Executive Summary for the School of Biology Strategy 2021-2026

The School of Biology's mission is to discover, develop and disseminate new knowledge to enable society to live healthy lives in an equitable and fully sustainable manner while promoting knowledge and appreciation of the natural environment.

The School of Biology has over 220 salaried staff, over 140 research students, and an annual intake of around 100 undergraduate students. The School is the UK's no 1 rated Biology Department in terms of teaching (Guardian Ranking 2021), and has developed several very successful Post Graduate Teaching (PGT) programmes, including one via distance learning. Our School has an enviable record of raising research funds, averaging over £10 million per year across 50 FTE research-active staff. We are proud of the quality and impact of our research, ranking 1st in Scotland and 2nd in the UK for Impact under the 2014 REF exercise. The School is also one of only three academic Schools in Scotland with an Athena Swan Gold award, highlighting that equality, diversity and Inclusion for all are central to our ethos.

We aim to maintain this national research and teaching status, but also increase our Global standing. We will continue to develop our diverse interdisciplinary outlook, expand our teaching and research portfolio of networks of people, explore new and emerging bioscience research opportunities and subjects of societal concern, and increase our engagement with national and international policy. We will continue to develop our teaching pedagogy in a new post-COVID era, encourage wider participation in our student body, and encourage further international links for students and researchers. Thus, we will enhance and develop our previous success in addressing the Diversity Agenda, which is now firmly embedded in the School's philosophy and procedures.

Our success has been driven by our committed and talented staff. We have been very successful in attracting and keeping Independent Research Fellows (IRFs). Since 2014, a significant number of our IRFs have been promoted, demonstrating that IRFs thrive within the School's environment. We have a dedicated team of education-focused academics committed to the development and implementation of the best educational practices. We also have a dedicated team of technical and administrative staff, capable of providing key skills for the development of the School in the coming decades. We will nurture and support development of all staff to ensure that all can achieve their full potential.

We recognise that higher education is changing and that we will need to engage even more with an international world: one where teaching will be delivered in the context of lifelong learning for a mobile workforce. We also will be looking to develop innovative teaching methods driven by our students' evolving needs. Alongside this, we will seek to develop philanthropic donations to help fund research into socially relevant big ideas that address challenges of biological diversity, environmental sustainability, health and resilience.

Our strategic priorities over the next five years will be to:

- Maintain our teaching success by adapting our teaching delivery to meet changing student needs.
- Maintain our research excellence by supporting all research efforts at the highest level.
- Maintain and enhance our small-group, high-quality research-led teaching.
- Plan to address life-long learning and professional education in our teaching portfolio.
- Enrich student employability by enhancing key skills development and commercial collaborations.
- Develop more industrial partnerships and sponsorships for post-graduate research.
- Nurture our ECR staff to help them develop successful research careers and strategic grants.
- Develop our Education-focussed staff so that they can help progress our teaching using internationally recognised standards.
- Continue to increase our interdisciplinary research links within the School, the University and beyond.
- Develop opportunities in the Eden Campus, nurturing partnerships with start-ups and SMEs.
- Support research strategies that improve the international profile of our research.
- Monitor and continually improve our research impact.
- Create an equitable, challenging and rewarding environment for all our staff and students.

Our School strategy is aligned to the University Strategy, and addresses our capabilities and opportunities in the context of the four key themes identified in it: World Leading St Andrews, Diverse St Andrews, Global St Andrews and Entrepreneurial St Andrews.

World-leading Biology

The School of Biology has a global reputation for the quality and impact of both our research and our teaching. It ranks consistently near the top of league tables in the UK: 1st in the UK by the Guardian (2021); 4th in the UK and 1st in Scotland in the Complete University Guide (2022). Under REF2014, the Impacts of the School's research were judged 1st in Scotland and 2nd in the UK. At the international level, we aim to continue improving our Global ranking position to within the top 100. This ambition is possible as research in the School of Biology operates across three internationally renowned Research Centres, each focusing on specific research themes. Research interests overlap across the Centres, maintaining a collegial research network despite being in physically different locations.

Our three Research Centres, the **Scottish Oceans Institute (SOI),** the **Centre for Biological Diversity (CBD)** and the **Biomedical Sciences Research Complex (BSRC),** are each an interdisciplinary research institute with collaborators in other University schools and centres including: Maths & Statistics, Geography & Sustainable Development, Earth and Environmental Sciences, Psychology & Neuroscience, Medicine, Physics, Chemistry, the Centre for Research into Ecological and Environmental Modelling (CREEM), and the Institute of Behavioural & Neural Sciences (IBANS). The **SOI** is a world leading centre of excellence in marine science, not least through its Sea Mammal Research Unit (SMRU). The SOI is housed in a recently completed £16.5M research and teaching complex at East Sands, funded by NERC, the Wolfson Foundation and international donations, and covers a broad range of marine related research from Developmental and Evolutionary Genomics, Marine Ecology, Fisheries and Resource Management, and Global Change. The **CBD** comprises arguably the leading group of animal behaviourists in the world. Based in the Sir Harold Mitchell and Dyers Brae buildings, the CBD links researchers working in traditionally distinct fields such as evolution, behaviour, ecology, molecular biology and biodiversity, and focuses on the measurement, origin and evolutionary consequences of biological variation. With upgraded teaching and laboratory space in its newly refurbished £50M North Haugh Biomolecular Sciences (BMS) Building, the **BSRC** houses world-leading interdisciplinary science at the interfaces of biology, chemistry, physics and medicine. Through its interdisciplinary inclusion of researchers in Physics and Chemistry, the BSRC hosts world-leading and pioneering facilities for biophysics, mass spectroscopy and optical microscopy. These facilities contain integral tools for investigating fundamental biomedical concepts in infection biology, molecular medicine, chemical biology, biophysics, evolution and development, with researchers contributing solutions to the prevention and cure of diseases and improved global health.

Biology is becoming increasingly broad and data-rich, and maintaining excellence will require that we play to our strengths while expanding and developing our interdisciplinary relationships. The School's exceptional rankings for teaching are underpinned by a diverse and flexible teaching curriculum, high levels of student satisfaction, bespoke research-led teaching and innovative Masters programmes. Our research programme (~£40M open grants) already has a highly diverse income portfolio. Further growth of funding will mean we develop and expand existing and new strategic partnerships, both locally and globally. Our success is underpinned by dedicated professional staff, and we will develop ways to nurture their skills and ambitions in teaching, research, technical and administrative support.

We will build upon our present success by:

- Continuing to recruit and support Independent Research Fellows to our staff in cognate strength areas, and in a forward-looking strategic manner to fit our mission.
- Supporting staff in grant applications through strategic guidance and 'pump prime' funding.
- Promoting further collaboration between our Centres and other Schools and Centres within the University. This is an aim of our BMS fire recovery fund.
- Investing more funds into Bioinformatics, both in hardware and personnel.
- Looking for opportunities for joint staff positions outside the School and in other research institutes.
- Maintaining a favourable student:staff ratio that is key to our students' satisfaction.
- Developing the diversity of our curriculum and teaching methods to adapt to a changing world.
- Exploring novel opportunities to encourage staff progression and development, and participating in initiatives in the University, e.g. the development of the Eden campus.
- Promoting for education focussed staff the uptake of Higher Education qualifications, providing funds for attending education conferences, and continuing to encourage leadership at the highest level.
- Developing initiatives (e.g. with University led schemes to promote continuing professional development opportunities for PSS staff and working with the University to improve regrading procedures.

Diverse Biology

Diversity and inclusion are at the heart of the School of Biology's ambitions. Our policies and procedures will continue to provide transparency and fairness to students and staff alike, and we will aim to enable all staff and students to achieve their full potential. Demonstrating the embedded nature of these principles, the School was awarded the University's first Gold Athena Swan Award (2021), only the third such award to any Scottish University department and only the third for a Biology department in the UK. Historically, our drive for equality has focused on gender imbalance; however, we recognise the need to address all imbalances in opportunity and we will build upon our policies and procedures by making these our central challenge for the next five years. Diverse Biology is overseen by the Biology Equality, Diversity and Inclusion Committee (BEDI), which has the widest school representation of all the School's Committees. We shall strive to ensure our beacon activities continue to influence the University's processes and committees in this important activity.

We continue to evolve a comprehensive workload model that identifies and balances the proportion of time that staff members spend on research, teaching and service and leadership. An annual BEDI committee report enables us to ensure that there are no inherent gender/age biases in workload. As indicated in our Athena Swan Gold award, the provision of grant exemplars, internal review and improvements to mentoring, and annual review, have led to substantial increases in grant applications, success rates, and grant income for female staff. Though most academic staff agree our Academic Review and Development process is effective, we will continue to review and improve this process. We have also created a new web-based resource for our postdocs to improve engagement and sense of community. We have developed several undergraduate tutorials on unconscious bias and other issues related to diversity and inclusion. We will continue to keep looking forward by showcasing these nationally. For our staff, we have developed a Checklist for Recruitment and Guidelines for Conference Organisers to ensure diversity, and we will continue to share our approaches with the wider university community through the BEDI Director and Science and Medicine Diversity Lead.

Director of Teaching-led annual education-focussed staff reviews will enhance the School's teaching and assessment by identifying support and improvements for staff and will play a key role in education-focussed staff skills development. We actively encourage teaching staff involvement in mentoring opportunities, and in sharing best practice within the University and with other educational institutions. We have several ongoing initiatives to improve gender-balance of staff across leadership roles, including engagement with the AdvanceHE Aurora scheme, an office holder 'length of tenure' policy, increased support for promotion, and the creation of deputy roles for all higher-level positions. We have achieved 50:50 male to female balance across all major roles with more women applying for promotion.

We will actively work on recognition and career progression for Professional Support Staff (PSS), developing a new operations framework with a unified administrative team to support research and teaching across the School instead of on a centre-by-centre basis. We will continue to run an annual PSS awayday to identify concerns of non-academic staff and develop processes for their resolution.

We have established a Minority Ethnic Champion to provide support to, and represent, the interests of BAME staff and students. Our network of staff and students will continue to hold regular open meetings and discussion events, and specific funds have been earmarked to instigate initiatives to support and encourage diversity.

We will continue to deliver these aims by:

- Supporting the BEDI committee and respecting its recommendations, including the development of a BAME microgrant scheme for students which will be developed for all potentially disadvantaged students.
- Pursuing schemes to increase representation for other minorities, such as the diversifying leadership (BAME) programme run by Advance HE.
- Ensuring that no student, of any race, orientation or other protected characteristic, feels inhibited to apply to study Biology at St Andrews, accepting an offer, or fully benefitting from the educational experience that we offer.
- Tailoring our online courses to be attractive to overseas students who would not normally be able to afford to come to St Andrews. This aim will be achieved by making full use of the Commonwealth Scholarship Council awards for our distance learning courses, and also by enhancement of our online teaching materials provision so that it is more supportive of students with disabilities, caring responsibilities or health issues.

Global Biology

We live in an increasingly internationalised world and this is reflected in the fact that almost 40% of the School's staff and students have been recruited from beyond the UK. Our research too is internationally focused. In 2021, at least 25% of our research funding came from Europe and North America, while a significant proportion from UK Research Councils is directed towards research that occurs overseas and with international collaborators. With research collaborators in >70 countries our research portfolio is truly global in scope. St Andrews staff run projects focused on the Antarctic, the Arctic, Canada, the rainforests of South America and Southeast Asia, throughout Africa, and in many Asian and European countries. We host numerous non-UK researchers funded by their local research agencies (long established links are with Mexico, Brazil, Portugal, Nigeria and China) and we have provided an attractive host institution for international IRFs. Biological research stemming from St Andrews contributes to multiple UN Sustainable Development Goals around poverty reduction, food security and global health, as well as capacity building globally. International engagement is key to our values and success.

Our Masters and PhD graduates contribute to a network of research and policy influencers around the world, with SOI- and CBD-trained graduates now holding key research and policy positions in the fields of behaviour, evolution, ornithology and marine mammal science globally. The BSRC also has extensive teaching links with sub-Saharan Africa in disease- and pathogen-related fields. We will continue to highlight and build-upon these collaborative links, as well as related funding opportunities, to both our staff and our students.

Our undergraduate students benefit from a well-established Study Abroad Programme with both University and School-level exchanges, and our Integrated Masters students and CASE-type post graduate students also continue to develop an ever-widening network of UK and international research and industrial partnerships. We will extend our identification of additional strategic exchange partners for both students and staff through working more closely with the university's Collaborations and Study Abroad (CSA) Team.

In line with the University's strategic aim to develop and support high-quality and innovative short programmes under the Global St Andrews brand, the School provides major contributions to teaching in short courses (Sutton Trust and International Summer Schools). The BSRC has helped pioneer several short courses, including an annual CCP4 Protein Crystallography Summer School, and the SOI regularly hosts external courses, most recently ones from UCLA and UCSD. Our online Sustainable Aquaculture course has successfully pioneered online graduate education for in-career training throughout the world, and we will continue to explore opportunities to align these programmes with our research and teaching strategies.

Competition among Universities is increasing, with many universities making substantial investments in their global activities. Alliances and partnerships among universities and other stakeholders are being developed continuously. Moreover, the Organisation for Economic Co-operation and Development predicts that the global population of university graduates will nearly double in coming years to reach 300 million by 2030. By 2030 China and India together are predicted to account for nearly half of all degree-holders worldwide. Clearly competition for post-graduate training will therefore only increase, and with that will come opportunities for extending our network of collaborators and influencers. Our existing research and teaching networks, coupled with the welcoming and cosmopolitan scholarly community in St Andrews, put us in a strong position to take advantage of these opportunities.

We will deliver these aims by:

- Developing our graduate training portfolio with a specific focus on overseas students and online.
- Extending our collaborator network, particularly in China, India and Africa, where we may expect the greatest growth in graduate education and research possibilities.
- Recruiting more international fellows through the University's Global Fellows scheme, and also by promoting the use of St Andrews to host international conferences, meetings and workshops.
- Seeking out further international research funding opportunities, making use of our extensive and growing international network of collaborators both from the global research we do, but also the many students who have graduated from our undergraduate and postgraduate programmes.

Entrepreneurial Biology.

Biology continues to have a strong impact on policy and society in the UK and beyond, from conservation of biodiversity, ecosystems to biomedical technology. Building on our historical success: our six REF2014 Impact Case Studies were ranked 1st in Scotland and 2nd in the UK, and we continue to develop our Impact and have strong entrepreneurial elements in our REF2021 submission.

We have produced significant patents with Industrial uptake from our research work in the last decade, and we continue to develop contracts with external companies. The SMRU Instrumentation Group, embedded within the SOI, designs, tests, builds and sells a range of cutting-edge telemetry devices for marine scientists around the world to understand climate change impact. We have successfully nurtured several spin-offs (e.g. https://synergy.st-andrews.ac.uk/biooutreach/business-outreach/) that cover marine environmental consulting services: SMRU Consulting, with Offices in Europe and North America; Xelect, a specialist genetics support to the global aquaculture industry with sales revenues >£1 million/annum; Pneumagen, which develops treatments for viral respiratory infections including COVID-19, attracting over £4 million investment to further develop its anti-viral treatments; and Genuswave, acoustic deterrent technology to protect marine mammals from potentially harmful interactions with marine industries, which has received >£1.5 million investments from Scottish Enterprise and overseas investors. We aim to encourage further spin-out opportunities using our Intellectual Property, especially with SMEs initiated at the Eden campus.

Many of our PhD and Masters students are also imbued with an entrepreneurial ethos through industrial placements, especially through CASE studentships that have been awarded from the MRC, BBSRC and MRS. The new IAPETUS NERC PhD students will also gain innovation and commercialisation experience through participation in an externally accredited 'Mini-MBA' programme.

We have strong representation in Scottish research pooling initiatives such as MASTS and SULSA, which will both continue to influence the Government's approach to the Life Sciences. The MASTS Directorate at the SOI is championing and managing the £12.4M budget '*Sustainable Management of UK Marine Resources*' Strategic Priorities Fund Programme. At UG level, our students engage in their fourth year with the interdisciplinary International Genetically Engineered Machine (iGEM) annual summer Competition with its award-winning entrepreneurial developments.

Being entrepreneurial is seeing potential in all our activities and translating that potential into action and application. We strive to foster a culture of collaboration, curiosity, and constructive challenge directed towards improving the well-being of our students, the local community and national and global society. We are already linked to an extensive network of industrial, policy, research and teaching partners and collaborators, nationally and internationally, and we will engage with new ways to nurture these links and drive entrepreneurial change in teaching, research, policy, and industry.

We will continue to expand entrepreneurially by:

- Refocussing the role of the Director of Impact (and the associated impact committee) to developing an entrepreneurial network that includes input from all Research Centres, but also Education focussed and PSS staff in order to capture and assess the widest number of ideas and opportunities.
- Make more use of the University's grant opportunities for entrepreneurial ideas.
- Encouraging and further developing our student placement opportunities through Honours projects (including Enterprise Honours Projects with support from Research and Innovation Services), Integrated Masters, taught Masters courses and PhD studentships.
- Developing our teaching practices to promote enterprise education at all levels by inviting entrepreneurial former graduates to take part in tutorials and by encouraging all teaching staff to engage in "Teaching Entrepreneurial Thinking" training opportunities.
- Encouraging the further development of research and teaching networks, including interdisciplinary linkages with other departments and companies, and entrepreneurial initiatives locally at the Eden Campus, nationally and globally.