeholders; e.g. Bull presented his 'Conservation Hierarchy' work at the 2020 World Economic Forum (Davos), and the IUCN subsequently adopted a motion to support its implementation, while fashion giant Kering S.A. modelled their global biodiversity strategy upon it (2020).

Relationships developed during fieldwork are fundamental to securing long-term impact. Engagement with people in the field ensures our staff's expertise is valuable to primary and secondary research users, also creating new audiences for it. The School recognises that trusted relationships created from fieldwork ultimately facilitate meaningful and lasting impact that matters to users. Therefore, the School encourages staff to carry out sustained fieldwork as a mechanism for enabling impact. Certain projects based on fieldwork have had the capacity to interact with wider issues of citizenship and community development; for instance, through education,

outreach, and training. We develop strong relations with, and provide expert advice to, diverse stakeholders. For instance:

- *Government.* Struebig and Bicknell's work with: the Government of Sabah, Malaysia, on legislative management of riparian areas in palm plantations, and the Indonesian government evaluating performance and guiding allocation of social forestry permits; Tzanopoulos's work on the sustainability of low-input farming with the European Directorate-General for Agriculture and Environment; Fish's knowledge exchange research work for Defra on farmers' uptake of practices of sustainable agricultural intensification and his advice to the Federal, Provincial, and Territorial Governments of Canada on Ecosystem Assessment;
- *Government agencies and advisers.* These include Natural England, via work on: Conservation Planning research on the Thames (Smith); roll-out of a District Level Licensing scheme to manage great crested newt populations (Griffiths); cultural ecosystem service assessment (Fish); and Bull's advice to the UK Parliamentary Office on Science and Technology on Biodiversity Net Gain.
- *Regional Councils.* Davies has provided Kent County Council with a needs assessment on open space provision; Rock Rokem supports Canterbury Council, Kent County Council, Lower Thames Crossing, and London Borough of Tower Hamlets on transport accessibility and infrastructure development.
- *Wildlife Trusts:* Smith has advised the Berkshire, Buckinghamshire, and Oxfordshire Wildlife Trust on nature recovery networks.
- *Training courses.* Our expert advice is complemented by wider enabling activities for stakeholders, namely training courses for those outside academia: World Conservation Monitoring Centre (WCMC) staff on conservation planning software for protected area expansion, Republic of Korea (Smith); Natural England staff on eDNA (Griffiths); and Macaw Recovery Network staff on conservation genetics and monitoring endangered parrots (Groombridge).
- *Capacity-building.* A decisive feature of all five Darwin Initiative projects during the period were, for instance, 'fair wild' certification and climate change adaption in India (MacMillan); as well as work for the Foreign Office/JNCC on Natural Capital Assessment across the British Overseas Territories (Fish).
- *Education.* This includes mentoring Arcus-funded PhD student Lucie Duonamou in China, and the training of 12 young Guinean primatologists in survey techniques, biological samples, statistics and social science methods (2019-20, Humle).
- *Technology.* This includes iTrade software, developed by Roberts with School of Computing colleagues to automatically identify illegally traded items, saving enforcement officers valuable time. Stakeholders include the National Wildlife Crime Unit, Wildlife Crime Unit (Metropolitan Police), UK Border Force, Environmental Crime Squad (Amsterdam Police), International Fund for Animal Welfare, TRAFFIC, and the World Society for the Protection of Animals.

To increase research uptake by users, practitioners, and the public, we also encourage public engagement, media broadcasts, and outreach and widening participation, for which we appointed an academic Outreach Coordinator (2015), including:

- *Public engagement.* Participation in the ESRC festival of Social Science, with, for example, Tzanopoulos's '50 Farmers' Tales' project leading to an oral-history documentary presented at a local Curzon cinema. Davies organising a funded Soapbox Science event in Canterbury (2018) to foster public interest in science, promoting wider understanding of our research.
- *Media and non-academic outlets.* SAC's media impact value was estimated at over £3 million in 2015, helped by the strong international profile of our staff and students. Staff have actively engaged with the global media by contributing more than 1,800 online items, in major outlets; e.g. the *Guardian*, BBC Radio. We also contribute to popular academic

platforms, including *The Conversation* (MacMillan, Humle, Davies, Struebig, Bull and others) and *Mongabay* (Bicknell, Struebig, Davies).

- *Outreach and widening participation.* Together with our nine postgraduate ambassadors, we visit secondary schools preparing A levels in Biology and Geography, sharing insights on conservation and human geography, and guidance in developing independent research projects. These activities showcase our research and cultivate aspirations to pursue study our fields of expertise.
- *Training the next generation of scholars.* Through CASE studentships, researchers have partnered with Durrell Wildlife Conservation Trust, Balfour Beatty plc., Paignton Zoo, Chester Zoo, Bermuda Environment Department, Jersey Environmental Services, ARC Trust, Zoological Society of London, Southeast Asian Rainforest Research Partnership, Butterfly Conservation, WWF, South East Asia Rainforest Research Partnership. DICE alone trained hundreds of PGT students from over 100 countries through its world-class MSc programme, who now hold leadership roles or run applied conservation projects worldwide.

The School facilitates impact through our 2017 research impact strategy, 'Transformative Research', deepening understanding of impact among academic staff, and fostering awareness of engaging research users. Impact activities are included in annual research audits where staff develop individual and/or collective impact plans. More specifically, the School has supported:

- Approval of study leave focused on impact and reallocation of administrative/teaching duties for researchers developing impact case studies;
- Allocation of over £100k of internal funding to add value to impact activities;
- Appointment of impact assistants and translators to support evidence gathering;
- Facilitation of collaboration with an illustrator to translate research findings;
- In-school workshops on developing pathways to impact (2017, 2020);
- Facilitation of workshops to embed users early and throughout the research process.

The future vitality and sustainability of our impact will be supported by:

- Providing annual training on impact, tailored to disciplinary needs;
- Appealing to research-user reviewers for major grant applications;
- Considering impact potential when hiring new staff;
- Encouraging participation of stakeholders outside academia in symposia and workshops;
- Increasing collaboration on articles with sectors outside academia, from 6% (e.g. Smith in *Conservation Letters* with BirdLife International; Bull in *Nature Ecology and Evolution* with IUCN, Wildlife Conservation Society and World Wildlife Fund) to 10%;
- Further exploring innovative translational work, such as artistic visualisation (Fish and Davies's graphic novels *The Roots of Transformation* and *A Woodland Journal*);
- Providing training on drafting policy briefs and infographics.

2. People

Staffing Strategy

Our staffing strategy attracts the very best researchers and strengthens our established specialisms, but also stimulates the emergence of new research fields, creates innovative collaborations and encourages research that is transformative within and beyond disciplines. Thus, we deepen and widen the remit of our research groups, strengthening the Unit by developing new collaborative positions, creating new labs and research centres.

Our academic staff body has grown slightly since 2014, through internal investment and external funding. Staff comprise two Lecturers, one Senior Lecturer, five Readers, and five Professors. In Geography and Environmental Social Science, the following new posts were created: Fish (2015); Hampton (2017; shared appointment with the Business School); Rock Rokem (2019); and Haque

(2020; in post after 31/07/20). The Conservation Science team is a longstanding one, with established specialisms complemented by the hire of Bull (2017) and Bicknell (2019).

Major research grants created further ECR posts, with postdoctoral researchers now at an all-time high, adding considerable vitality to the research groups: Austen, Fisher, Maund, Royer (all ERC-funded); Bicknell, Boron, Bride, Luke, Saratsi, Stewart (NERC); Jackson, Tollington (European Commission); Bormpoudakis (Defra, ARC Trust, Southern Water, SAERI); Deere (Leverhulme); Mitchell, Voigt (NERC); Buxton (ARC Trust, NERC); V.-Canelas (SAERI); Betz-Heinemann (Southern Water). One post was internally funded in genetics to support the research of a member of staff with significant administrative duties (Labisko).

Staff Development

Career development is a priority. Appraisal, mentoring, probation, study leave, and promotions are managed in line with Kent's equal opportunities policy and Academic Career Map, recognising and rewarding talent. The Unit has disseminated and embedded the Concordat to Support the Career Development of Researchers in practices overseen by the Research Committee (RC).

Appraisals. Staff appraisals are conducted annually, and are an opportunity to discuss career trajectory. In addition, annual research audits are conducted by the Director of Research under our School's Research Support Framework, discussing research aspirations, plans, and needs.

Study leave. The Unit is committed to supporting fieldwork, applying the University's study leave policy to all staff with flexible timing to allow combinations of funded and unfunded leave into longer periods. Study leave plans are scrutinised by the RC, checking alignment with Research Strategy. During the REF period, over 50% of staff benefited from study leave, with 19 terms of leave granted.

Promotion. Recognition and reward for activities is primarily achieved through promotion. Although the Unit does not nominate candidates for promotion or make promotion decisions, it has a panel that encourages staff applications – especially female staff – providing constructive feedback on draft applications. Since 2014, three staff have been promoted to Professor (Davies, Groombridge, Smith), six to Reader (Davies, Humle, Roberts, Smith, Struebig, Tzanopoulos), and three to Senior Lecturer (Bull, Humle, Struebig): 12 individual promotions for 13 permanent members of staff. Recognition also came via University Research Prizes (Bicknell, , Griffiths, Davies, Struebig).

Training. The University offers extensive training through its Learning and Development programme, accredited Unit for the Enhancement of Learning and Teaching, Graduate and Researcher College (Researcher Development Programme for PGTs/PGRs), and Research and Innovation Services (Grants Factory, ECR Network). In line with the Concordat, the Unit offers tailored training (six events a year, on average) via the annual Shared Practice in Research programme, including: media training, excellence in scholarship workshops, open access, and GDPR information sessions. There is a School Learning and Development budget for staff.

Support for research development. Unsuccessful funding applications are reviewed by our RDO, assessing suitability for other funders. Less-experienced staff, and those few staff whose grant proposals have been regularly rejected, are supported in preparing applications through mentoring, best-practice sharing, and one-to-one support. External feedback on the quality of our publications is sought annually and provided to staff, enabling them to gauge research quality.

Support for ECRs. The School's Workload Allocation Model (WAM) protects new appointees' research time, reducing teaching and administration loads by 50% (first year) and 25% (second year). All staff are encouraged to take on administrative roles for career progression towards early promotion, and the Unit's promotion panel includes an ECR. ECRs are invited to join PhD supervisory teams to gain experience, and start establishing their own research team, through proposing PhD projects to DTPs. Our bi-annual research fund calls prioritise ECRs. ECRs on probation are assigned a senior mentor to support integration and development, monitoring their intellectual and academic development and ensuring that they take advantage of opportunities.

Elements of our Shared Practice in Research programme are ECR-specific, such as a six-hour grant-writing workshop with discipline-specific advice. Initiatives from postdoctoral staff, such as organisation of seminars and conferences, are especially welcomed. PDRAs benefit from the same level of support as senior colleagues, with a career-supporting probation programme. Since 2016, supervisors of postdoctoral researchers have been allocated WAM credits to ensure dedicated support.

Research Students

We maintained PGR student intake throughout the period, with approximately 20 new PhD and four MRes students annually. PGRs now equate to 16% of the School's student population. With 56.17 PhD and 21 MRes awarded since 2014, the School surpassed the 48.5 submitted to REF2014. These numbers are testament to our strong international reputation for research, success in securing scholarships, and demand from our graduates to undertake MRes. Our PhD students won the annual RSPB Award for Outstanding PhD three times (Bicknell, 2017; Hinsley, 2018; Robinson, 2019). In 2019, PhD student Nguyen was included in the BBC's annual 'Women of the Year' list.

In this REF cycle, the Unit won 22 UKRI (NERC/ESRC) studentships and 32 from other funders, exceeding our REF2014 numbers. These other studentships have been awarded internally (e.g. Vice-Chancellor's Scholarships or SAC Graduate Teaching Studentships) and externally from governments and charities (e.g. Patsy Woods Trust, Carr Foundation, Kew Royal Botanic Gardens, WCPF, Royal Thai Government). MSc Research students have also been successful in attracting external funding (particularly Chevening and Darwin Initiative). DICE offers an annual scholarship funded through private donations.

The high quality of our PGR training and supervision is ensured by the following mechanisms:

- *UKRI doctoral training, provided to all PGRs irrespective of funding source.* The Unit is part of a NERC Doctoral Training Programme (EnvEast, now ARIES), one of 15 DTPs, as well as ESRC Doctoral Training Programme SeNSS (we participate in the Science, Technology, and Sustainability pathway). Training events include: 'Geographic Information Systems and Spatial Analysis' (Tzanopoulos); 'R for Environmental Research' (Griffiths); 'The Use of Drones in Conservation Surveys and Assessments' (Roberts); 'Capture and Analysis of Data Using Camera Traps' (Humble); 'Think Big: Innovation in Research' (Griffiths); and 'Careers in Conservation and the Environment' (Griffiths). Together with Kent's School of Mathematics, Statistics, and Actuarial Science, we were awarded NERC Advanced Training funding (2016-19, £82k) to run statistical ecology training.
- *Kent Graduate and Researcher College's (GRC) policy and training.* The GRC champions the strategic development of provision for graduate education and research across the University. It runs the Researcher Development Programme for PGRs and PDRAs, and robust training for supervisors. Alongside specialist training, PGRs are encouraged to develop transferable skills offered by the GRC (to which staff contribute) and the Unit for the Enhancement of Learning and Teaching. Each year, the GRC's Postgraduate Experience Awards fund student-led events.
- *SAC structures and provision.* Synergies between the School's four research groups - the two others being social and biological anthropology - create a stimulating interdisciplinary context for graduate research. Team supervision is mandatory (minimum two supervisors). Formally recorded meetings take place between student and supervisors monthly, together with an induction review (six weeks), probation review (10 months), second-year review (24 months), and third-year review (36 months). Supervisory panels monitor training (e.g. personal development plans), engagement with the Researcher Development Framework (supported by the GRC), and review progress. All PGRs have access to desk space with networked computers. They must attend three doctoral training courses, including professional development skills. They also benefit from access to PGT modules that encourage them to engage with theory and multidisciplinary research methodologies.

Support for our PGRs is provided via:

- Three PGR seminar series, and four additional seminar series organised by the School's research groups.
- Five research centres affiliated with the School.
- Stirling, DICE, and KISS annual lectures (around which PGRs have workshops involving the keynote speakers).
- Specialist training, including 'R for Environmental Sciences'.
- Support for events. The unit has hosted several conferences to which PGRs have contributed; for example, the 2014 Postgraduate Research Festival 'Valuing Nature' (2016).
- The student-led Conservation Society, and Women in Conservation Network.
- Reading groups with a strong postgraduate contribution; e.g. The Anthropocene, Human Ecology (the latter is now superseded by Geography and Environmental Social Science).
- Active support and encouragement to publish research. The majority of our PhD students have published in peer-reviewed outlets.
- Support for grants. PGRs are encouraged to apply for competitively awarded research funds. SAC bursaries (£500 per annum) are available to all students, and the Division runs a PhD top-up fund for research expenses.
- Support for job applications. Over 20 of our PhDs went on to university lectureships and research positions worldwide (UK, USA, Canada, Brazil, Mexico, Chile, Tanzania, Ethiopia, Namibia, Malaysia, Bangladesh, Seychelles). Over 15 have integrated conservation research positions; e.g. WWF, IUCN, IIED and Panthera.
- Reduced teaching loads for GTAs, and support from a GTA Coordinator.
- Walk-in pastoral care from a dedicated officer, who also disseminates a range of wellbeing initiatives.
- Dedicated, newly refurbished social spaces.

The vast majority of our students complete their studies within their degree registration period. PGRs often study with practitioners (e.g. NGOs, government agencies), acquiring skills that enhance employability; 98% are employed or in further study within six months. The School has achieved top 10 positions for student experience and employability (DLHE 2016), and is renowned for our high-quality PGT and PGR community (100% satisfaction in PTES 2016).

Equality and Diversity

We achieve staff satisfaction by creating an open, inclusive, fair, and democratic workplace. Our transparent Work Allocation Model protects research time uniformly, and includes credits for leadership roles and PGR and postdoctoral supervision. We encourage colleagues to conduct research in areas that enthuse them. We also identify early on where colleagues might be struggling, and proactively giving them support. This applies equally to PGR welfare.

Following three years of preparation, including focus groups and efforts to address substantial lessons learned in the process, the School received its first Athena SWAN Bronze Award in June 2020. Currently, 16% of the total FTE are women (40% across the School), one of them having been promoted to Chair during the REF period (Davies). On research-only contracts there has been an even gender balance, and our PGR community is 67% female. In the REF2021 period, the Unit appointed its first female Director of Research (Davies, 2016) and Head of School (Kivell, 2019), and, encouraged by successive Heads of School to pursue leadership roles, female staff have undertaken the LFHE Aurora Leadership programme and Women's Leadership Programme. The Women in Conservation Canterbury Network was founded in 2019 by female students and staff, with a mission 'to advance inclusivity and gender equality in conservation'.

Female staff coming back from maternity before 2019 were given a 20% reduction in teaching load, and from 2019 a term of study leave. Staff with other special circumstances benefited from discretionary leave and flexible arrangements, i.e. phased return to work (one staff), part-time work (one staff). Part-time and fixed-term staff benefit from exactly the same career development

opportunities: training, study leave, and research funding (both external and internal). Maternity, paternity, adoption, and sickness leaves count as qualifying service when calculating study leave entitlement. Those with caring responsibilities or health issues were enabled to work remotely if necessary, even prior to Covid-19.

We recruit widely and promote diversity across the staff base. New staff during the REF period represented varied geographical origins, including France, Greece, and Israel. All ages and career stages have access to the same opportunities and support. We observe the University's policies towards colleagues with disabilities, who constituted 15% of staff across the School since 2014. We go further in the area of mental health by offering 'mental health support' and emotional wellbeing sessions specifically for PhDs and PDRAs; and sessions about appropriate behaviour in off-campus academic-related activities. In 2019, training about what constitutes a healthy laboratory environment became mandatory for supervisors based in laboratories. The Head of School received mental health training from the charity Mind.

The Unit is aware of remaining shortcomings on equality and diversity, these having been assessed through the Athena SWAN process. In 2017, staff and students were surveyed about work culture, workload, work/life balance, leave, and promotion. Subsequent focus groups discussed areas of discontent. An Athena SWAN task force was constituted to establish an action plan and implement it. Actions included: a Code of Conduct for off-campus research activities, now adopted across the whole University; limiting meetings and events to primary-school opening hours; measures to promote gender balance on promotion panels; unconscious bias workshops for all staff (2017, 2019). Additional e-learning on EDI is compulsory; new members of staff must complete it within six months. The School requires all staff on recruitment panels to have undertaken awareness training on equality. All adjustments associated with lockdown owing to Covid-19 have taken matters of equality and diversity into consideration.

Our REF preparations have been open and inclusive, observing the University's Code of Practice at all times. We sought views from all staff members on their own outputs; all external feedback has been shared with them, with annual opportunities to discuss.

3. Income, infrastructure and facilities

Income

Since 2014, we have pursued two strategic aims: 1) applying to larger grant schemes; and 2) recruiting more ECRs for postdoctoral research. In both aims, we have exceeded expectations, maintaining an upward trajectory for research applications, awards, income generation, and staff participation. Research income during the REF period was £4.92 million. This figure obscures a massive, sustained increase in grants competitively awarded, by value: £7.6 million since August 2013 (excluding standalone doctoral grants) and 56 in number (compared to £3.8 million and 38 awards in the REF2014 period). We have built from a foundation of small grants, mostly from charities, to major awards in each research group. Of the awards in the REF2021 period, 16 were in excess of £100k (in comparison to nine in the previous period): one ERC Consolidator (Davies, with Fish as co-I); one Leverhulme Research Leader (Struebig); three NERC (Davies, Struebig; Griffiths as co-I); five Darwin Initiative (Groombridge x 2, Griffiths, Struebig, Smith); one GCRF (Davies with Smith); two European Commission (Groombridge, Tzanopoulos); one Defra (Griffiths with Tzanopoulos); one Leverhulme Project Grant (Struebig); and one from Southern Water (Fish and Tzanopoulos). Our funders include international organisations (United Nations Environment Program), UKRI (e.g. GCRF), governmental agencies and departments (e.g. Natural England, Defra, DfID), European funding (e.g. COST, ERC), charitable and wildlife/conservation trusts (e.g. Leverhulme, Arcus; Mohamed bin Zayed Species Conservation Trust), and professional associations (Ornamental Aquatic Trade Association).

Infrastructure and Facilities

The Unit periodically reviews its organisational infrastructure for nurturing research activity. Each of our research groups has a Head, who provides intellectual leadership and mentorship to staff,

encouraging them to pursue research interests, secure funding, and cultivate meaningful impact. Our Research Committee (RC) and Director of Research (DoR) coordinate research strategy and monitor implementation, vetting grant applications, annual appraisal, and study leave applications. In addition to reviewing our research strategy, the post-holder launched an impact strategy. The School created a new post of Research Development Officer (RDO, 2015), to support funding applications and strengthen the quality of outputs and impact. The RDO reviews unsuccessful applications, assessing suitability for other funders. The DoR and RDO sit at the heart of School research activities, collaborating closely. All research is subject to School Research Ethics Committee approval and GDPR regulation; ethical compliance is scrutinised by our Research Ethics Advisory Group (comprising eight staff members, chaired by the DoR). A Health and Safety Officer provides advice and oversees risk assessments. The Unit also benefits from a dedicated Technical Support Officer, Librarian, two Finance Officers, and Postgraduate Student Support Coordinator. Promoting international links to postgraduate students and collaborators, the School has an Internationalisation Officer.

Every year we reinvest on average 25% of research overheads into the projects that generated them, to enhance output quality or provide additional assistance. We reinvested 10% of overheads into research centres, seminar series, major research events, away days, and seed funding. We created a new fund to facilitate impact. Staff benefit from an annual conference allowance. From 2016, holders of grants above £75k without buy-out are given an additional 10% of their WAM credits for research, protecting research time and delivery. Numerous small grants from internal funds in excess of £150k have launched pilot studies and collaborations, and facilitated impact (University seed funds, University GCRF block grant, Kent/Ghent fund, University impact funds, Eastern ARC consortium).

Space and facilities. In 2014, we created a new PhD Write-Up Room and refurbished our Swingland Room teaching space. It was in 2017, however, that the University and School made a substantial investment of over £1 million to create and improve space and facilities: additional meeting rooms, an ERC project room, a dedicated student support meeting room, generous communal spaces, and a mixed postdoctoral research space promoting collaboration.

Research laboratories and collections. We benefit from Genetics and Ecology laboratories. The former received a Patsy Wood Biodiversity Fund donation, purchasing a QPCR machine and high-volume centrifuge (2014, £14k). The Ecology laboratory is used for processing and analysing samples, including environmental DNA, and houses a live amphibian collection for training in handling and measurement. There is an on-campus trial area for long-term ecological monitoring and experimental fieldwork. The Unit owns two computers with advanced computational capacity for statistical and spatial analyses. We curate a unique collection of around 50 illegal wildlife trade items donated by the UK Border Force, for training purposes, with donations forthcoming from the Metropolitan Police and National Wildlife Crime Unit via University funding (£2k). Through ex-staff member (Honorary Professor) Bodmer, the School partners with a Peruvian Amazon field station running four research vessels. We collaboratively use other research infrastructure (e.g. Groombridge's award of £25k to access NERC's Biomolecular Facility).

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

Collaborations and Networks

Staff collaborate extensively, engaging with researchers across Kent and far beyond, making significant contributions to and across their respective disciplines; for example, a conservation biologist (Griffiths) contributing expertise on non-primate biorhythms to an anthropology project on human skeletal growth (Mahoney). Evidence of collaboration comes through research projects, visiting scholars, publications, and joint PGR supervisions with, for instance, biologists (Struebig), engineers (Bull, Roberts), psychologists (Davies, Fish), veterinarians (Humble), endocrinologists (Humble), business scholars (Fish), computer scientists (Roberts), mathematicians (Griffiths), and economists (Roberts, Tzanopoulos). Staff undertake interdisciplinary collaboration with UK research organisations, including (by frequency) the universities of Brighton, Exeter, Oxford, Cambridge, Sussex, Bangor, Imperial College, Zoological Society of London, Lancaster, James

Hutton Institute, UCL, East Anglia, Reading, Stirling, Highlands and Islands, and the Natural History Museum.

Our staff also collaborate with research organisations around the world, in over 80 countries, our principal collaborators being: University of Queensland, CNRS, Universidad Nacional Autonoma de Mexico, Aristotle University of Thessaloniki, Center for International Forestry Research, University Malaysia Sabah, University of Belgrade, University of Melbourne, Czech Academy of Sciences, Ghent University, James Cook University, University of Connecticut, University of Copenhagen, University of Tasmania, University of Zurich, Leibniz Institute for Zoo and Wildlife Research.

In the period 2014-18, 69% of our papers were co-authored with international collaborators. An indicative list of our collaborative networks includes:

- Davies's ERC award, 'Environmental Space and the Feel-Good Factor: Relating Subjective Human Wellbeing to Biodiversity' (£1,602,854) with long-term collaborators Leeds and the James Hutton Institute, and users outside academia including WWF and Natural England. Others include the University of Queensland, University of Exeter, Forest Research and Woodland Trust. Linked to this research, Davies participates to an EU-funded expert group, EKLIPSE, led by La Sapienza, Paris 8, and Wageningen.
- Fish's co-coordination of the NERC-led Valuing Nature programme underpins research links with policy stakeholders including Natural England and scientists at the Centre for Ecology and Hydrology and the Oxford Martin School. His role led to a NERC impact and innovation research award with CEH, analysing linkages between NERC valuation and global challenges research.
- Struebig and Davies's contribution (£501,079) to NERC's Human Modified Tropical Forest programme, bringing together CEH, the universities of Oxford, Lancaster, Aberdeen, and QMUL, with other stakeholders such as Universiti Malaysia Sabah, Forest Research Centre Sabah, Yayasan Sabah, the Forest Trust, Sime Darby, Sabah Forest Department, SEARPP, Benta Wawasan Sdn. Bhd. Building on this, Struebig obtained two British Council/Newton awards on riparian protection in oil palm, one including Bicknell (£150k). Struebig received a grant from the same funder to build capacity for Malaysian ECRs.
- Our five Darwin Initiative projects since 2014 (Groombridge's in Kenya's, £352k; Griffiths's in Madagascar, £159k; Groombridge's across Indian Ocean islands, £306k; Struebig's in Indonesian Borneo, £291k; and Smith's in Maputaland, £294k) all hinge upon international collaboration and capacity-building.
- Struebig's Leverhulme Trust award for 'Tolerating Tigers' (£226,392) involved the University of Cambridge, Fauna and Flora International, and Universitas Nasional Indonesia.
- Groombridge's COST action on Invasive Parrots (£363,834) brought together a consortium of European universities from 18 countries with the Mauritius Wildlife Foundation, University of the Witwatersrand, and Universidad Nacional del Centro de la Provincia de Buenos Aires.
- Struebig's coordination of NERC's Wallacea Programme brings biodiversity expertise from 25 research institutions in the UK and Indonesia, alongside a Kent-led project involving QMUL, Sheffield, NHM, Universitas Indonesia, Wildlife Conservation Society, Fauna and Flora International, and Operation Wallacea. His prestigious £1 million Leverhulme Research Leader project (2020) has significantly expanded his team into a Defaunation Hub.
- Davies and Smith's participation in delivering capacity-building in Indonesia, Vietnam, Congo, and Brazil for the £17.8 million GCRF Hub on Trade, Development, and the Environment involves a consortium led by WCMC that includes eight UK universities, the International Institute for Sustainability, Centre for International Forestry Research, Beijing Normal University, CSIR-South Africa, and UNEP.

Visiting fellows also enrich our research culture by offering alternative perspectives on current paradigms, and collaborating directly on staff and student research projects. They have come from

the National Autonomous University (Mexico), Wageningen (Netherlands), Otago (New Zealand), Ferdowsi University of Mashhad (Iran), Estonian University of Life Sciences, University of the Balearic Islands (Spain), Northeast Forestry University (China), Green Islands Foundation (Seychelles), University of Castilla-La Mancha (Spain), Colegio de Postgraduados en Ciencias Agrícolas Veracruz (Mexico), Government Debendra College (Bangladesh), Leuven (Belgium), Universitat Autònoma de Barcelona (Spain), and Wildlife Conservation Society (Indonesia). A two-year Nippon Foundation project (Smith) brought in a visiting PDRA; another, Dr Bryson-Morrison, joined Humle on a two-year Arcus-funded grant (2019); and Takahiro Kubo, funded by the Japanese Society for the Promotion of Science, is working with MacMillan for two years. Our two seminar series have attracted over 90 speakers since 2014 from across the world (UK, Brazil, China, Germany, Luxembourg, Mexico, Netherlands, Sweden, Switzerland, Vietnam, USA).

Wider Contributions to the Economy and Society

Our research environment is made relevant through targeted interfaces with local, national, and international stakeholders. Examples include our Darwin Initiative projects, but both research groups engage in good practice; for example, Tzanopoulos and Fish's partnership with Southern Water, and Struebig's work with Malaysian oil palm stakeholders. We collaborate with many conservation NGOs, particularly the North of England Zoological Society (Chester Zoo), Panthera, IUCN, Wildlife Conservation Society, BirdLife International, and Fauna and Flora International. Of note is Bull's work for the Asian Development Bank, assessing biodiversity alongside infrastructure (Uzbekistan). Our intellectual environment is further enriched by honorary appointments, linking to their own networks; for example, Seychelles Islands Foundation, WCMC, WWF, Royal Botanic Gardens at Kew, University of Victoria (Canada), Borneo Nature Foundation, FundAmazonia (Peru), Parks Australia. DICE joined the Environmental Decisions Alliance, and the DICE Director co-founded the Kent Wildlife Network (Smith, 2019).

Contributions to the Discipline

Our disciplinary contributions reflect our commitments and capacities in research at the interface of people and nature, cumulatively deepening integration of natural and social science in our core areas of expertise. Recent growth in human geography complemented the established strengths of DICE over the assessment period, which Professor Dame Mace (a former leading light of global conservation) described in 2019 as 'among the best of the UK's leading academic institutions for conservation science and a world-leader in research and capacity building'. Contributions are enabled by wider activity; since 2014, staff have organised 12 international conferences and symposia, five workshops, and 20 other types of event (e.g. film screenings, annual lectures). Illustrative contributions include:

- Harmonising frameworks for gathering environmental evidence across natural and social sciences, notably on ecosystem services, livelihoods, and wellbeing (Davies, Fish, Struebig).
- Developing spatial decision-support tools to benefit biodiversity (Bicknell, Davies, Smith, Struebig), plan future water environments (Fish, Tzanopoulos), and enhance urban mobility (Rock Rokem).
- Integrating conservation and economics to understand incentives for conservation (MacMillan), dynamics of illegal wildlife trade (MacMillan, Roberts), and reconcile biodiversity protection with economic development (Bicknell, Bull, Griffiths).
- Fostering participatory, deliberative, and community-based approaches towards conservation and environmental planning concerning human/wildlife conflict (Humble, Struebig), and rural ecosystem management (Davies, Fish, Tzanopoulos).
- Using international expertise to strengthen UK research and policy, including spatial planning (Smith) and biodiversity net gain (Bull).

Indicators of Wider Influence

Advisory roles. Wider influence is evidenced partly through advisory positions: invited Chair of the Public Engagement Strategy Advisory Group at NERC (Fish, 2019-20); serving member of the

Natural England Science Advisory Committee (Davies, 2017-present); Vice-President of the International Primatological Society and editor of the *Regional Action Plan for the Conservation of Western Chimpanzees 2020-2030* (Humle, 2018); member of the NERC ARIES DTP Multidisciplinarity and Strategy Board (Griffiths); UK Government's Illegal Wildlife Trade Advisory Group and the UK Police's Cyber-enabled Wildlife Crime Priority Delivery Group (Roberts).

Prizes. Our staff and alumni have received conservation-related awards beyond those already mentioned, including the Marsh Award for Conservation Biology (Griffiths), Whitley Awards in 2015, 2017, and 2020 (Desbiez, Gubi, Medici, Ikemeh), Britain's top 'conservation hero' (BBC Wildlife Magazine, Singleton), and CNN Hero (Sabuhoro).

Fellowships. Staff actively participate in international professional bodies (e.g. SAA, BES, IPS), and hold visiting fellowships and professorships worldwide (e.g. MacMillan's Chair of Environment, Leibniz Centre for Tropical Marine Research in Bremen, Germany; Roberts's Visiting Research Fellowship at Merton College and Department of Zoology, University of Oxford; Roberts was also CUGE Visiting Fellow with the Centre of Urban Greenery and Ecology, National Parks Board (NParks) in 2020, and Visiting Fellow of the Singapore Government; Griffiths' Honorary International Conservation Research Fellowship, Durrell Wildlife Conservation Trust; Smith's Honorary Senior Fellowship, WCMC).

Journal editorship. These include: *Conservation Letters* (senior associate editor, Davies), *Remote Sensing in Ecology and Conservation* (honorary editor, Davies), *Conservation Biology* (handling editor, Bull), *Conservation Evidence* (editorial board, Griffiths), *Applied Ecology* (associate editor, Struebig), *PeerJ* (sectional editor, Roberts), *Frontiers in Ecology and Evolution*, *Human Ecology*, *Oryx* (editorial board, Smith). Fish co-founded a new British Ecological Society journal, *People and Nature* (2018), remaining lead editor. Landmark edited books include: *Conservation Research, Policy and Practice* (Davies, Smith); *Routledge International Handbook of Ecosystem Services* (Fish); and *Primates in Peril* and *State of the Apes* (Humle).

Funding panels. Staff acted as funding panel members and referees for research proposals for: ERC, EC Cost Actions, Social Sciences and Humanities Research Council of Canada, H2020 Societal Challenges, National Science Foundation, NERC, Research Council of Norway, Academy of Finland, Lincoln Park Zoo Field Conservation Fund, National Geographic, Leverhulme Trust, ESRC, BBSRC, Swiss National Science Foundation, Czech Science Foundation, Czech Academy of Sciences, Dutch Research Council, AgreeSkills, Center for Synthesis and Analysis on Biodiversity, and British Herpetological Society.

Learned societies. Staff contributions to professional associations, learned societies, and boards of research users include: the Royal Geographical Society (Rock Rokem, Fellow), British Ecological Society (Davies), British Herpetological Society (Griffiths, President), North of England Zoological Society, Amphibian and Reptile Conservation Trust, Wildwood Trust (Griffiths, Trustee), World Congress of Herpetology (Griffiths, Executive Committee), Great Crested Newt Expert Licensing Panel of Natural England (Griffiths), Western Chimpanzee Action Plan (Humle), UK Defra International Wildlife Trade Review Board (MacMillan), European Federation for Primatology (Humle), Projet Primates France (Humle), Projet Primates Guinée (Humle), EKLIPSE expert EC working group (Davies), Iwokrama International Centre for Rainforest Conservation and Development (Bicknell), Sophia Point Rainforest Research Centre in Guyana (Bicknell), Illegal Wildlife Trade Advisory Group for the UK Government (Roberts), and Ecosystems Knowledge Network (Fish). Davies is on the international advisory board for Applied Ecology Resources. Roberts is Academic Lead for Interpol/IFAW's Global Wildlife Cybercrime Action Plan, member at Partnership for Action Against Wildlife Crime UK, and expert at Alliance to Counter Crime (ACCO).

Staff have been particularly active within the IUCN, including: Amphibian Specialist Group (Griffiths), Reintroductions Specialist Group (Griffiths), IUCN-SGA Extractive Industry task force (Humle), IUCN/SSC Primate Specialist Group (Humle), Executive Committee for the Section on Great Ape Conservation (Humle), Species Survival Commission (Smith), World Commission on

Unit-level environment template (REF5b)

Protected Areas (Smith), ASA/ASG Reintroductions group (Griffiths), and Commission on Ecosystem Management (Bull).

These are just some of the ways in which our staff have contributed to the vitality and sustainability of their disciplines in the UK and beyond, rendering tangible our intellectual contributions at the highest level on an international scale.