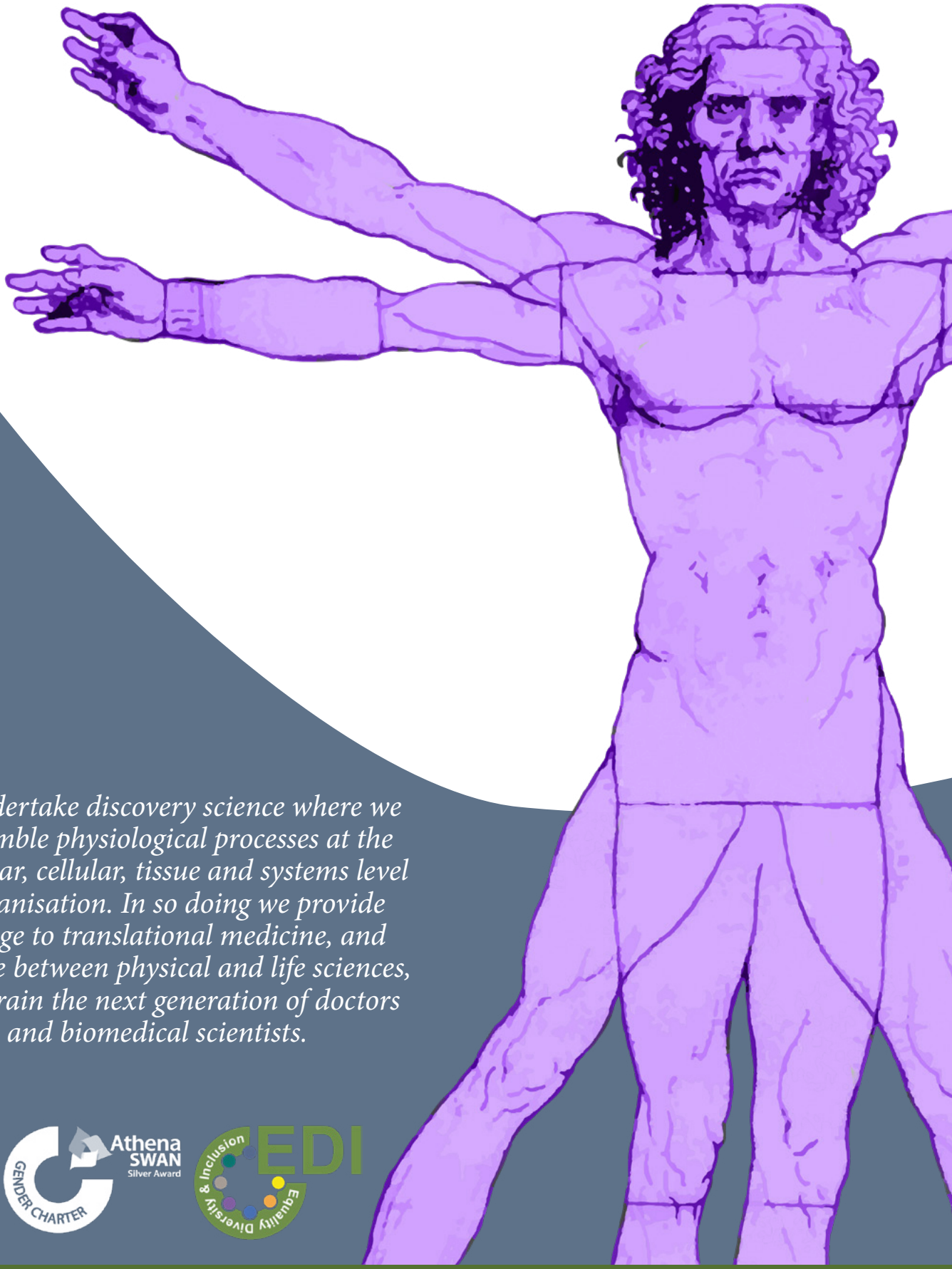
DEPARTMENT OF
PHYSIOLOGY,
ANATOMY &
GENETICS

Annual Report 2022–2023



We undertake discovery science where we reassemble physiological processes at the molecular, cellular, tissue and systems level of organisation. In so doing we provide a bridge to translational medicine, and interface between physical and life sciences, as we train the next generation of doctors and biomedical scientists.

UNIVERSITY OF OXFORD

GENDER CHARTER

Athena SWAN Silver Award

EDI Equality Diversity & Inclusion

Defining Excellence
Oxford Anatomy and Physiology ranked #1 in the QS World University Rankings by subject 2017, 2018, 2020, 2021, 2022, 2023

A Year of

From the Head of Department

The Department of Physiology, Anatomy and Genetics has enjoyed an enormously successful year. We continue to lead the way with our ground-breaking research and top-quality advanced degrees, as recognised once again in the QS world rankings, having retained our spot as world number one for Anatomy and Physiology.

This year has also seen an extraordinary number of awards and prizes for our department, both from our esteemed long serving members and distinguished new recruits. We were delighted to welcome Visiting Professor Dame Professor Sue Black FRS in September, and also Professor Irene Tracey FRS in January as the University of Oxford's new Vice Chancellor and also Honorary Professor at DPAG. In May, we congratulated Professor Black FRS and Professor Tracey FRS, together with Professor Scott Waddell FRS, on their election to the Royal Society. We also offered our congratulations to Professor Gero Miesenböck FRS, who in January was awarded the Japan Prize in the field of Life Sciences for pioneering work in the field of optogenetics. In April, we were delighted to welcome Professor Molly Stevens FREng FRS, as she took up the post of John Black Professor of Bionanoscience, soon after she was awarded the 2023 Novo Nordisk Prize. We also extend a warm welcome to Professor Stevens's large, interdisciplinary research group whose members are drawn from disciplines across the medical and physical sciences.

Additional highlights for me this year have been hosting a number of eminent scientists: Professor Richard W. Tsien delivered the Burdon Sanderson Prize Lecture in October, Professor Anne C. Ferguson-Smith FRS delivered the Mabel FitzGerald Prize Lecture in November, Professor Dino Giussani delivered the GL Brown Prize Lecture in February, Professor Sir Chris Whitty FRS delivered the Sherrington Prize Lecture: Public Understanding of Science in March, Professor Silvia Arber delivered the Sherrington Prize Lecture in May closely followed by a special lecture from 2003 Nobel Laureate Chemistry Professor Peter Agre, and Professor Dame Frances Ashcroft FRS delivered the Sir Hans Krebs Prize Lecture in June.

I am also delighted to announce that in collaboration with UCLA's Professor Kalyanam Shivkumar, I have recently been awarded an $8M Leducq International Network of Excellence Program Award. Here we will set up a major new transatlantic network to pioneer cutting-edge neuromodulation technologies to diagnose and treat heart disease. This will offer an exciting range of opportunities for our current and prospective early-career investigators.

Furthermore, we continued to honour our rich history of acclaimed physiologists this year. I was delighted to see an Oxfordshire Blue Plaque unveiled in honour of pioneering physiologist Mabel FitzGerald at her long-time Oxford residence 12 Crick Road in October. We also paid tribute to our former Dr Lee's Professor in Anatomy Sir Wilfrid Le Gros Clark FRS in March by relocating his bronze portrait bust created by Sir Jacob Epstein to a new permanent home in the Sherrington Building.

I conclude by congratulating all our academic and professional services staff for their unfailing hard work in helping us maintain our world-leading position and for making DPAG an ever more vibrant and productive community each year.

David Paterson

DPAG top of the world rankings for fourth consecutive year

DPAG has once again been ranked world number one for Anatomy and Physiology in the 2023 QS World University Rankings by Subject. It is one of four top rated Oxford University departments, and the only science department to achieve number one.

www.dpag.ox.ac.uk/news/dpag-top-of-the-world-rankings-for-fourth-consecutive-year

Three new DPAG Fellows of the Royal Society

Congratulations are in order to Professor of Neurobiology Scott Waddell FRS, Visiting Professor of Forensic Anatomy Dame Sue Black FRS, and DPAG Honorary Professor and Vice-Chancellor of Oxford University Irene Tracey FRS on their election to The Royal Society.

www.dpag.ox.ac.uk/news/three-new-dpag-fellows-of-the-royal-society

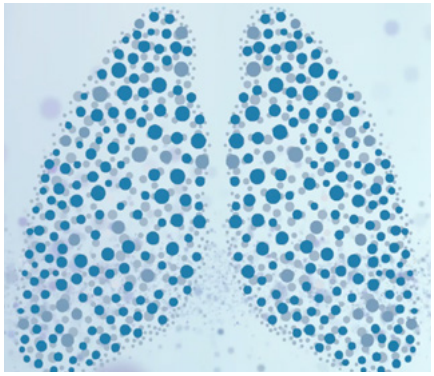
© David Vintiner

Professor Molly Stevens FRS FREng joins DPAG as John Black Professor of Bionanoscience

Professor Stevens's research has been instrumental in addressing some of the major healthcare challenges of our time, contributing a broad portfolio of biomaterials for applications in disease diagnostics and regenerative medicine. The Stevens Group will be based in the top floor of the Kavli Institute for Nanoscience Discovery.

www.dpag.ox.ac.uk/news/professor-molly-stevens-joins-dpag

Progress



New computational technique reveals changes to lung function post COVID-19

A collaborative study led by Professor Peter Robbins and Dr Nick Talbot published in the *Journal of Applied Physiology* studied patients at six and twelve months after COVID-19 infection. Using a novel technique called computed cardiopulmonography to assess lung function, they found that prior COVID-19 infection was associated with more uneven inflation of the lungs during normal breathing.

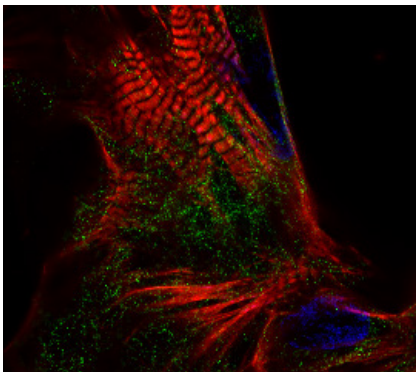
www.dpag.ox.ac.uk/news/new-computational-technique-reveals-changes-to-lung-function-post-covid-19-infection

© Paul Wilkinson

Professor Dame Sue Black FBA FRS joins DPAG as Visiting Professor of Forensic Anatomy

Last September, the Department welcomed Professor Dame Sue Black DBE OBE FRS FRSE FBA FRAI FRSB ChFA, Baroness Black of Strome and one of the world's leading forensic scientists, as our Visiting Professor of Forensic Anatomy. Professor Black said: "I look forward to rediscovering my anatomical roots and re-engaging with students in this glorious discipline." Professor Black also became the 37th President of St John's College.

www.dpag.ox.ac.uk/news/professor-dame-sue-black-joins-dpag-as-visiting-professor-of-forensic-anatomy



© Ms Carla Handford, Dr Kun Liu, Dr Dan Li

New blood test from DPAG cardiac researchers could save lives of heart attack victims

In a new study published in the *Journal of the American Heart Association*, a team of researchers led by Associate Professor Neil Herring found that routine testing for the stress hormone Neuropeptide Y (NPY) in the hours after a heart attack has the potential to save thousands of lives. The blood test – costing just £10 – could ensure patients with the highest NPY levels, and thus at greatest risk of heart failure, are identified and treated sooner.

www.dpag.ox.ac.uk/news/new-blood-test-from-dpag-cardiac-researchers-could-save-lives-of-heart-attack-victims

Key cause of type 2 diabetes revealed

Research led by Dr Elizabeth Haythorne and Professor Frances Ashcroft FRS published in *Nature Communications* reveals that high blood glucose reprograms the metabolism of pancreatic beta-cells in diabetes. They have shown, for the first time, that glucose metabolites, rather than glucose itself, are what drives the failure of beta-cells to release insulin in type 2 diabetes. They also demonstrated that beta-cell failure caused by chronic hyperglycaemia can be prevented by slowing the rate of glucose metabolism.

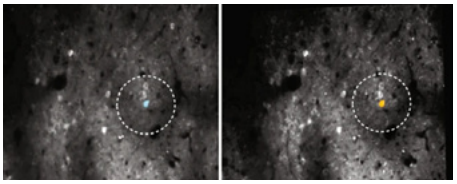
www.dpag.ox.ac.uk/news/key-cause-of-type-2-diabetes-uncovered

© Janelia Research Campus

Researchers discover why multisensory learning is beneficial for memory

New research published in *Nature*, led by researchers Dr Zeynep Okray, Dr Pedro Jacob and Professor Scott Waddell, has discovered a detailed neural circuit mechanism that explains how multisensory learning improves memory performance. They found that multisensory learning opens specific microcircuit bridges within large serotonergic neurons that bind learning sensory cues and enable an animal to recall a complete memory using either sensory cue alone.

www.dpag.ox.ac.uk/news/researchers-discover-why-multisensory-learning-is-beneficial-for-memory



New evidence for how our brains handle surprise

A new study led by Professor Randy Bruno is challenging our perceptions of how the different regions of the cerebral cortex function. The research, published in *Nature Communications,* has found that a group of 'quiet' cells in the somatosensory cortex that rarely respond to touch in fact react to unexpected or surprising events, regardless of the type of stimuli. These results suggest that their function is not necessarily driven by touch, but may indicate an important and previously unidentified role across all the major cortices.

www.dpag.ox.ac.uk/news/researchers-uncover-new-evidence-for-how-our-brains-handle-surprise

Professor Sir Chris Whitty FRS brings greater understanding of epidemics to Oxford

On Friday 10 March, Chief Medical Officer of England Professor Sir Chris Whitty KCB FMedSci FRS, who formerly studied his BA in Physiological Science in the Department, delivered the Sherrington Prize Lecture: Public Understanding of Science titled *Thinking through epidemics*. Professor Whitty's gripping lecture outlined the five key strategic principles needed to successfully fight a pandemic. Following his lecture, Professor Whitty took time to meet with Oxford's students and research staff at an afternoon cream tea reception held in the Sherrington reception foyer.

www.dpag.ox.ac.uk/news/professor-sir-chris-whitty-brings-greater-understanding-of-epidemics-to-oxford

Burdon Sanderson Blue Plaque and Prize Lecture

On Monday 17 October, as part of The Physiological Society roadshow, Emeritus Professor of Cardiovascular Physiology Denis Noble FRS unveiled a new plaque honouring the Department's first Waynflete Professor of Physiology, Sir John Burdon Sanderson. The unveiling was followed by the Burdon Sanderson Prize Lecture titled *Synaptic plasticity, calcium regulation and Alzheimer's disease* by Professor Richard W. Tsien, a pioneer in the study of calcium channels and synaptic transmission.

www.dpag.ox.ac.uk/news/richard-tsien-delivers-burdon-sanderson-prize-lecture

www.dpag.ox.ac.uk/news/denis-noble-unveils-blue-plaque-to-honour-burdon-sanderson

Honours, Fellowships and Prizes

The Department is proud to host a number of academic staff who have been honoured with fellowships and prestigious awards. The following list offers some highlights of such honours from the past year, though it is not exhaustive:

Professor David Paterson, Leducq International Network of Excellence Program Award; **Professor Gero Miesenböck FRS**, Louisa Gross Horwitz Prize and Japan Prize; **Professor Dame Frances Ashcroft FRS**, Manpei Suzuki International Prize for Diabetes Research, Vanderbilt Prize in Biomedical Science and Debrecen Award for Molecular Medicine; **Professor Denis Noble FRS**, Lomonosov Gold Medal; **Professor Dame Sue Black FRS**, 2022 Christmas Lectures; **Professor Irene Tracey FRS**, Honorary Fellow of The Physiological Society; **Professor Jaideep Pandit**, Gold Medal of the Royal College of Anaesthetists; **Professor Zoltán Molnár**, Fellow of the Royal Society of Biology; **Professor Manuela Zaccolo MAE**, Elected Member of Academia Europaea and Fellow of the Istituto Veneto di Scienze, Lettere ed Arti; **Professor Molly Stevens FRS**, shortlisted for the 2023 A F Harvey Engineering Research Prize; **Professor Ana Domingos**, conferral of title of Professor of Neuroscience; **Professor Nicola Smart**, conferral of title of Professor of Cardiovascular Science; **Associate Professor Armin Lak**, appointed to an established post as Associate Professor of Integrative Neuroscience in association with St John's College; **Associate Professors Nicol Harper and Dan Li**, conferral of title of Associate Professor; **Associate Professor Sarah De Val**, BHF Senior Basic Science Research Fellowship renewal; **Associate Professor Lisa Heather**, BHF Intermediate Basic Science Research Fellowship extension; **Dr Mootaz Salman**, Young Scientist Lectureship Award from the International Society of Neurochemistry and National Medal of Distinctive Scientific Achievement by the Government of Iraq; **Dr Becky Carlyle**, Alzheimer's Research UK Senior Research Fellowship; **Dr Charmaine Lang**, Parkinson's UK and Rosetrees Trust Joint Senior Research Fellowship; **Dr Annie Park**, Wellcome Early-Career Award; **Dr Hugo Fernandes**, Alzheimer's Society Dementia Research Leader Fellowship; **Dr Jose Prius Mengual**, Epilepsy Research UK and NATA Emerging Leader Fellowship Award; **Dr Peregrine Green**, Heart Rhythm Congress 2022 Young Investigator Award; **Dr Louisa Zolkiewski**, Bruce Cattanach Prize; **Adam Wells**, Krebs Memorial Scholarship; **Marcos Castro Guarda**, IMPRES 2022 best oral presenter; **Sian Wilcox**, Goodger and Schorstein scholarship; **Ni Li**, Peter Beaconsfield Prize 2023; **Mark Selwood**, Gold and Bronze Medals at the 24th World Transplant Games.

Professor Nicola Smart

Professor Zoltán Molnár

DPAG hosts successful first Science in the Park event

More than 100 children, along with around 50 parents, grandparents and caregivers enjoyed an exciting variety of activities on the theme of 'How the Body Works' in University Parks on Tuesday 26 July 2022. This 'Science in the Park' event was run by DPAG's Outreach and Public Engagement Working Group (OPEWG) and volunteers comprising research scientists, clinical anatomy teaching staff, and graduate and undergraduate students. Following excellent feedback from visitors, the team went on to engage hundreds more at the Oxford Science and Ideas Festival, the ATOM Festival of Science and Technology, and are set to re-run Science in the Park this summer 2023 with the Department of Biochemistry.

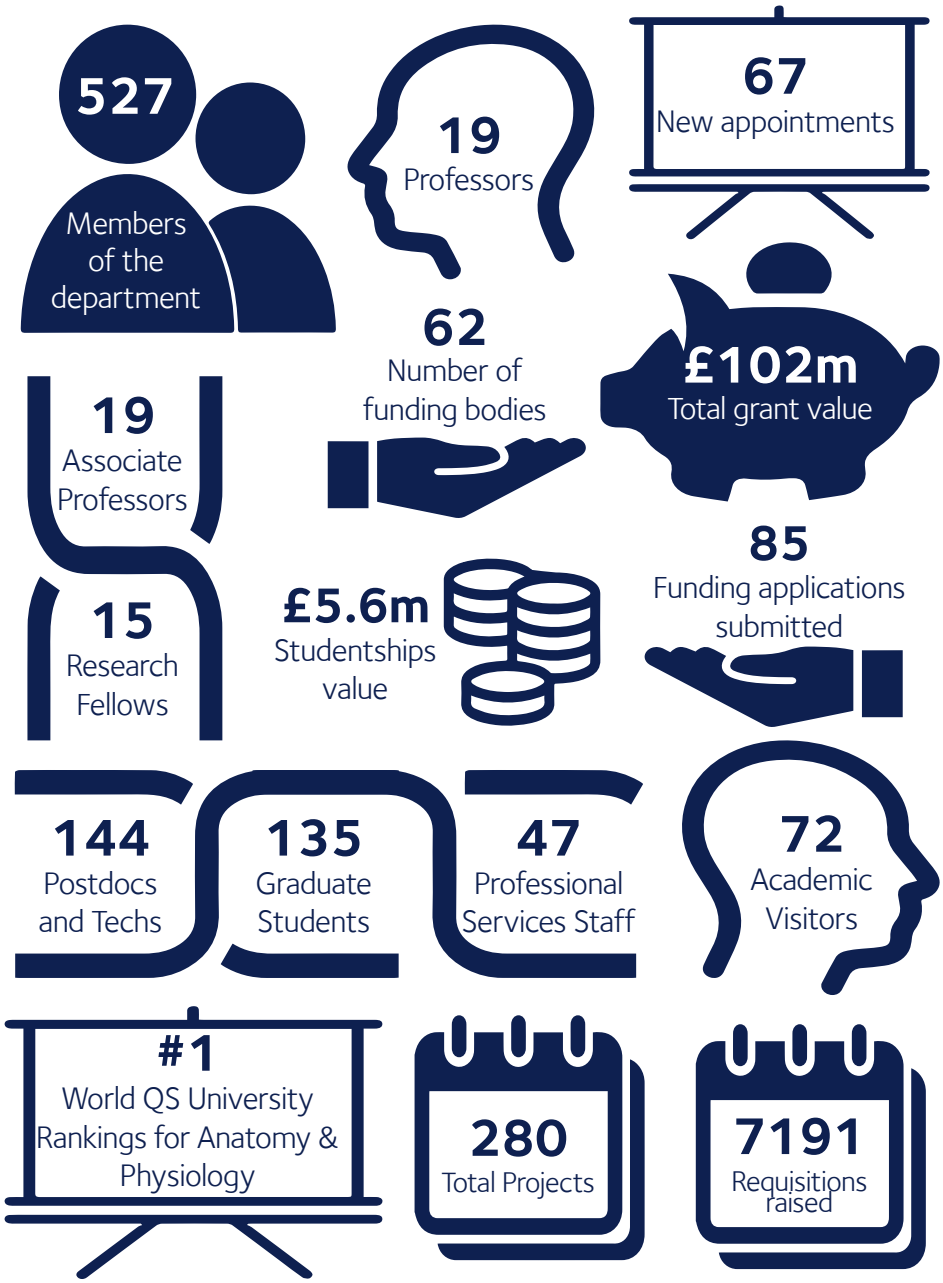
www.dpag.ox.ac.uk/news/dpag-hosts-successful-first-science-in-the-park-event

Inaugural winners of the DPAG Prize for Public Engagement with Research

The DPAG Prize for Public Engagement with Research (PER) recognises and rewards excellence in public engagement activities delivered by staff and students across DPAG. The department's inaugural prize was supported by University of Oxford's PER Culture Change Fund. Winners of the staff category, Dr Katherine Brimblecombe, and student category, Anna Kordala, were presented with a certificate and £150 gift voucher by the Head of Department Professor David Paterson. The review panel felt that Dr Andia Redpath and DPhil student Jéssica Luiz should also be commended and each received a certificate recognising their achievement.

www.dpag.ox.ac.uk/news/inaugural-winners-of-the-dpag-prize-for-public-engagement-with-research-announced

Statistics for 2023–2023



Sherrington Talks 2023

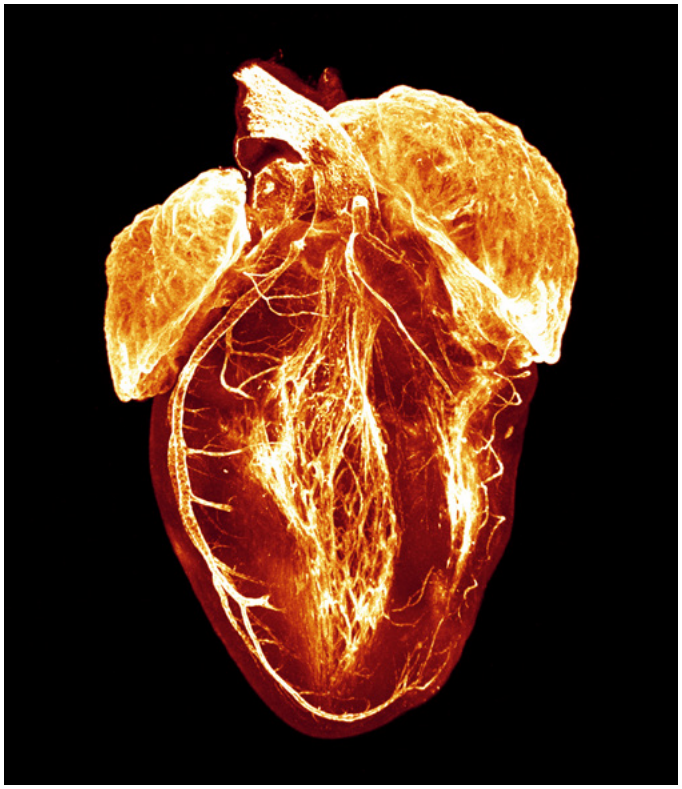
Third year DPhil students presented their research to senior DPAG members at the annual Sherrington talks. This year's joint prize winners are Conan O'Brien with a talk titled *Investigating the form and function of adrenal gland macrophages* and Antara Majumdar with a talk titled *Graded Representations of Economic Value Across Frontal Cortex.*

www.dpag.ox.ac.uk/news/sherrington-talks-2023-prize-winners

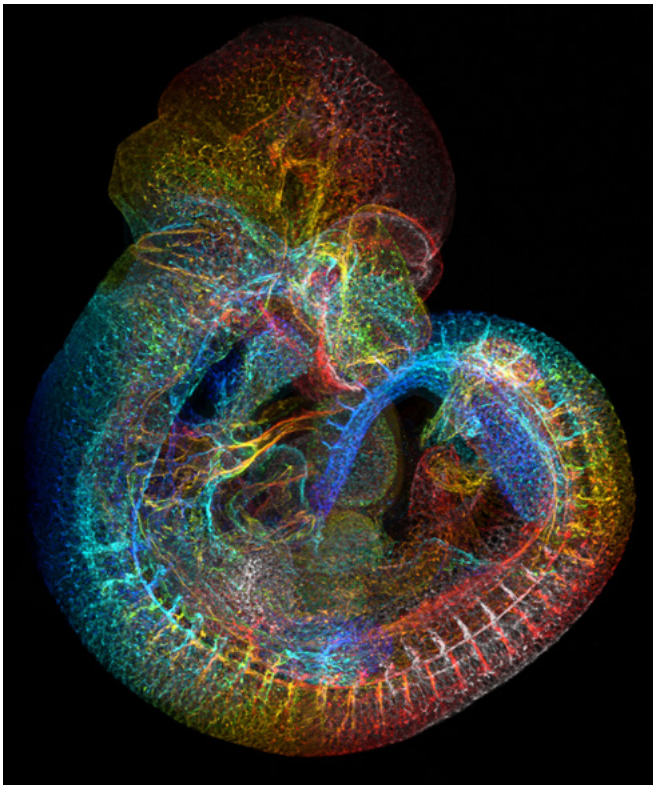
DPAG Lab attains LEAF Gold

The Wade-Martins Group has achieved a Laboratory Efficiency Assessment Framework (LEAF) Gold Award in recognition of its sustainable practices. The Award was presented at the Vice-Chancellor's Environmental Sustainability Awards on 20 June 2023, alongside a Bronze Award to the Cragg Group.

www.dpag.ox.ac.uk/news/wade-martins-group-attain-gold-sustainability-award



Joint First Prize:
'3D-rendering of a post-natal mouse heart' by Judy Sayers



Joint First Prize:
'Rainbow vasculature'
by David Grainger

The Head of Department awarded two prizes and three commendations in a competition to refresh the science on the Sherrington building walls.

www.dpag.ox.ac.uk/news/winners-of-dpag-image-competition-2023-announced

DEPARTMENT OF
PHYSIOLOGY,
ANATOMY &
GENETICS

www.dpag.ox.ac.uk
01865 272548
communications@dpag.ox.ac.uk
Sherrington Building, Parks Road, Oxford, OX1 3PT