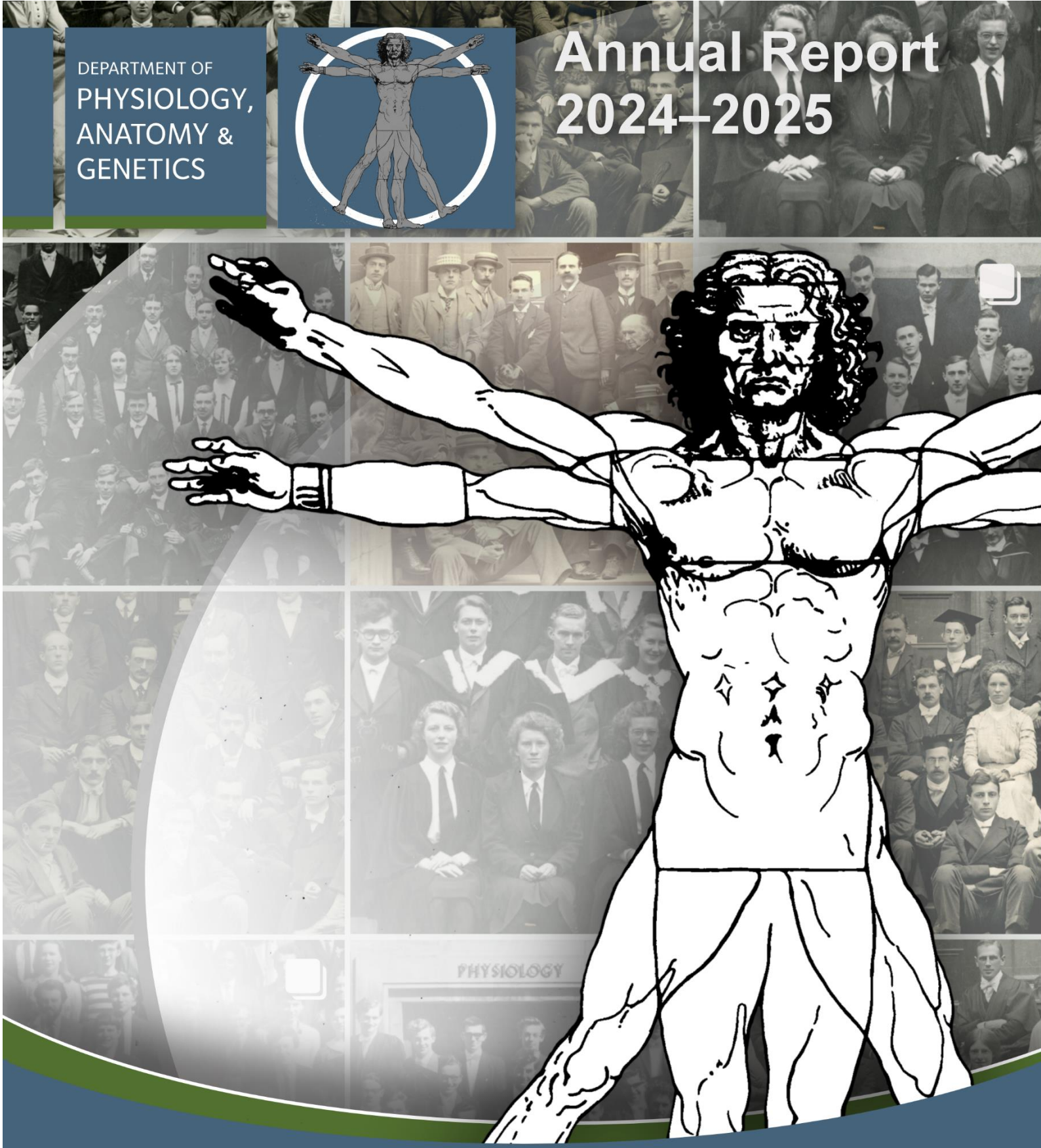
DEPARTMENT OF
PHYSIOLOGY,
ANATOMY &
GENETICS

Annual Report 2024–2025



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

A year of progress

Head Of Department address

The Department of Physiology, Anatomy and Genetics has enjoyed another enormously successful year. Members of our department continue to attract international recognition for their research, and many have achieved career success this year, as evidenced by the various awards and honours listed below. I would particularly like to congratulate Gero Miesenböck for his election to the US National Academy of Sciences, Zoltan Molnar for his election as a member of EMBO and also the Hungarian Academy of Sciences, Ana Domingos for her election to EMBO, and Molly Stevens, who was made Fellow of The Academy of Medical Sciences, also awarded the Armourers and Brasiers Company Prize by the Royal Society.

Members of DPAG have had a very busy year for publications, with research published across a wide range of different international scientific journals. Congratulations to Pawel Swietach and Alzbeta Hulikova, whose new method for detecting haemolysis has been licenced to Muhdo Health and Camtech Innovations.

Throughout this year we have hosted many events and talks, and our Prize Lecture series has attracted top-level speakers. We have been honoured to hear talks by, among others, Breakthrough Prize winner Professor Masashi Yanagisawa, Professor Sheena Iyengar, Professor Andrew Marks, Professor Jackie Schiller, Nobel Laureate Professor James E Rothman and Breakthrough Prize winner Tony Hyman. Our various societies have also been busy and the Heart Rhythm Club, Cortex Club and Researcher Society all hosted successful lecture series and events of their own.

Finally, in September Professor Sir George Radda sadly died. Professor Radda was our first Head of Department when the Medical Sciences Division merged the Department of Human Anatomy and Genetics and the University Laboratory of Physiology to create the single Department of Physiology, Anatomy and Genetics in 2006. Professor Radda received numerous prestigious awards and honours during his career for his pioneering efforts in using spectroscopic techniques for metabolic studies.

Oxford Anatomy and Physiology ranked #1 in the QS World University Rankings by subject 2017, 2018, 2020, 2021, 2022, 2023, 2024, 2025

QS WORLD UNIVERSITY RANKINGS

Honours, Fellowships and Prizes

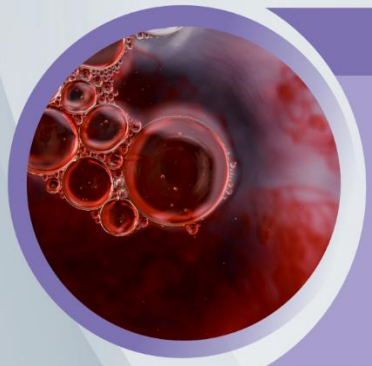
Molly Stevens made Fellow of The Academy of Medical Sciences, appointed Deputy Director of Q-BIOMED Hub, also awarded The Royal Society's Armourers and Brasiers Company Prize, **Zoltan Molnar** elected a member of EMBO and also elected as a member of the Hungarian Academy of Sciences, **Frances Ashcroft** received the Rolf Luft Award, **Raffaele Sarnataro** awarded a Fulford Junior Research Fellowship, **Lukas Krone** made Staines Medical Research Fellow, **Robin Klemm** received a Wellcome Discovery Award, **Jakub Tomek** won a 3R's Prize, **Luise Schlotterose** awarded a Newton International Fellowship by The Royal Society, **Samira Lakhal-Littleton** elected Fellow of The European Society of Cardiology, **Andrew King** part of team awarded a Wellcome Discovery Award, **Ana Domingos** elected a member of EMBO and received a Wellcome Discovery Award and also an ERC Advanced Grant, **Anna Cook** awarded a postdoctoral fellowship from EMBO, **Mootaz Salman** awarded the ALBA-Roche Research Prize for Excellence in Neuroscience, **Jacinta Kalisch-Smith** received an Intermediate Fellowship from the BHF, **Emily Carroll** awarded a Junior Research Scholarship from Linacre College, **Jascha Achterberg** received a St John's Career Development Research Fellowship, **Vladyslav Vyazovskiy** re-elected as Vice-President of ESRS, **Gero Miesenböck** elected to The US National Academy of Sciences, **Rui Ponte Costa** made Associate Professor, **David Paterson** awarded an honorary degree by the University of Otago.

Student spotlight

The department welcomed 30 new students in the 2024/25 academic year, marking a growth that we are optimistic about sustaining in the years ahead. These students represent a truly global cohort, supported by a diverse range of funding sources. Scholarships and studentships have been awarded through Oxford-administered schemes, government sponsorships, UK Research Councils, as well as generous contributions from philanthropic foundations and charitable organizations. This broad base of support reflects the department's commitment to accessibility and academic excellence on an international scale.

Our students continue to excel not only in their academic pursuits but also across a wide range of extracurricular activities. Many have had their research published in high-impact journals, showcasing the department's commitment to cutting-edge science and scholarship.

Beyond the lab and lecture hall, DPAG students are actively involved in sporting excellence, participating in **Rugby, Rowing (men's and women's boats), Karate, Jiu-jitsu, Real Tennis, Lawn Tennis and Basketball**—with several students proudly holding a **Blue**, Oxford's highest sporting honour.

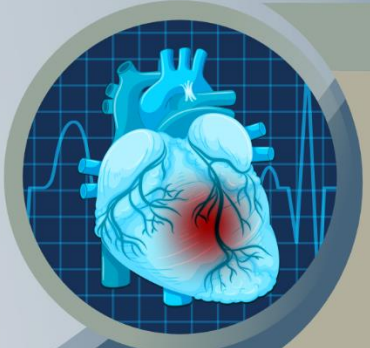


New method for detecting haemolysis, developed by the Swietach Group, has been licenced to Muhdo Health and Camtech Innovations by OUI

Research from Pawel Swietach and Alzbeta Hulikova has paved the way for a revolutionary new test that could transform the way we detect haemolysis. The Swietach group identified a novel, urine-based biomarker for haemolysis and developed a prototype lateral flow device (LFD) for rapid, non-invasive point-of-care detection. This new urine-based test eliminates the need for expensive and invasive blood samples, making diagnosis faster, easier, and more accessible. OUI has filed a patent and has signed development licenses with two commercial partners, Camtech Innovations and Muhdo Health, who will support this project.

Remembering the need for sleep

The Miesenböck group is finding clues to the mystery of sleep in the properties of sleep-inducing cells in the brain. Writing in Nature, they reported that sleep-inducing neurons in the brains of fruit flies respond to breakdown products of peroxidised membrane lipids. The neurons contain machinery that increases their electrical discharge when lipid-derived carbonyls accumulate. In an incisive demonstration of how lipid peroxidation dictates the need for sleep, the authors examined mutant flies that cannot rid their brains of lipid-derived carbonyls. They found that the animals were almost always asleep.



A special pacemaker that can reverse heart failure through switching its fuel from sugar to fat

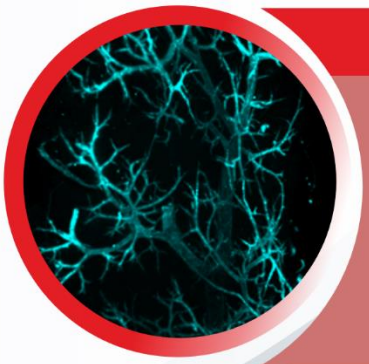
A study led by Professor Neil Herring and supported by the British Heart Foundation found that a pacemaker treatment for heart failure can reduce the size of the main pumping chamber by 50%. Moreover, the pacemaker helps switch the fuel the heart uses from sugar back towards fat to increase its energy production and this appears to be key to producing a stronger heartbeat. The research, published in the European Heart Journal, involved 14 volunteers and experiments both in a MRI scanner and during pacemaker implantation when measurements of flow and pressure could be taken alongside blood sampling from within the heart to assess its fuel uptake.

DPAG in the IDRM

Over the past year, DPAG researchers based at the IDRM have made significant contributions to cardiovascular and developmental biology, publishing landmark studies and securing prestigious funding. Publications from the Stone and Riley Groups were featured on consecutive Nature Cardiovascular Research covers. The Stone Group used single-cell genomics to trace the origins of lymphatic endothelial cells, while the Riley Group uncovered how the heart's conduction system regenerates, with a striking cover image by author Judy Sayers. The De Val Group published new insights into blood vessel gene regulation, and the Simões Group reviewed how immune cells shape cardiac health. In developmental biology, members of the Srinivas Group contributed to a review on extraembryonic tissues and co-edited the second edition of a leading mouse developmental atlas, featuring a cover image by Shifaan Thowfeequ. In December, the Oxford Organoid Hub was launched, co-led by Filipa Simões to advance human disease models, alongside the announcement of the UKRI-funded MRC/BHF Centre of Research Excellence in Advanced Cardiac Therapies, co-led by Paul Riley and partially based at the IDRM. Jacinta Kalisch-Smith was awarded a 5-year BHF Fellowship to study how placental blood vessel development affects neonatal heart conditions.

Child heart disease may be more likely if mother has anaemia during pregnancy

Mothers who are anaemic in the first 100 days of pregnancy have a much higher chance of having a child with congenital heart disease, according to research led by the Sparrow Group, funded by the British Heart Foundation and published in the journal BJOG. The study looked at data from 16,500 mothers and found that, if the mother was anaemic in the first 100 days of pregnancy, the likelihood of having a child with congenital heart disease was 47 per cent higher than the usual risk of around 1 in 100. New research will investigate whether taking iron supplements before and during pregnancy could help to prevent some heart defects at birth.



Understanding the biological basis of obesity: a sympathetic path to treatment by burning fat

Understanding the biological basis of obesity is crucial to developing effective therapies. New research has uncovered that Neuropeptide Y (NPY), produced by sympathetic neurons, plays a protective role against obesity by sustaining thermogenic adipose tissue, which dissipates energy as heat. The study suggests that energy dissipation might play a more significant role than appetite in maintaining body weight for some individuals. This research was conducted by Yitao Zhu under the guidance of Professor Ana Domingos, with help from Dr Lu Yao and collaborators around the world.

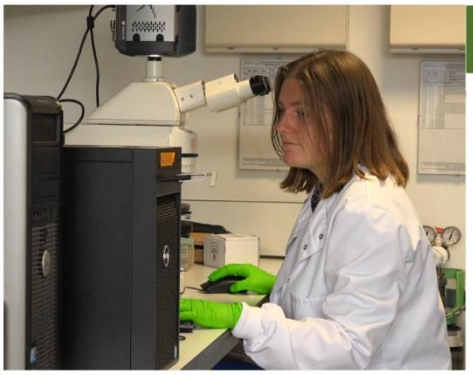
Professor Randy Bruno publishes study on how our senses are combined

Professor Randy Bruno co-authored a study in Neuron, on the stability of cross-sensory input. Professor Bruno and his former graduate student Dr Dan Kato built a special microscope that allowed them to image the activity of many neurons in the brains of mice performing behaviours with multiple senses. They discovered that, while learning indeed changes the main sensory representation of a given primary area, it cannot change the representation of other senses. Their findings indicate that the cerebral cortex must use its secondary areas to generate even the most rudimentary object representations.

An inclusive community

DPAG – A great place to work

Our people are our greatest asset at DPAG and we aim to ensure that everyone has the support they need to thrive and achieve their best whilst working or studying in the department. Key activities supporting this aim over the last year include:



Lunch & Learn

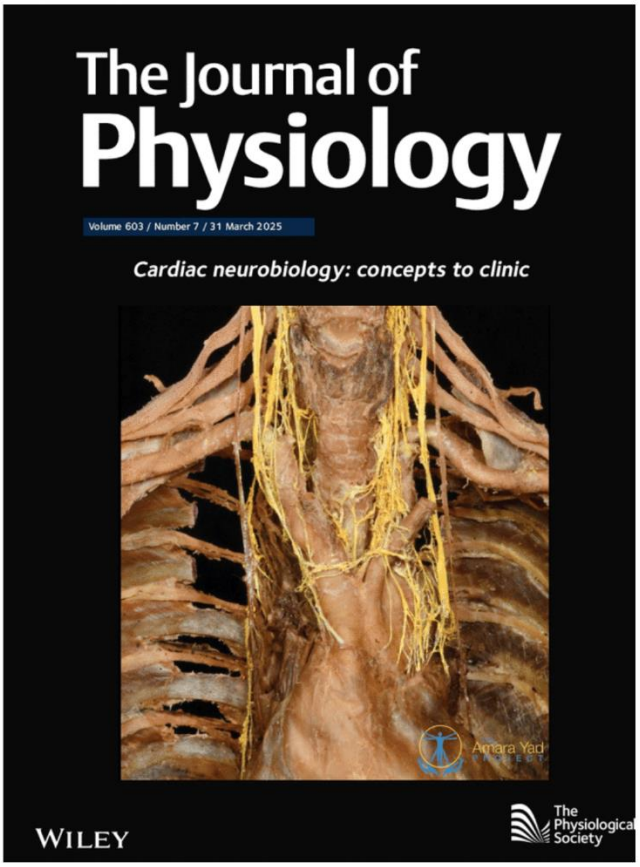
Our Lunch & Learn programme is a Training & Career Development Working Group initiative which started in 2021. It has gone from strength-to-strength with 20 sessions delivered to over 500 attendees in the last year, on topics ranging from Writing for High Impact Journals, to Having a Family in Academia, and everything in-between. The flexible nature of the programme enables us to cover a wide variety of subjects in response to the needs of our staff and students. Our speakers provide useful information, and panellists are very open about the challenges they have experienced, as well as the opportunities that they took, which encourages ongoing conversations.

Respectful Behaviours Framework

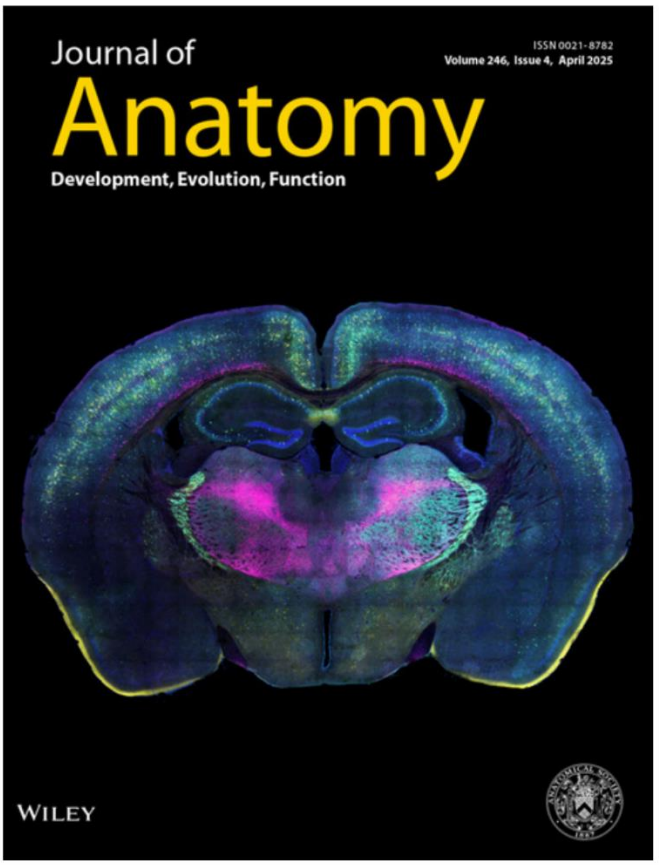
The DPAG Respectful Behaviours Framework was created in collaboration with staff and students to define expectations of behaviour within the department. The Framework is now included within our job advertisements, on our website, and on the walls of our buildings. It has helped people to recognise what is expected of them and others, giving them the confidence to speak up about unacceptable behaviours, and has helped line managers and HR when addressing issues. As a result, the 2025 staff survey shows a 14% increase in the proportion of staff who believe that the department sets clear expectations of behaviour. The Framework has been shared with other Oxford departments and institutes as an example of best practice.

Working Groups

Our Working Groups have each been established to focus on topics of importance to the DPAG community, including Anti-Racism, Outreach & Public Engagement, Training & Career Development, and in 2024, Disability. The Working Groups include members from across the department, in a variety of roles, including Graduate Students, Professional Services, Researchers, and Group Leaders, and each group defines and delivers impactful initiatives within DPAG. In the last year, the newly formed Disability Working Group delivered a well-received Disability Q&A session for Group Leaders and Line Managers, ran a Disability Survey to better understand the experiences of disabled staff and students, raised the profile of disabled scientists for Disability History Month, and called for support meetings for individuals, which have now been introduced. Our Working Group members collectively make a significant difference to the lives of their colleagues, for which we are immensely grateful.



The special edition of the Journal of Physiology was co-edited by our Head of Department Professor David Paterson, with Professor Kalyanam Shivkumar and features several papers by DPAG scientists.



DPAG's Florina Szabó, working with Zoltán Molnár, Anna Hoerder-Suabedissen and colleagues, published a paper in the Journal of Anatomy, and her beautiful microscope image is on the cover of the April 2025 issue.

2024/25 In Numbers

- 629 Members of the department
- 59 Members of Faculty
- 189 Researchers
- 158 Graduate Students
- £127m Total Grant Value

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