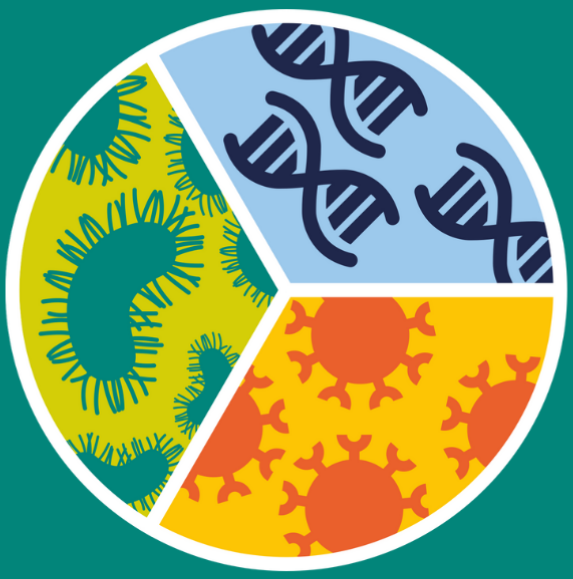


MEDAWAR DAY

2025

Oxford Martin School

Agenda

Time	Session
9:30 – 10:00	**Coffee on arrival**
10:00 – 10:10	***Welcome and introduction*** John Frater
10:10 – 10:40	**Azim Ansari** A Tale of Two Nucleotides: Host Genetics Drives Cytosine and Uracil composition of HCV
10:45 – 10:53	**Qijing Shen** The impact of genetic variation in antigen presentation pathway genes on HCV infection outcomes
10:55 – 11:03	**Callum Board** Isolation and characterization of monoclonal antibodies from immunocompromised patients following three doses of COVID-19 vaccine.
11:05 – 11:13	**Hattie Parker** Immune control and viral escape: A case study of ATI in paediatric HIV-1
11:15 – 12:00	**Guest Speaker: Ole Søgaard – Arhus University** Toward an HIV cure: Progress, Challenges, and Future Promise
12:00 – 13:00	**Lunch Break**
13:00 – 13:08	**Cathy de Lara** Sustainability in the PMB
13:10 – 13:40	**Aris Katzourakis and Anselmo Jiro Kamada** Fighting fire with fire: hosts turning viruses against their infectious relatives'
13:45 – 13:53	**Charles de Souza** Characterization of gag-ERV orthologs across bat species
13:55 – 14:03	**Anna Borlase** Modelling morbidity for neglected tropical diseases
14:05 – 14:13	**Claire Keene** New MSc in Health Service Improvement and Evaluation
14:15 – 14:45	**Adrian Smith** The evolution of TLR mediated recognition of unmethylated CpG DNA motifs
14:45 – 15:15	**Coffee Break**
15:15 – 15:45	**John Frater** The RIO Trial: Sustained antibody and T cell mediated HIV control off ART'
15:47 – 15:55	**Dan Coneyworth** Every last drop(let): leveraging microfluidics for single molecule DNA amplification
15:57 – 16:05	**Yanxu Chen** MAIT Cells Are Required to Sustain Memory Inflation During MCMV Infection
16:07 – 16:15	**Kaitlin Reid** Viral populations of archived clotting factors from 1974 - 2014
16:17 – 16:47	**Susie Dunachie** Vaccines for Gram-negative bacteria
16:50 – 17:00	***Closing statements*** Philip Goulder

Message from Director Paul Klenerman

It is a pleasure to introduce Medawar Day again. I am sorry to miss it but John Frater will take over and the day looks once again to be good entertainment as well as informative. Thanks also must go to Daniel for his hard work in making this happen, and Philip Goulder too on the management committee.

Meanwhile I hope people are drawing some inspiration from Peter Medawar's medal in the entrance. The handover from the family was a lovely event and they are rightly pleased it has gone to a good home. The Medawar prize was also launched last year and went to a student from the Dunn School (where Medawar and his wife Jean both worked). Hopefully soon there'll be a recipient from the Medawar building, so if you are an aspiring student or early career researcher encourage your supervisor to apply for you later in the year.

I'd like to thank the team on the sustainability committee for their work – this was important anyway but it turns out to be essential to get the right accreditation for the funding agencies. We've been doing well with the Green Impact awards so hopefully things will continue with LEAF. If you would like to contribute to this effort please do join the committee and meanwhile everybody please keep up the good work in reuse, recycling and generally saving carbon.

Last year we had a lot of work to do on safety – the Cat 3 labs were the obvious focus of this but an awful lot of background paperwork needed as well. There's been a big impact on many people's work but many thanks for everybody's patience and efforts. We are in a new system now, well supported by Lawrence Eagles from the NDM - and welcome to our new deputy lab manager Nathan Jones who will help Peter Thomas keep things under control.

All of that goes to illustrate that working to improve and raise the profile of safety culture is a priority for all of us – but it nevertheless does not have the recognition it should. To redress this, this year we will start an annual award for the person who has made a contribution to the smooth running and especially the safety aspects of the Medawar (Medawar Day award). I'll kick it off this year with my own nomination - but hopefully we can keep it going and over time all the key contributors can get recognition.

Next year the Life and Mind Building (LaMB) next door will open its doors. We should all benefit from this and not just because the access will be easier at the Medawar, but also we will have access to more facilities in the new building. It is something we are discussing with the Biology teams and will keep everybody up to date on the new opportunities.

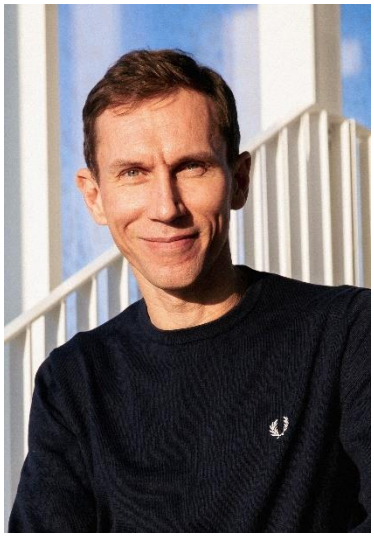
Finally, if you have any ideas for the building, big or small, please let us know. Having events like today to bring the groups together is very important, and any ideas for other activities or initiatives that can help get the best out of the environment and improve people's welfare, science, professional development or simply enjoyment would be warmly welcomed.

Have a great day

Guest Speaker:

Ole Søgaard – Arhus University Hospital

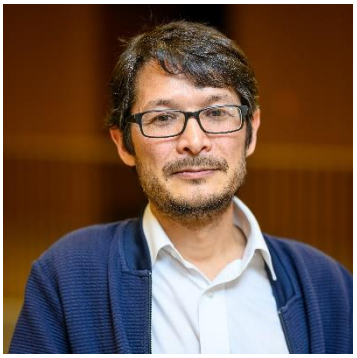
Talk title: Toward an HIV cure: Progress, Challenges, and Future Promise



Dr. Søgaard is an infectious disease physician at the Department of Infectious Diseases at Aarhus University Hospital, Denmark, and a professor at the Department of Clinical Medicine, Aarhus University. After receiving his PhD in HIV epidemiology in 2011, he transitioned to experimental medicine focusing on investigating novel or repurposed medicinal compounds and using a translational research approach to developing cures for virus infections. In 2015-2016, Dr. Søgaard was a visiting researcher in the Nussenzweig Laboratory of Molecular Immunology at The Rockefeller University, New York. As a physician-scientist with extensive training both in basic science immunology/virology and clinical medicine. His research is focused on the understanding of virus pathogenesis and persistence, including clinical investigations into immunomodulation, broadly neutralizing antibodies, and reversal of HIV-1 latency. The majority of his work has been done in the field of HIV-1 cure.

Abstract:
Antiretroviral therapy (ART) has transformed HIV-1 infection from a fatal disease into a manageable chronic condition. However, longitudinal studies reveal that the decay rate of the HIV-1 reservoir is so slow that ART alone cannot eliminate the reservoir within the lifetime of people living with HIV-1 (PLWH). This underscores the urgent need for safe and scalable strategies to achieve an HIV-1 cure. Most HIV-1 cure strategies fall into two main categories: (1) approaches aimed at eradicating or inactivating the reservoir and (2) approaches designed to induce immune-mediated control of the virus. Hematopoietic stem cell transplantation (HSCT) has demonstrated the potential to completely eradicate the HIV-1 reservoir, as seen in case reports of PLWH receiving HSCT for hematologic conditions. However, due to its inherent risks, HSCT is not a feasible cure strategy for otherwise healthy individuals. Consequently, most research has shifted toward strategies focused on immune-mediated control of HIV-1. Cytotoxic CD8+ T cells are strongly associated with spontaneous HIV-1 control, making the enhancement of CD8+ T cell immunity a promising avenue for clearing infected cells and achieving long-term viral suppression. Despite these prospects, therapeutic HIV-1 vaccines have so far failed to produce the desired results in clinical trials. Nevertheless, a range of other compounds - both those specifically designed for HIV-1 cure and repurposed drugs from fields such as oncology and haematology - have been investigated for their potential to impact HIV-1 persistence. While many of these interventions have not succeeded in significantly reducing the reservoir or inducing robust adaptive immune responses, recent trials have reported encouraging outcomes, with some individuals achieving partial or complete long-term control of HIV-1 after discontinuing ART. These findings raise the possibility that a functional cure for HIV-1 is achievable. In this talk, I will provide an overview of the most promising therapeutic strategies in the pursuit of an HIV-1 cure, including the use of broadly neutralizing antibodies. I will also discuss key populations that may have a higher likelihood of achieving a cure and address the critical barriers that remain in developing effective interventions. Additionally, I will review findings from in-depth studies of the biological mechanisms underlying sustained HIV-1 suppression in individuals who maintain control for years after stopping ART.

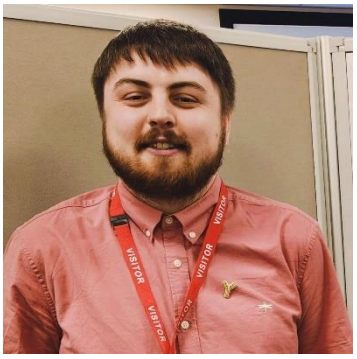
Speakers (A-Z)



Azim Ansari

Talk title: A Tale of Two Nucleotides: Host Genetics Drives Cytosine and Uracil composition of HCV

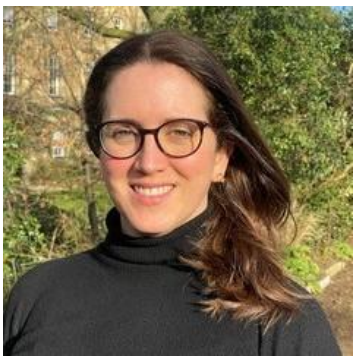
Bio: I received my undergraduate degree in Engineering in 2009 and a DPhil in Statistical Genetics from the University of Oxford in 2014. I was awarded a Royal Society and Wellcome Trust Sir Henry Dale Fellowship in 2020 and currently am a group leader at Nuffield Department of Medicine. My main research focus is understanding host pathogen interactions using genomic data and developing statistical methods to integrate heterogeneous sources of data in infectious diseases.



Callum Board

Talk title: Isolation and characterization of monoclonal antibodies from immunocompromised patients following three doses of COVID-19 vaccine.

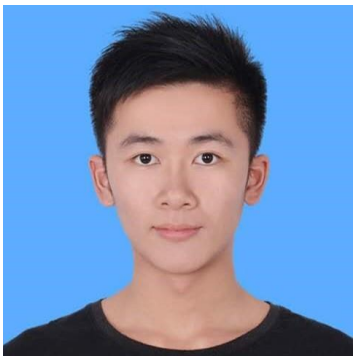
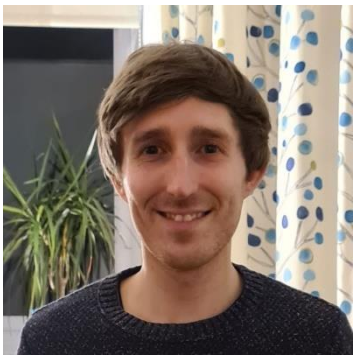
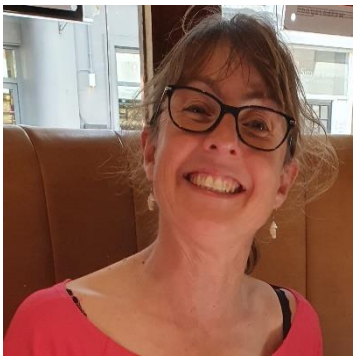
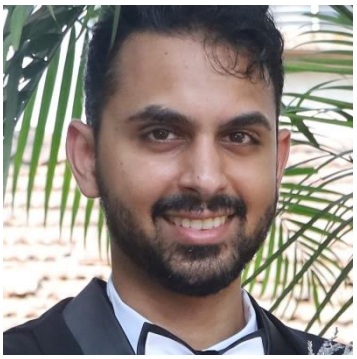
Bio: Callum begun working at the University of Oxford directly after completing his undergraduate degree at Plymouth University. In 2021 he moved into Research Assistant role in the Oxford Autoimmune Neurology Group – maintaining a patient-facing role in clinics alongside carrying out exploratory and diagnostic assays on patient samples in the lab. Callum is now working as a Research Assistant within the Barnes Group where his main focus is to phenotypically characterize the antibody responses of individual B cells in immunocompromised individuals in response to SARS-CoV-2 vaccination. Alongside this, Callum also assists in other research within the group aiming to design an effective vaccination against Hepatitis C.

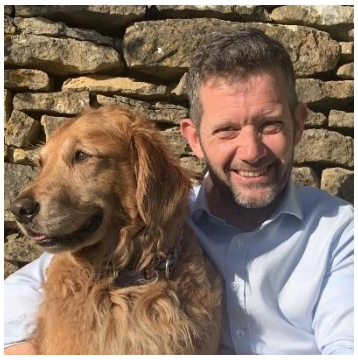
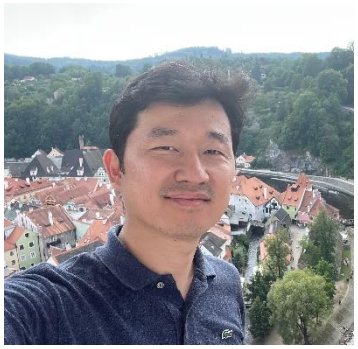


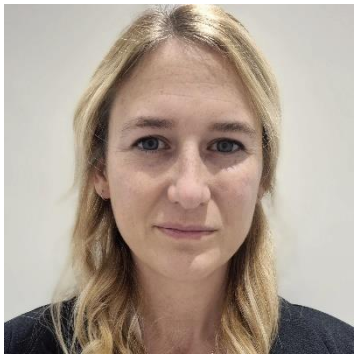
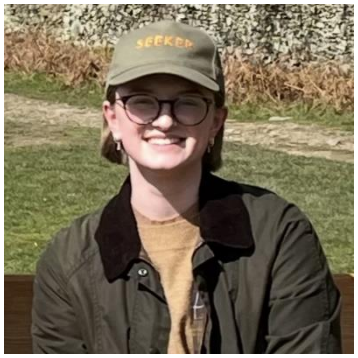
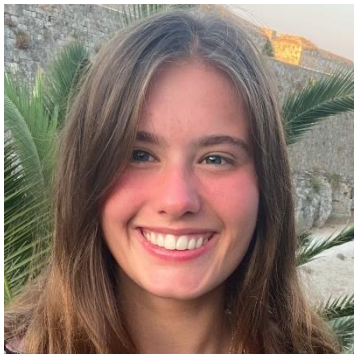
Anna Borlase

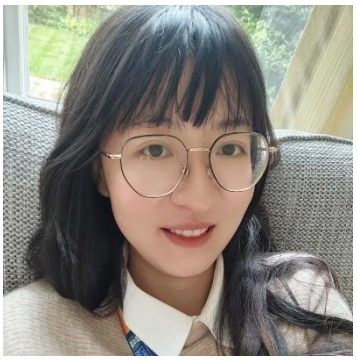
Talk title: Modelling morbidity for neglected tropical diseases

Bio: I am an infectious disease modeller and epidemiologist with a veterinary and public health background. Currently a Royal Society Dorothy Hodgkin fellow in the Department of Biology, I previously worked at the Big Data Institute in Oxford with the Neglected Tropical Disease (NTD) modelling consortium. I am interested in incorporating long-term morbidity risk into NTD transmission models, exploring the role of non-human reservoirs of infection for NTDs, and quantifying the morbidity burden attributable to zoonotic transmission.

	**Yanxu Chen** Talk title: MAIT Cells Are Required to Sustain Memory Inflation During MCMV Infection Bio: I am Yanxu Chen, a visiting DPhil student at the University of Oxford. I obtained a medical degree and a specialization in urology from Sun Yat-sen University, China. My research previously focused on transplant rejection immunology. Currently, I am undergoing PhD training in MAIT cell biology, exploring its role in adaptive immunity.
	**Dan Coneyworth** Talk title: Every last drop(let): leveraging microfluidics for single molecule DNA amplification Bio: Dan is a research assistant for the Frater group. His work involves using an 'in house' microfluids platform to sequester both cells and DNA into droplets for downstream applications.
	**Cathy de Lara** Talk title: Sustainability in the PMB Bio: After completing my Masters in Immunology I came to work at the PMB with the Beverley group in 2009. In 2011 I joined the Klenerman group as an RA, I am now a part of the sustainability committee and am the Collections Responsible Officer for the human tissue samples held under our HTA licence. When not at work you will find me taking photographs at the bottom of the sea.
	**Charles de Souza** Talk title: Characterization of gag-ERV orthologs across bat species Bio: As part of the Paleovirology group, Charles is involved in the discovery and characterization of conserved endogenous retroviruses (ERVs) in mammalian genomes and their potential of being repurposed for host cell function. Using bats as his organism of study, he has uncovered several ancient orthologous ERVs and found them to be evolving and transcriptionally active. He describes in this talk his findings and discusses potential of co-option of several ancient retroviral Gag genes in bats.

	**Susie Dunachie** Talk title: Vaccines for Gram-negative bacteria Bio: Susanna Dunachie is Director of the NDM Centre for Global Health Research at Oxford University, Professor of Infectious Diseases, NIHR Global Research Professor and Honorary Consultant in Infectious Diseases in the NHS. She is also Adjunct Professor at Mahidol University, where she has collaborated with Thai partners on international research projects since 2011, including four years based in Bangkok. Her focus is strengthening laboratory research capacity in lower-resource settings and developing vaccines for vulnerable populations, including defining immune correlates of protection for B. pseudomallei (melioidosis), other Gram-negative bacteria, SARS-CoV-2 and RSV. She leads the T cell work package of the Wellcome-funded SEACOVARIANTs consortium in SE Asia and is the immunology advisor for NERVTAG.
	**John Frater** Talk title: The RIO Trial: Sustained antibody and T cell mediated HIV control off ART Bio: John Frater is a Professor of Infectious Diseases and the interim Director of the Peter Medawar Building in Paul's absence, where he leads the HIV Reservoir and Cure Group. The aim of his research is to explore strategies for targeting the reservoir of latent HIV infection in treated individuals, with a specific interest in primary HIV infection. He is a lead investigator on a number of major HIV clinical studies (eg RIO, AbVax, RIVER, HEATHER), many of which include antiretroviral therapy treatment interruptions. His laboratory focus is on immune responses that may lead to viral control and the impact of viral variation. He also works as an Honorary Consultant Physician in the NHS in HIV and Infectious Diseases.
	**Anselmo Jiro Kamada** Talk title: Lessons from the past: exploring how glires coopted endogenous viruses to counteract retroviruses Bio: Dr. Anselmo Jiro Kamada is a postdoctoral researcher under Aris Katzourakis supervision, specializing in genomics and virology, with a focus on diversity of endogenous viral elements(EVEs) in mammalian genomes and its implications for health and disease. His current work explores how some EVEs benefits the host by restricting the deleterious effects of exogenous and endogenous viruses activity, by using molecular tools for heterologous gene expression system and in vitro viral challenge.

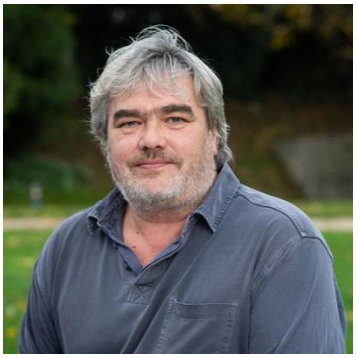
	**Aris Katzourakis** Talk title: Fighting fire with fire: hosts turning viruses against their infectious relatives Bio: Professor Katzourakis studies the evolutionary biology of viruses and their interactions with their hosts. He has been instrumental in founding the field of paleovirology, which explores viral/host interactions over timescales of millions of years, and exploits the viral 'fossil record' made of endogenous viral elements. He works on a range of viruses from across the diversity of extant and extinct viruses.
	**Claire Keene** Talk title: New MSc in Health Service Improvement and Evaluation Bio: Dr Claire Keene is the Deputy Director of the MSc in Health Service Improvement and Evaluation, under the Centre for Global Health Research. She is a South African clinician with experience designing and implementing differentiated service delivery interventions. Her research explores people's engagement with HIV care, predominantly in a South African public sector context.
	**Hattie Parker** Talk title: Immune control and viral escape: A case study of ATI in paediatric HIV-1 Bio: Hattie is a research assistant in the Goulder group. Prior to her role at Oxford, she completed a BSc in Biochemistry with Professional Placement at the University of Bath. She is particularly interested in investigating the immune responses associated with viral control in early ART-treated children living with HIV.
	**Kaitlin Reid** Talk title: Viral populations of archived clotting factors from 1974 - 2014 Bio: Kaitlin is a 2nd year DPhil Clinical Medicine student who is working on technology to improve blood safety as part of Genomics to Enhance Microbial Screening within the Blood and Transplant Research Units. The main focus of her work is analysis of genomic data from archived Plasma-Derived Medicinal Products (PDMPs) manufactured during the time of the Infected Blood Inquiry. The aim of this project is to use historical genomic data to further understand the viral content within archived PDMPs and inform developments in blood safety technologies for contemporary PDMPs.



Qijing Shen

Talk title: The impact of genetic variation in antigen presentation pathway genes on HCV infection outcomes

Bio: I am Qijing Shen, a third-year DPhil student jointly working in the Ansari and Band groups. My research focuses on immunology, Bayesian statistical modelling, and bioinformatics. I am dedicated to developing statistical models and bioinformatics tools to better estimate and detect host-pathogen interactions, advancing our understanding of infectious diseases. Beyond research, I serve as the deputy chair of the graduate student committee at NDM and previously held the position of GCR President at Reuben College. In my free time, I enjoy playing the piano, watercolour painting, and skating.



Adrian Smith

Talk title: The evolution of TLR mediated recognition of unmethylated CpG DNA motifs

Bio: After working in the department of Biology at Yale then at the Institute for Animal Health I moved to Oxford in 2008. My group has broad interests in the comparative biology of infectious disease and immunity. We employ a range of molecular and cellular approaches to determine how different animals interact with microbes and infectious disease. Our current interests include:

- using TCR repertoire analysis to define the biology of conventional and nonconventional T cells in birds and mammals.
- Using ancient DNA to analyse the historical relationship between infectious disease, humans and livestock
- Defining the evolution of pattern recognition focussing on Toll like receptors.

The PMB is a cross-divisional, multi-disciplinary building focused on research in host-pathogen interactions. Established for 2 decades now it has developed and strengthened over time through a strong sense of combined purpose and a collaborative ethos. There are 3 major strands to the work which are closely integrated:

Pathogen biology. This includes studies of major microbial pathogens with a focus on persistent viruses and invasive bacteria. The work extends from single cell studies to global molecular epidemiology, taking advantage of high throughput sequencing approaches to understand the evolution of pathogens within and between hosts.

Host immune responses. This includes a focus on successful control of pathogens with implications for vaccine development, as well as defining critical mechanisms for pathogen escape. Much of the work has focused on T cell responses and protective memory, including paediatric responses and unconventional T cell populations but increasingly tools for antibody development and evaluation are a part of the groups' work.

Mathematical biology. This includes development of approaches to understand host-pathogen interactions within host and at the population level. The integration of statistical modelling with sequence evolution and host immunology has been very powerful in shedding light on pathogen history and developing models for future epidemic behaviours, from HIV to Zika, including COVID-19.

The shared endeavour across these three strands is to make quantitative descriptions of the processes that generate observed patterns in host-pathogen interactions. Different research groups bring different techniques to that endeavour, but there is a clearly articulated and well-understood shared goal. With an understanding of underlying processes in place it becomes possible to make precise hypotheses about the likely outcome of potential interventions. Close links between theory and observation allow those hypotheses to be tested.

Our aim is to strengthen the interactions in this area which have increasing potential because of the new technologies which allow better insights into host immunity coupled with increasing sequencing power and improved insights through integrative models. On a practical level this is fostered by well-equipped and technically secure category 3 space for pathogen research, shared office space and interaction areas, and core facilities which encourage and sustain group working.

The recent period of the pandemic has highlighted the value of the building, with many contributions to the efforts to understand the behaviour of SARS-CoV-2 and the impact of vaccines. The 3 strands mentioned above have been very much in evidence and the collaborative ethos likewise. It has also brought us closer to colleagues across Oxford sites through the Oxford Immunology Network and I think further raised the profile of the building and the need for such pathogen focused facilities.

Paul Klenerman (NDM)
Director

Philip Goulder (Paediatrics)
Deputy Director

John Frater (NDM)
Deputy Director

NDM

Azim Ansari

Ellie Barnes

Peter Simmonds

Tropical Medicine

Proochista Ariana

Susanna Dunachie

Mike English

Kevin Marsh

Biology

Anna Borlase

Sunetra Gupta

Aris Katzourakis

Moritz Kraemer

Bridget Penman

Adrian Smith

Rachel Tanner