# HUGHES HALL
## UNIVERSITY OF CAMBRIDGE

# How the Hughes Hall community is tackling the COVID-19 pandemic

# Introduction

Hughes Hall is a dynamic and progressive College with nearly 60 Governing Body Fellows, 219 further Senior Members from all walks of life, 874 full- and part-time postgraduates and 177 mature undergraduates from more than 80 countries. We aim to bridge the academic and external worlds and often talk about being an impact-orientated College, passionate about research translation, and committed to changing the world for the better. Whilst our Bridge initiative continues to grow, establishing new centres of excellence and supporting innovation amongst researchers, there are many individuals in our midst making impact an everyday reality.

We have collated a selection of the brilliant, diverse and significant ways in which the Hughes Hall community is contributing to local, national and international efforts to tackle the COVID-19 pandemic. Our students and seniors (arranged alphabetically below) are making a tangible difference to people's lives, now and for years to come.

Ernest Aguinam is a Hughes Hall Cambridge-Africa Scholar with a Doctor of Veterinary Medicine degree (2012) from the University of Maiduguri in Nigeria and a research-based MPhil in Veterinary Science (2018-2019) from the University of Cambridge, with six years' experience in veterinary and related practice. He is currently working on a Sars-Cov-2 vaccine development project at the Department of Veterinary Medicine. His role involves accessing immune responses generated by vaccine candidates.

Ernest told us more: "My work is entirely lab based. The COVID-19 vaccines developed at the Laboratory of Viral Zoonotics are first tested in animals for their ability to generate immune responses that would kill or neutralize Sars-Cov-2 and other coronaviruses. Using tissues from vaccinated animals, I 'screen' these candidate vaccines for their ability to generate immune cells that will recognise parts of the virus and potentially kill it."

He performs similar experiments using human blood samples from COVID-19 survivors and exposed individuals as part of a separate collaborative project between the University and Papworth Hospital, aiming to understand better how the body reacts to the virus. He concludes: "I hope my work can help lead us to a better understanding of COVID-19 disease and the development of a broadly protective vaccine, perhaps even one which can protect against multiple coronaviruses in potential pandemics."

Aliko Ahmed is a Hughes Hall Associate, Professor, public health physician, epidemiologist and health strategist with almost 30 years' experience in clinical, academic, and public health policy and practice across low- and high-income countries.

He is also Regional Director for the East of England at Public Health England (PHE) where his leadership during the pandemic has been critical in many ways to local and national responses to the virus, including new highly reactive and coordinated ways of working within an immensely pressurised environment and accommodating a previously unseen pace of change.

Chantal Babb de Villiers is a Research Associate at Hughes Hall, based at the PHG Foundation, a think tank specialising in innovation and healthcare with a focus on genomics. Chantal is a senior policy analyst and part of a project looking at how Sars-Cov-2 sequencing is being implemented and used globally. The Foundation is contributing to the greater understanding of genomics and why it is important, including pathogen genomics.

Chantal explained: "As the number of coronavirus cases has increased around the world so has the number of genetic sequences completed. To date (23 Nov 2020) just under 213,000 sequences have been done globally, with new sequences being uploaded to the online database GISAID daily. Globally, Sars-Cov-2 sequencing data has been important for understanding how the disease enters a country, how it is transmitted, and how it evolves at local, regional, national and international levels. Sequencing data is also key in developing diagnostic tests and vaccines. We study the latest findings internationally and how the sequencing information is generated, shared and used in public health policy. Clearly understanding this will ensure we maximise the potential of sequencing to combat this disease."

Jonathon Coates is a Hughes Hall Affiliate who completed his PhD last year on the existence and function of macrophage subtypes in Drosophila and whose interests focus primarily on immune cell biology, particularly the role of metabolism and hypoxia. He is now leading work looking at how COVID-19 research is being shared.

Although the last pandemic occurred only a decade ago, the way science operates and responds to current events has experienced a paradigm shift in the interim. The scientific community responded rapidly to the COVID-19 pandemic, releasing over 16,000 COVID-19 scientific articles within four months of the first confirmed case, of which 6,753 were hosted by preprint servers. Focussing on bioRxiv and medRxiv, two growing preprint servers for biomedical research, Jonathon and colleagues investigated the attributes of COVID-19 preprints, their access and usage rates and characteristics of sharing across online platforms. Results highlight the unprecedented role of preprint servers in the dissemination of COVID-19 science, and the impact of the pandemic on the scientific communication landscape. The paper is currently under revision with PLOS Biology and available here: https://www.biorxiv.org/content/10.1101/2020.05.22.111294v2).

Cat Fitzpatrick is a Hughes Hall Associate, and an experimental physicist with a strong interest in translating advanced optical techniques into new medical devices who completed an EngD in Photonics in 2013. She was involved in a great deal of PPE-related volunteering earlier in the year and was fully occupied in the COVID-19 response: "On the day before lockdown, I rescued a 3D-printer from the West Site and hoped to help somehow. Since then, with the Early Detection Programme, I have been volunteering on several COVID-19 related projects. First, I worked on making face shields at Makespace, which has now distributed thousands to Addenbrooke's and across the local area. Then I got involved with the national organisation 3DCrown, where I am coordinating distributed 3D-printed face shield protection."

Alongside this, Cat also volunteered as UK Logistics Director for HelpfulEngineering, an international non-profit focused on COVID-19 response, liaising between national and international PPE projects, and looking at applying international innovations to meet UK needs and regulatory requirements. She reflects on her efforts: "While lockdown with a toddler hasn't been without challenges, it has been genuinely inspiring to (virtually) meet so many talented, caring people and to see communities come together to take care of frontline heroes."

Tamsin Ford is a Professor of Child and Adolescent Psychiatry and a Governing Body Fellow. Tamsin's academic work focuses on the effectiveness of interventions and the efficiency of services in relation to the mental health of children and young people, with a particular focus on the interface between the education and health systems. In 2017, she worked on a national survey of the Mental Health of Children and Young People in England for the NHS and has been working on the 'Wave 1' follow-up to this – published in October 2020.

Tamsin summarised her recent work: "We are following up with interviews to find out more about access to mental health services, and 'good versus bad' lockdown experiences which will provide a wealth of data, as the NHS, and the country, consider the wider impacts of the pandemic for years to come. There will be another wave of follow-up in February 2021." The aims of the recent survey were:

1. to compare mental health between 2017 and 2020, by age, gender and various demographics
2. to describe life during the COVID-19 pandemic - the report examines the circumstances and experiences of children and young people including family dynamics, parent and child anxieties, access to education and health services, and changes in circumstances and activities.



Emanuele Giovannetti is a Professor of Economics at Anglia Ruskin University, and a Fellow and Director of Studies in Economics at Hughes Hall. He has been working with the UN's International Telecommunication Union as Vice Rapporteur for a Study Group. He organised an international webinar on *Digital Exclusion and Policy Effectiveness in COVID-19 Diffusion* examining how more inclusive information and communications technology (ICT) policy and infrastructure could stem the spread of COVID-19.

Epidemiological evidence has shown that the spread of pandemics across regions and nations follows patterns of underlying social and economic inequalities, among them digital exclusion. Emanuele's webinar therefore addressed how digital exclusion impacts the effectiveness of public health policies created in response to those pandemics and how digitally inclusive policies can be crafted in ways that curb their spread.

The research discussed and the conclusions reached by a range of expert participants included the need to find solutions based on infrastructure sharing and multi-stakeholder partnership; context-based approaches involving, for example, SMS-based apps in places where Bluetooth is scare; improved symptomatic reporting systems; collaborative approaches to cybersecurity; and digital inclusion being central to all future policy making in this area. This article provides further details about how this work will inform future international ICT policy.

Ellen Higginson is a Hughes Hall Research Associate currently working on two COVID-related projects. Ellen and her colleagues were funded by Cambridge-Africa to support capacity building for COVID-19 diagnostics with collaborators in the Democratic Republic of Congo (DRC) and Madagascar. In addition, she is working with colleagues at the International Vaccine Institute in Korea on two large COVID-19 surveillance projects in Madagascar and Burkina Faso, funded by the Swedish government.



The grants were originally awarded to increase COVID diagnostics capacity in DRC and Madagascar, described here: https://www.cambridge-africa.cam.ac.uk/initiatives/emergency/. Ellen told us more: "We ended up changing our plans slightly in each location to make better use of the funds. In DRC, they decided to use the equipment

and consumables to set up a new diagnostics lab at the University: the opportunity to have a new lab that could serve half the city of Kinshasa was very appealing. They are now setting up the lab and validating the qPCR to begin testing soon. This is so important as increasing numbers of cases in the DRC suggest the start of the second wave."

For Madagascar, funds are supporting laboratory capacity building within the Universite de Antananarivo. This lab is now the central laboratory analysing samples from COVIA Madagascar – a surveillance project assessing the COVID burden in rural areas. The team is working to equip rural health centres with both rapid antigen test kits and qPCR sample collection kits to determine the number of active cases, and also conducting a serosurvey to determine what percentage of the population have antibodies and are likely to have been infected before. Ellen summarised her experience: "Although this has been a tough year for all of us and this is absolutely not what I was expecting to be doing, it was fantastic to have the opportunity to support laboratory capacity building with our collaborators in DRC and Madagascar. These new molecular diagnostic labs will have utility far beyond COVID, and we feel lucky to have received this funding to work with colleagues overseas to implement something with lasting benefits."

Sarah Hoare is a medical sociologist whose PhD focused on end-of-life care, and a Research Associate at the THIS Institute, as well as being a Governing Body Fellow. She contributed to a rapid response project to develop an ethical framework for COVID-19 testing for NHS workers which sought to identify and characterise the ethical considerations likely to be important to the UK NHS testing programme.

The report offers an ethical framework and practical recommendations to help guide good practice nationally and locally to ensure:

- Clarity about testing goals
- Access, effectiveness, and efficiency
- Acknowledgement and management of the strengths and limitations of the current test
- Understanding how the test is used in practice and the implications of these uses
- Clarity in relation to choices about testing both in principle and in practice
- Clarity about data protection and confidentiality
- Trustworthiness and legitimacy
- High quality information and communication about testing.

Offering a set of practical and actionable recommendations, the analysis illustrates the value of explicit, systematic and consultative consideration and ethical issues; and is likely to have relevance to many other areas of practice and policy in response to the pandemic.

Bill Irish is the Regional Postgraduate Medical Dean, a Governing Body Fellow, and Tutor. He reflected: "Most of my year has been spent supporting the UK COVID-19 response. My main responsibility has been to oversee the re-deployment of healthcare trainees to support COVID-19 activity, without unduly impacting on the supply of doctors and other healthcare professionals to the NHS. Part of this has been looking after and supporting their wellbeing during a very stressful period."

Bill has helped implement a technology-led blended learning strategy to maintain healthcare education during the pandemic; work that will be evaluated through a project led by the Bridge at Hughes Hall over the next six months. A number of Hughes Hall graduate entry medics qualified early and contributed

through a programme called the "interim foundation programme" which Bill was responsible for here, in the East of England.

Bill reflected on one of the most difficult moments of the past year: "The most challenging bit for me was the illness and ultimately the death of one of our junior doctors from COVID. This had a massive impact on morale amongst those colleagues who worked with him, and really brought home the risks that our trainees were taking on the "front line" of the NHS in the East of England. As Dean this gave me many sleepless nights, and made me really question our approach to shielding those students and doctors with risk factors – particularly those from BAME backgrounds."

Agnieszka Iwasiewicz-Wabnig is a Fellow of Hughes Hall, Director of Partnership Development at the Maxwell Centre, and Industry Engagement Champion at Cambridge Zero.

Since March this year, Aga has proposed, designed, delivered and run the Cambridge-wide COVID Academic Initiatives (CAI) Hub, connecting a team of over 60 professionals and leaders across the University to support emerging projects aimed at tackling the pandemic. Many of these projects are highly interdisciplinary, sometimes in ways the University has not been previously set up to support.

Aga explained more about her work: "This community is supported by common online communication and a data sharing platform through MS Teams which I have developed and implemented, but it is not publicly accessible due to the confidentiality of many of the projects. As such we do not have a dedicated website and did not have much publicity – we coordinate and support rather than carry out the research itself." This page describes what the CAI Hub is and what it does: https://www.cam.ac.uk/business-and-enterprise/tackling-covid-19 and in further detail here: https://www.cam.ac.uk/covid-19-academic-initiatives-hub-cai (behind Raven).

Daniel Knowles is an EMBA student with Hughes Hall. In his professional role as Head of Operations at the Automobile Association, he has overseen the delivery of several special projects in support of the national effort to resist the COVID emergency.

He told us about some significant achievements: "The biggest project saw us grow the London Ambulance Service fleet from a little under 300 vehicles to more than 600 operational units, and maintain it at that level to this day. Smaller projects have included the creation of a field workshop at the London Nightingale Hospital and reinforcement of the maintenance operations in the East of England and West Midlands Ambulance Services.

"My role has been an executive one, and I haven't actually turned a spanner myself, but this work has been important to many aspects of tackling the pandemic nationally and I am proud to have played a role."

Jenny Lund is a GP partner in a rural practice near Ely and a Hughes Hall PhD student. Funded by the Wellcome Trust, she splits her time between research and general practice. She recalls: "Although general practice probably didn't see the number of COVID cases initially expected it was a time of huge transformation and I now work in a way I couldn't have imagined 12 months ago, with the majority of my consultations now being either by telephone or video."

Jenny reflected on some of the positives such as what can be achieved when red tape is swept away: "We were told we could use any

software for video consultations without a lengthy approval process – something we had been trying to set up for months was turned around in just 12 hours. The vast majority of our patients now have same day access to a clinician instead of 2-3 weeks' wait for a routine appointment."

Challenges for many in GP practice remain ensuring access for patients without digital access and ensuring those with serious conditions are not too scared to seek medical care. General practice in Cambridgeshire is currently delivering 10% more consultations than this time last year and, having vaccinated more of the population than ever before for flu, is now trying to establish how to deliver the largest mass vaccination campaign ever seen in the UK, whilst maintaining all normal services. Jenny summarised: "I'm lucky that my PhD research was amenable to being paused and grateful for the flexibility shown by the College, Department and University in allowing me to meet my clinical commitments. I don't think general practice or academic life are ever going to be the same again, but I hope by this time next year we can meet and discuss changes in person rather than over zoom."

Rakesh Modi is a PhD student and a GP in rural Cambridgeshire so has been seeing patients throughout the pandemic. Earlier in the year, he was also doing additional shifts for NHS111 handling calls from patients with suspected COVID-19.

He is a researcher on the NIHR-funded SAFER trial investigating screening to detect an undiagnosed heart condition and told us how the study has launched an additional feasibility study to test ability to deliver their intervention remotely following the pandemic: "Originally, people aged 70 and over would be given a handheld device to check for a dangerous but common heart rhythm called atrial fibrillation (AF). Participants would have the screening process and subsequent results explained to them face-to-face by at their general practice. Now, those 'in-person' consultations seem potentially unethical and unsafe. Trial consultations explaining how to perform AF screening will now be remotely performed by video or telephone whilst simultaneously confronting the challenges this poses.

Rakesh and the SAFER team are looking to redraw the future landscape of healthcare so that in 2021, they have a better idea of how screening is carried out in healthcare, primary care and research, balancing the risk of 'in-person' appointments with the logistical challenges of remote screening practices. Rakesh concludes: "I think that remote working will leave its footprint on the health system as it can be highly efficient where resources are scarce – I can now conduct 50 consultations in the morning instead of my normal 25. Most people are adapting to it, although who are we leaving behind?"

Alexander Moerchel is a part-time PhD student at the Institute for Manufacturing and a member of Hughes Hall. Together with his supervisor, Dr Frank Tietze, and fellow researchers at the Innovation and Intellectual Property Management (IIPM) Lab he conducted a study of IP related challenges in the Crisis-Critical Sector.

The COVID-19 pandemic exposed the firms, organisations and supply chains directly involved in manufacturing products critical to the health crisis (known collectively as the Crisis-Critical Sector) to unprecedented challenges. Firms from other sectors rushed into the Crisis-Critical Sector to support the effort to upscale incumbent manufacturing capacities, thereby introducing Intellectual Property (IP) related dynamics and challenges. The team applied an innovation ecosystem perspective on the Crisis-Critical Sector and a novel visual mapping approach to identify IP associated challenges and IP-specific dynamic developments during and potentially beyond the crisis. You can read about this work in more detail at the team's blog.

**Johan Ordish** is a Hughes Hall Associate and has recently taken up an appointment as Group Manager (Software as Medical Device and Digital Health) with the Medicines and Healthcare Products Regulatory Agency (MHRA) where he is working with multiple government bodies and other stakeholders to ensure any COVID-19 medical devices that contain software are safe and effective.

He told us: "My group is in charge of regulating all software as a medical device, ensuring that it is safe and effective. As you can imagine, we're involved in the COVID-19 effort in many ways."

**Ajith Parlikad** is Head of the Asset Management Group for the Institute for Manufacturing and a Governing Body Fellow. He highlighted two key activities. Firstly, work predicting demand for critical resources at Addenbrooke's hospital during the COVID wave(s). Since April, he has worked closely with clinicians and the operations team at Addenbrooke's to predict patient admissions, model patient flows through the hospital, and estimate subsequent demand for critical hospital resources such as general ward and ICU beds, ventilators, oxygen, and staff. The application of a stochastic discrete event simulation approach provided a more informative prediction of the demand for critical resources compared to deterministic approaches that were in place, and helped management to prepare for the crisis.

Secondly, scheduling for the University's asymptomatic testing programme – Ajith was part of the team managing and organising the logistics of testing kits for the asymptomatic testing programme. He was responsible for developing the schedule for testing, and routes for collection, that is, which colleges will be tested on which day of the week, and in what order. This involved generating the optimal schedule and routing that balanced the varied demand (number of pools) at each college and the testing capacity available, ensuring the collection/drop-off each day could be performed within a time-window.

Ajith reflected on these roles: "In both activities, it was very interesting to learn and understand the critical challenges faced by people managing these operations (often unnoticed as they are "under the radar" and away from the public eye). It was also satisfying to see how traditional industrial engineering principles could be used to support a progressive University and hospital in dealing with the pandemic." A webinar for those who would like to find out more about Ajith's work is here.

**Nyarie Sithole** is a NIHR Clinical Lecturer in Infectious Diseases at Addenbrooke's Hospital. After completing his MBChB degree in Zimbabwe, he completed an MSc in Infectious Diseases and Tropical Medicine at LSTM and attained his PhD from the University of Cambridge. He is a member of the Royal College of Physicians.

As a Clinical Research Fellow with the Department for Medicine and a Consultant in Infectious Diseases he is heavily involved at the clinical level and currently looking after COVID-19 patients.

Ian Steed is an Associate of Hughes Hall and works in non-profit management and development. He is involved in the pandemic working on a peer learning project for around 6000 health professionals involved in routine immunisations in 90 countries (predominantly sub-Saharan Africa and South Asia). The impact of COVID-19 on routine immunisation is one initial theme; the next step is building on their learning to help in mass vaccination once a vaccine is made available.

Ian told us more: "What excites me is how technology is enabling us to reframe traditional understandings of training and learning in the immunisation sector, moving beyond face-to-face information transfer to learning at a scale that is rooted in people's day to day professional experience and needs. It is great to hear individuals describing how they have taken a project that evolved through a peer learning programme, and reporting back on implementation progress and impact 2-3 months later - we are starting to create evidence linking training to impact, which is a serious challenge in many contexts."

Crucially, this process amplifies the voices, experiences and opinions of people in the global health system who are rarely heard, and certainly not on such a large scale. This learning network is particularly relevant now, as the vaccine gets introduced, requiring countries to adapt to vaccinating new target audiences with new logistical requirements. It is unique in that these professionals are at all levels of health systems, including local health facilities. The latest peer learning exercise is here.

Andreas Stylianides is a Professor of Mathematics Education, Hughes Hall Governing Body Fellow and Director of Learning and Teaching at the Faculty of Education. His research is committed to understanding and acting upon problems of classroom practice. A premise underlying this dual commitment is that, by engineering ways to address problems of practice, one develops also a better theoretical understanding of the processes (didactical, cognitive, epistemological, etc.) underpinning the problems.

He contributed to educational discourse around the issues of home-schooling at a time when all schools were closed due to the pandemic, for example, this article on home-schooling on the University's website: https://www.cam.ac.uk/stories/schools-in.

Caroline Trotter is Academic Director of Cambridge-Africa and a Governing Body Fellow. She ran a COVID-19 emergency award scheme through the ALBORADA research fund for two months from early April, operating a rolling emergency funding scheme to make awards, up to a maximum for each award of £20,000, to Cambridge and African researchers working together to address COVID-19 in Africa. 15 projects from African colleagues and their Cambridge collaborators were supported to help make a difference to the COVID response in nine African countries. Nidhi Singal, a Hughes Hall Fellow, was one of the successful applicants and a number of other Hughes Hall researchers were in the teams that won grants. More details can be found here.

Caroline also told us about her own research: "My work has focused on the COVID collateral impacts on immunisation for meningitis. We have shown that, in the UK, lockdown effects have likely dampened transmission of the bacteria that cause meningitis more than enough to counter any falls in immunisation. In many African countries, we predict that the success of previous campaigns should be enough to sustain protection if routine immunisation uptake falls in the short term."

Nicole Wheeler is a Research Associate and works as a data scientist and bioinformatician at the Centre for Genomic Pathogen Surveillance, at the Wellcome Sanger Institute where she examines the role of machine learning and artificial intelligence in genomic surveillance of emerging high-risk pathogen strains. When COVID-19 hit, the team joined the COG-UK consortium to help with processing, visualising and interpreting the genomic data that was being produced in the UK.

Nicole explained: "I'm volunteering to work with a group in the Philippines in setting up COVID genome sequencing and analysis with some local hospitals. I joined this project through JOGL (Just One Giant Lab), an online platform for community-led, open science research and development projects. The project is run by a core set of collaborators in the Philippines and is open for others to join and contribute. The goal is to set up genomic sequencing of COVID samples from scratch in a community-led effort, and then to publish an open guide to how we did it for people in other low-income settings to use."

The team is collaborating with a local hospital in the Philippines to plan a sampling strategy, collect samples and sequence them on a MinION DNA sequencer, in order to help the hospital understand how cases among patients are related, and whether they are being driven by transmission within the hospital or from the community. Nicole told us more: "Challenges have included acquiring funding for the pilot project and designing the sampling strategy to ensure we can demonstrate the value of genome sequencing in understanding the spread of the virus and gain funding to scale up the project."
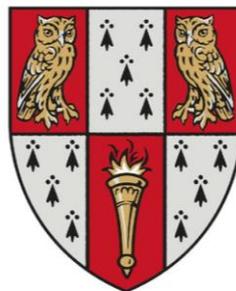
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