

Centre for Personalised Medicine

Annual Report 2022



The Oxford Centre for Personalised Medicine was established through a very generous donation from the Dr Stanley Ho Medical Development Foundation to St Anne's College in 2013. The Centre has enjoyed an ongoing fruitful collaboration with the Foundation over the last nine years, developing exciting academic partnerships with friends in Macau, Hong Kong and the Great Bay area as a result. The Centre also acknowledges with grateful thanks ongoing funding from the Wellcome Trust.



Executive summary

The Centre for Personalised Medicine (CPM) is a partnership between the University of Oxford's Wellcome Centre for Human Genetics and St Anne's College, Oxford. It is a communication, engagement and research vehicle for students, academics, clinicians, the public and policy makers to explore the benefits and challenges of personalised medicine. The Centre's principal aim is to explore personalised medicine from a range of perspectives. To this end, it coordinates a wide range of events (both online and in-person) and activities including seminars, conferences, public lectures, blog posts, vlogs and podcasts.

Personalised medicine is a broad term that describes the use of what we can measure about individuals to inform their healthcare, as opposed to treating an entire group or population in the same way. To some extent, medicine has always been personalised, in that health care professionals will usually aim to tailor interventions or treatments to the person in front of them. However, over recent decades, the amount of health data that we can generate about individuals has massively expanded - from genetic and genomic testing, whole body imaging and cardiac monitoring to home blood pressure, direct-to-consumer testing, fitness monitors and much more. Personalised medicine addresses how we can use this vast array of data more effectively to diagnose and treat patients, as well as predict disease and offer screening in a population. Other ways of personalising medicine involve tailoring certain drugs and therapies according to how people respond to them. Understanding the reasons for this variability, whether it be underlying biology, socioeconomic factors or environmental influences (or often more likely, a complex interplay of all these factors), can help identify the best drug to give to the right patient, and / or highlight strategies to prevent disease in vulnerable communities. Using individual-level data on millions of molecular and physical measures may help us improve prevention, prediction, diagnosis and treatment for groups of individuals. Personalised medicine is hugely powerful when done right, but it also raises significant clinical, ethical, legal, economic and societal challenges. It is both the benefits and challenges that the CPM is here to discuss.



It has been a real pleasure to be the Director of the CPM over the last year. A great introduction for me was taking part in the Websedge film summarising the work of the CPM for the American Society of Human Genetics meeting on my first day and then gradually getting back to face-to-face meetings. Hosting Professor Hattersley's annual lecture in the Sheldonian, with dinner in the Ashmolean, was a highlight, and great therapy for online lecture fatigue. The stellar team of JRFs, ably supported by the programme coordinator and administrative support, have rolled out new initiatives so that the CPM goes from strength to strength.

Our systematic literature review of ethical issues in diversifying genomic data and our glimpse into public views about genetics through the Mass Observation programme are examples of new types of activities for the CPM, as are supporting two MSc students over the next year and developing a podcast and vlog series. I look forward to year 10 of CPM life!



Professor Anneke Lucassen
Director, Centre for Personalised Medicine



People

The CPM is entirely dependent on the talented and enthusiastic individuals who make up its Steering Group, Advisory Board and office team. **Professor Anneke Lucassen** has had a full year in post as the Centre's Director, as well as establishing her research group in Oxford and her own clinical work. The CPM is benefitting from her insight into the interface between genomic research, clinical practice, and public discourse about these developments as well as her wide-reaching collaborations.

The Centre welcomed two new Junior Research Fellows (JRFs) in September 2021, **Dr Rachel Horton** and **Dr Katherine Wood**. Along with **Dr Pdraig Dixon** and **Dr Nicky Whiffin**, this stellar team of four have undertaken an enormous range of activities. A fifth JRF, **Dr Sarah Briggs**, has just been appointed and will start in September 2022.

The CPM's Steering Group, who shape the overall direction of the Centre's events and activities, has welcomed new members **Dr Zoi Alexopoulou** and **Professor Catherine Pope**, and said a fond farewell to **Dr Nina Hallowell**. The External Advisory Board said goodbye to **Professor Sir John Bell** after eight years and gained new members, **Professor Jane Anderson** and **Dr Frances Rawle**.

Administration Team



Catherine Lidbetter



Thea Perry



Steering Group



Professor Anneke Lucassen



Helen King, Co-Chair



Professor John Todd, Co-Chair



Dr Zoi Alexopoulou



Dr Padraig Dixon



Professor Julia Hippisley-Cox



Dr Rachel Horton



Professor Cecilia Lindgren



Professor Catherine Pope



Professor Francis Szele



Dr Nicky Whiffin



Dr Katherine Wood

External Advisory Board



Professor Jane Anderson



Dame Mary Archer, Chair



Professor Sir Peter Donnelly



Professor Gary Ford



Tim Gardam



Richard Girling



Ian Huen



Professor Dennis Lo



Dr Frances Rawle



Dr Magdalena Skipper



Professor Joseph Sung



Year 9 summary of activities 2021-22

Key to demographic groups:

 Clinicians and academics

 Students

 Schoolchildren

 Patient groups and the public

CPM and OGC Forum on host pathogen genomics (online) - September



The CPM hosted the second forum in a series collaborating with the Oxford Genomics Centre, featuring talks by Professor Julian Knight, Dr Francesco Boccellato and Professor Angela Brueggemann, among others, and an industry session featuring PacBio, Oxford Nanopore and Illumina.



Freshers' introductory talk (in-person) - October



JRFs Dr Katherine Wood and Dr Padraig Dixon spoke to the new intake of students at St Anne's College, introducing them to personalised medicine and the work of the CPM, and encouraging them to join the Oxford University Personalised Medicine student society.

Director's inaugural lecture (in-person) - November



Professor Anneke Lucassen presented a lecture at St Anne's College entitled *The Promises of Genomic Medicine: An interdisciplinary approach to translation and implementation*, the first major in-person event since early 2020 (pictured, left). The lecture summarised how her research started in the molecular genetics laboratory, identifying genetic factors in disease. As a medic, she went on to specialise in clinical genetics where she found that the translation of these research findings raised a variety of ethical and legal issues. Over the past 20 years, Professor Lucassen has combined her clinical workload with running a research group exploring ethical issues to remove barriers to progress. She highlighted how coming to Oxford and taking on the Directorship of the CPM couldn't feel more apposite for her.

Lunchtime guest lecture by Richard Karlsson Linnér (online) – November



Genetic risk and life insurance underwriting

Professor Richard Karlsson Linnér from Leiden University gave a talk about his work using polygenic scores in life insurance. He explored whether and how genetic tests can contribute to life insurance underwriting beyond traditional risk factors such as smoking or family history of disease. He found that polygenic scores in the top decile showed a shorter median lifespan independent of other factors used in conventional insurance underwriting. He concluded with an urgent plea for policy makers to engage with insurance companies about using genetic information in underwriting decisions.

Precision Medicine seminar, Sun Yat-sen University (online) – November



Professors Simon Leedham and John Todd contributed on behalf of the CPM to the online International Seminar on Precision Medicine as part of the 111th Anniversary of The First Affiliated Hospital, Sun Yat-sen University. Professor Leedham discussed the role of molecular

phenotyping in driving treatment selection in oncology therapy, whilst Professor Todd gave an overview of the impact and state of precision medicine in the UK.

Ethox seminar introducing the CPM (online) – November



With new Director Professor Anneke Lucassen at the helm, the time was right for the CPM to lead a seminar with Ethox, a multidisciplinary bioethics research centre at Oxford that aims to improve ethical standards in healthcare practice and medical research, and with whom the CPM has worked closely in the past. The Ethox Centre is part of the Wellcome Trust Centre for Ethics and Humanities. This took the form of Professor Lucassen and the four JRFs exploring their individual research areas, and initiating discussions with Ethox academics about mutual fields of interest.



Being Human Festival: Familial Fortunes (hybrid) – November



Advances in science mean that we will soon be able to screen the genetic code of every newborn baby to see whether their DNA predicted any life serious illnesses. Many countries in the world already screen for certain serious conditions, but whole genetic code sequencing potentially expands the number of diseases that can be predicted before symptoms arise. The audience was asked: "Would you want to know the chances of your child getting various diseases in later life? How certain should this information be before you are told (eg if only a 10% chance of something versus a 90% chance does that make a difference?). Would this knowledge affect your life choices, and what you would share with your family?"

In this interactive hybrid event, hosted by Vivienne Parry, Professor Anneke Lucassen, Professor Michael Parker and Dr Sarah Wynn of the charity Unique discussed the complex ethical issues using fictionalised cases. An online and in-person audience joined them in exploring how scientific advances can have repercussions for healthcare choices, family relationships and how we choose to live our lives.

The event was a collaboration between the Wellcome Centre for Ethics and Humanities and the CPM. A blog post, writing up this hugely successful event, can be found here:



Guest lecture by Dr Fleur Meddens (online) – November



Rank concordance of polygenic risk scores and personalized screening

Dr Fleur Meddens from the Leverhulme Centre for Demographic Science and the Department of Sociology at the University of Oxford gave an online seminar about the implications of ranking polygenic risk distributions in individuals. Using simulations and empirical applications, she demonstrated that rankings are associated with considerable uncertainty and that different methods for creating polygenic risk scores provide different rankings. These findings have important implications for personalised disease prediction using polygenic risk scores.

Outreach event at Cherwell School (in-person) – November



Dr Pdraig Dixon gave a talk at The Cherwell School, a local Oxford secondary school. It examined some of the wider societal consequences of developments in personalised medicine, especially in relation to equity and economic impacts. The engaged audience of young scholars asked fantastic questions; further events with Cherwell School are planned for the forthcoming academic year.

CPM lecture for St Anne's Online (online) – January



The CPM gave an evening of talks as part of the St Anne's Online series, hosted by the College Development Office and aimed at alumni. The core team of the Director and the four JRFs presented their individual research areas, and how they interface with personalised medicine, and provided an overview of the Centre and its work.

Dr Stanley Ho Memorial Lecture by Professor Heidi Rehm (online) – February



The Centre was honoured to host Professor Heidi Rehm to give this year's Dr Stanley Ho Memorial Lecture. Professor Rehm is co-director of the Program in Medical and Population Genetics and an institute member at the Broad Institute, US. She is the chief genomics officer in the Department of Medicine at Massachusetts General Hospital and a professor of Pathology at Harvard Medical School. Professor Rehm is an outstanding human genetics scientist whose work over the past decade has been transformative for rare disease diagnostics. She is a prominent figure in establishing guidelines for clinical genetic testing and has worked tirelessly to promote open data sharing between clinical and research labs.

Professor Rehm (pictured, right) gave a fantastic talk entitled *Creating a Global Ecosystem to Support Genomic Medicine* focussed on the "ten bold predictions for 2030" from the National Human Genome Research Institute. She included interactive polling where the audience was asked how likely they thought these predictions were to be realised. Professor Rehm discussed how the projects and initiatives she is leading are contributing to the discovery of new disease genes, powering genome analysis, improving variant interpretation, and generating global consensus standards through the fostering of open data sharing.

He focussed on the collaborative aspect of the project, which involved 47 studies, and the HGI's public engagement strategy, the latter being very important in an ongoing pandemic.



Guest lecture by Kumar Veerapen (online) – February



Dr Kumar Veerapen (pictured, right) gave a guest lecture on *The Global COVID-19 Host Genetics Initiative (HGI)*. Dr Veerapen is a computational scientist at the Broad Institute and led much of the HGI's public engagement in the first two years of the Covid-19 pandemic. He discussed the key scientific findings from the HGI's work, which brought together large cohorts of individuals with Covid-19 from across the world and performed Genome Wide Association Studies (GWAS) to discover regions of the genome that are associated with more severe disease.



Lecture by Professor Cecilia Lindgren for St Anne's Online (online) – March



Professor Cecilia Lindgren of the CPM's Steering Group gave a talk to the College alumni community through St Anne's Online, describing how Oxford researchers at the Big Data Institute are developing, evaluating and deploying efficient methods for acquiring and analysing information for large clinical research studies to identify the associations between lifestyle exposures, genetic variants, infections and health outcomes around the globe.

Lecture to OxWEST Computational approaches to understanding the genetic basis of rare diseases (online) – February



JRF Dr Nicky Whiffin gave a talk in February to the Oxford Women in Engineering, Science and Technology (OxWEST) Society. She gave an overview of the ongoing science and interests of her research group at the Wellcome Centre for Human Genetics, and also talked about some of the challenges of being a woman in science.



Dr Eric Minikel and Dr Sonia Vallabh (online) – March



The CPM hosted husband and wife team Dr Eric Minikel and Dr Sonia Vallabh (see images, above) to give a guest lecture: A genetically informed paradigm for primary prevention of prion disease. Dr Vallabh is a patient-scientist and both she and Dr Minikel turned to genetic research after her mother's early death from Prion disease. After genetic testing, Dr Vallabh learnt that she had inherited the genetic variant that had caused her



mother's disease and so she knows that this disease will likely develop in her over the next few decades. Prion disease has a variable age of onset and increasingly debilitating symptoms that often progress quickly, and for which there is no current treatment or cure. The couple spoke about their journey, from early scientific discoveries to more recent progress developing an antisense oligonucleotide (ASO) therapy. They talked from the heart and were hugely engaging, touching on many different aspects of personalised medicine including the difficulties of developing treatments for very rare conditions, and needing to start treatments before disease onset.

OUPM annual student symposium (hybrid) – March



The Oxford University Personalised Medicine Society's annual symposium was planned to take place as an entirely in-person event at St Anne's College; it was switched to a hybrid event at the last minute, however, due to COVID affecting a couple of speakers. Attendance was extremely good online, with about 25 students attending in person. A hackathon was also arranged as part of this event.

Lecture to Precision Cancer Medicine MSc students (in-person) – March



Professor Anneke Lucassen held a plenary lecture for the MSc Precision Cancer cohort, focussing on aspects of personalising cancer prediction and treatments.

Lecture to NIH Oxford-Cambridge scholars programme – March



JRF Dr Nicky Whiffin (pictured, below) gave a talk at the end of March to students on the NIH Oxford-Cambridge scholars program. This initiative sees students split their research time between the National Institute of Health in the USA and a research group at either Oxford or Cambridge. The students had a day of talks followed by a dinner, at which Dr Whiffin was the guest speaker. Her talk focussed on her journey to becoming a research team leader, including some tips on how to survive imposter syndrome.



Guest lecture by Holly Eggington (online) – April



Holly Eggington is a DPhil student in Cancer Science, studying the interaction between cellular compartments in colorectal cancer at the Wellcome Centre for Human Genetics. She is also a medical student, passionate about bridging the boundary between laboratory and clinical research, in addition to being President of the Oxford University Personalised Medicine (OUPM) Society. Holly presented a thoroughly engaging talk on her current research, looking at plasticity in colorectal cancer.

Annual Lecture by Professor Andrew Hattersley (hybrid) – May



Professor Andrew Hattersley FRS, Consultant Physician, Gillings Chair of Precision Medicine, and Professor of Molecular Medicine at the University of Exeter delivered the CPM Annual Lecture to an audience drawn from the public and across the University, at the Sheldonian Theatre in Oxford (pictured). Professor Hattersley's highly engaging focussed on how personalised medicine can advance diabetic care. He argued that correctly defining and diagnosing subtypes of diabetes has

improved clinical care in this patient population. This requires both hypothesis-driven research and a willingness, as well as capacity to identify and embrace 'found science' that can emerge from unexpected findings; this challenges our existing understandings and practices and supports investigations into new and potentially fruitful domains. The lecture was followed by a dinner for Professor Hattersley that was hosted by the CPM in the Ashmolean Museum (pictured).



Dr Danya Vears and Dr Chris Gyngell guest lectures – June



The CPM was delighted to host Dr Chris Gyngell and Dr Danya Vears (pictured, right) from the Murdoch Children's Research Institute, Melbourne, Australia, for a joint talk during their trip to the UK. This was the first in-person CPM event at the Wellcome Centre for Human Genetics for a few years and it was great to have such an engaged audience.

Rapid challenges: ethics and genomic neonatal intensive care

Dr Gyngell presented some research looking at the ethical aspects of rapid genomic testing for critically ill babies. His talk illustrated the challenges of having meaningful consent conversations about complex investigations with parents at a time when they are under great stress, and raised questions about how to support families as they make decisions regarding genomic testing. Key questions included: is verbal / implied consent ever sufficient for rapid genomic testing? What should clinicians do in cases where one parent gives consent but the other refuses?

To share or not to share: Public perspectives on genomic data sharing

Dr Vears then presented results from recent focus groups where she spoke to members of the

general public about data storage and data sharing. She outlined how storing and sharing genomic data is essential to improving future genomic testing, but explored the challenges in doing this responsibly. She discussed how participants in her research were overall quite supportive of genomic data being stored, but the purpose of data storage mattered, and it was difficult to develop a 'one-size-fits-all' approach.



Dr Pdraig Dixon guest lecture in the Netherlands – July



JRF Dr Pdraig Dixon was honoured by an invitation to talk at the 70th anniversary symposium of the Department of Medical Genetics at the University Medical Centre Groningen. He spoke about the economic opportunities and challenges associated with genetics and personalised medicine, including how public policy and regulatory environments will need to evolve to account for new developments in these domains.

Scholarships, bursaries and student support

The CPM supports students in a variety of ways. As in the previous year, it has not been possible to undertake visiting Dr Stanley Ho Medical Development Foundation scholarships within universities in Hong Kong and Macau, due to ongoing COVID restrictions. It is hoped that these may be resurrected in the year ahead. The Centre has, however, supported a number of short-term visiting research placements for University of Oxford students. Summer 2021's placement student, Megan Lee, writes:



I completed an 8-week long placement in the Computational Rare Disease Genomics (CRDG) Lab in the Wellcome Centre for Human Genetics, led by Dr Nicky Whiffin. I am very thankful to the CPM for enabling this opportunity, and to the CRDG lab for welcoming me so warmly. Through this placement, I learnt about the importance of understanding how datasets are curated, as this affects how they should be interpreted and the insights they can provide. I also learnt about the power of statistics in assessing the validity of conclusions, and that although I did not obtain any definitive results, the conclusion that analysis of 3'UTR introns with respect to NMD is complicated by small statistical power is still relevant. I also learnt how to code in R, which will prove to be very useful given its power in handling large datasets and generating plots. Overall, I thoroughly enjoyed this project, in particular participating in lab teas and meetings where I learnt from fellow lab members. I am very thankful for the opportunity to complete this placement in the CRDG lab, and am now inspired to pursue a career in bioinformatics.



The CPM additionally financially supports in-person attendance to conferences for Oxford University Personalised Medicine Society students.



OUPMS activities throughout the year

The CPM has hugely enjoyed working alongside and supporting the OUPM Society, appreciating their many successes, such as the student symposium and the brilliantly put-together and engaging magazine, *The Gene 'Zine*. Working collaboratively with these talented and enthusiastic students brings the Centre to a wider student audience, so the collaboration is of mutual benefit. Holly Eggington, OUPM Secretary 2020-2021, OUPM President 2021-2022, writes:

“ I’m grateful for the opportunity I’ve been given to work as OUPM President this past year. It’s been an exciting year to work as part of any student society, as we move away from the restrictions of the pandemic and towards finally meeting and holding events and collaborating in person once more. We’ve worked on lots of different projects this past year, most successful, some less so, and I hope the incoming committee both continues the incredible work of this year’s team, and grows the society even further based on both our successes and learning points. OUPM has only been established for 3 years, so seeing the growth of the society and how keen so many students are to become involved with our events has been incredibly heartening to see. The support of the CPM has been invaluable, and we truly couldn’t have grown at such a rapid pace nor had the ability to hold such a range of events without their help. OUPM is a truly altruistic endeavour; our team, made up largely of medical and DPhil students, is incredibly busy, even without the introduction of the workload of running events, talks, and publishing multiple issues of our exciting new magazine. Having worked as secretary for the previous year’s committee, leaving OUPM feels bittersweet, but I’m also confident that I’m leaving the society in passionate and competent hands, so I can’t wait to see where new President Michael Milad and the rest of the new team, along with the CPM, take OUPM next!



”

President: Holly Eggington, Vice President: Gokul Parameswaran, Secretary: Kay Shigemori, Treasurer: Marie-Josephine Beaubrun, IT Officer: Kwame Baffour-Awuah, Event coordinator: Michael Milad, Education Officer: Sanskriti Swarup, Publicity Officer: Jacqueline Murphy, Magazine Chief Editor: Dahria Kuyser

Review of the year's activities:

The Oxford Personalised Medicine Society Student Journal was rebranded as *The Gene 'Zine*, the new journal format focuses on popular science-style articles, with the aim of improving layperson knowledge of novel science and history regarding personalised medicine.

An online talk series in collaboration with OxAI was very successful, resulting in a number of talks on the application of Artificial Intelligence to healthcare, both in person and online:

The implementation of artificial intelligence into radiology in the NHS. Ready for the big time? Professor Fergus Gleeson

'Virtual contrast dye' to replace gadolinium and needles: how AI is advancing heart MRI Quiang Zhang
AI Powered Computational Cardiology Natalia Trayanova

AI in Health Tech: From Research to Start-up to Scale-Up Ross Upton

COVID-19 multi-omic blood Atlas (COMBAT) Professor Julian Knight

Big data, statistics, and diagnosing rare genetic disease Dr Nicky Whiffin

The OUPM team additionally carried out two well-attended Introduction to Python programming language workshops during the academic year.



Website and social media



The website remains a key resource for the Centre and as a means of communication and outreach to the wider community. It has been updated to make finding information easier, especially in searching for relevant recorded talks in the vast video library. Twitter is our main social media tool and our interactions on this platform have been extremely beneficial.

Blog



The Centre for Personalised Medicine Blog series has seen a number of posts over the year, including introducing the new Vlog series and announcing the St Anne's doodle competition and its winning entry. A longer post celebrated some of the women involved with CPM for International Women's Day. In this post, JRF Nicky Whiffin spoke to six CPM women: Director Professor Anneke Lucassen, EAB member Dr Frances Rawle, JRF Dr Katherine Wood, SG chair and St Anne's Principal Helen King, SG member Professor Cecilia Lindgren, and Programme Coordinator Catherine Lidbetter. Each of these awesome women answered three questions on their role models, challenges for women in science, and advice for their younger



selves. A final post reflected on the incredible 2021 Annual Lecture by Dr Adam Rutherford *Race, Genomes & Data: The Bias Built into Science*.

Podcasts



The Centre for Personalised Medicine podcast series explores the promises and pitfalls of personalised medicine, and asks questions about the ethical and societal challenges it creates. It is available via Oxford Podcasts, Apple and Spotify. Podcasts began last year, with a pilot series interviewing members of the CPM advisory board about their careers and their perspectives on personalised medicine.

To facilitate a new series some CPM members had an excellent training day from Research Podcasts, following which we launched a new series on research into ethical issues in personalised medicine. The first episode features Dr Gabrielle Samuel discussing the environmental cost of personalised medicine, and it was released to

coincide with Genomics Conversation week. In this episode, Dr Samuel outlines the environmental impacts of personalised medicine, ranging from the materials needed to make and cool data servers, to the single-use plastic waste generated by laboratory experiments, to the energy needed to freeze and preserve biobank samples. She highlights the need to take sustainability seriously in personalised medicine, making hard choices about resource consumption and being mindful of planetary limits.

The second episode features Professor Anneke Lucassen, talking about why the same genetic finding might mean different things to different people. She discusses how, often counter to people's expectations, context is key to making sense of the genetic code. Using the analogy of language, where a word might mean different things in different contexts and where we sometimes need to look at the sentence around the word to understand what it means, Professor Lucassen explains how genetic variants work just the same – we need to look at the genetic context around the variant, and also the environment in which it arises.

Forthcoming episodes include Dr Lisa Ballard and Professor Lucassen talking about why it might be important to share genetic results within a family; Dr Kate Lyle discussing how the way we imagine the future of personalised medicine influences what that future will be; and Dr Susie Weller helping us to consider 'who's the patient?' in the context of genomic medicine.



Dr Nicky Whiffin was interviewed on *The Genetics Podcast* by Patrick Short of Sano Genetics on the non-coding genome, and how it feels to create a brand new research group. Professor Anneke Lucassen joined the *Innovations Uncovered* podcast series to explore the benefits and challenges of personalised medicine.



Vlog Flash Interview Series



This year, the CPM has launched a *Flash interview* vlog series, which can be found on the website and the CPM YouTube channel, and has been widely published on social media. We have so far released 12 vlogs, with several more in the pipeline, where Dr Katherine Wood, one of our JRFs, discusses aspects of personalised medicine with people playing important roles in the field. From clinical experts to academic and industrial researchers, sociologists and data scientists, we have tried to capture what precision medicine means to different people with a broad range of perspectives. For example, a discussion with Dr Maxine Mackintosh and Dr Lyra Nightingale from the Genomics England Diverse Data programme focused on their work promoting the requirement for diversity in genomic data, while Dr Emma Stanton from Oxford Nanopore emphasised the importance of partnership between the NHS, academic researchers and industry for the field of personalised medicine to progress and the important role that new technologies will play in the precision medicine revolution. Another highlight was a striking conversation with Professor Andrew Wilkie, a consultant in clinical genetics. He highlighted something that all the patient-facing clinicians echoed: that some of the hyperbole around genomic research findings is not always

easy to translate into clinical practice. We will continue to develop the vlog over the next year with further interviews and new formats; we anticipate the vlogs being an important resource on the CPM website that can be re-shared to coincide with important developments in the field.



Art competition
Masked / Unmasked



Art projects



This year the Centre for Personalised Medicine has enjoyed encouraging people to express their creative side! In the spring of 2022 it ran an art competition for students and staff at St Anne's College. The winner was Psychology and Philosophy undergraduate student Jake Mainwaring, who created this stunning pair of paintings (see opposite page) that raise the debate: in the case of personal data, should the subject have the right to cover up something beautiful / useful (the painting underneath) if that would have bad consequences (e.g. data collected for research / statistical purposes being erased)?

The experience of running a college art competition laid the groundwork for a school's art competition, opening in September 2022, inviting students from Years 7 to 9 to create art around a theme of 'medical measurements'. Entries from this competition will go on to form part of a Centre for Personalised Medicine art exhibition in the pipeline for next year.

Video animation



The CPM's first video animation on polygenic risk scores, with English and Cantonese versions, went live in September 2021. This sits on the website along with other 'explainers' that introduce personalised medicine-related concepts to lay audiences. A version in Cantonese is also available.

Video for ASHG



The CPM was honoured to be asked to present its work at the autumn 2021 American Society of Human Genetics (ASHG) conference in the form of a video. Three versions of varying lengths were created and they provide an excellent introduction to the Centre's work.



Research activities

The Centre has just embarked on an exciting project to collate the views of diarists in the *Mass Observation Project* about various aspects of genetics and personalised medicine. Results are starting to roll in so keep a look out on the CPM website if you would like to know more.



Genomics England's Diverse Data Initiative commissioned the CPM to review the literature on ethical, legal and social aspects of attempts to diversify genomic data. The review highlighted how despite calls to increased diversity, genomic data held in worldwide research databases and biobanks remains overwhelmingly Eurocentric. This means that our understanding of what normal variation in a genetic code looks like is not so good for those of other ancestries, and this is a problem for emerging tools like polygenic risk scores which may then be wrong for more than 80% of the world that does not have recent European ancestry.

Year 10 Summary of planned activities

The CPM's 2022-23 programme of events and activities will include:

- A Personalised Medicine in pregnancy workshop
- The much-delayed Padua / Oxford summer school in September
- A guest lecture by Professor Tim Elliott on personalised cancer vaccines
- A Black women's health consultation workshop
- A multi-speaker event exploring Genetics and insurance, and another looking at polygenic risk scores
- A collaboration with the PHG Foundation looking at newborn genetic screening
- The Dr Stanley Ho memorial lecture, to be given by Professor Jeffrey Macklis
- The CPM Annual Lecture



Strategic plan 2022 - 2023

Whilst the return to face-to-face activities was perhaps a little slower than we had hoped last year, we have continued to benefit from the greater international reach that virtual meetings allow. The long-postponed Padua summer school will now happen in person in September, as we go to print.

From September a 5th JRF joins us with interesting ideas for the CPM to focus on; she joins a hugely talented team whose outputs continue to amaze and inspire me. In this 10th year of the CPM, we will continue to explore digital health, big data and artificial intelligence, and the benefits and challenges of using these to personalise medicine. Our focus on some of the ethical, legal and societal aspects (ELSA) that need to be addressed in personalising medicine will continue. For example, CPM work has helped to highlight how personalising medicine is often more effective for people of European ancestry, in part because most of the genetic codes studied globally come from people of this ancestry.

We are looking forward to hosting a workshop on black women's health on the 19th November, led by Plumer fellow Dr Jenny Douglas, to explore how medicine can be more effectively personalised for black women to correct the health disparities currently faced by black women in the UK. Another key issue for personalising medicine effectively will be to pay attention to issues around environmental sustainability as the carbon (and other) footprints around health data creation and storage rapidly increases. One of our new podcasts outlines some of the issues to consider here.

We look forward to building closer links with the PHG foundation in Cambridge; its founder Dr Ron Zimmern was also a founding member of the CPM's External Advisory Board. One of the first projects for the CPM-PHGF collaboration is a more in-depth look at issues around genomic diversity. Another will be exploring the issues that need to be considered in implementing polygenic scores as a tool in personalising medicine.

More broadly, building on international collaborations, particularly with those in the Pearl River Delta region of China, we will be exploring an improved knowledge exchange platform. We will also be focussing on bids to renew our funding as we come to the end of a 5-year cycle. This ends at the same time as funding for the Wellcome Centre for Human Genetics, but we hope that the CPM will be intricately involved in exciting new plans for a Wellcome Discovery platform. We welcome new collaborations or ideas about how the CPM might develop; please do contact us to discuss your thoughts.



Year 9 Impact Statement 2021-2022



With generous support from the Dr Stanley Ho Medical Development Foundation and The Wellcome Trust

Number of event attendees

Number of events



Collaboration



Virtual attendees from
38 countries



1,157 YouTube subscribers
32,000 views in the last year
Over 86,000 'lifetime' views



152 Facebook followers



1,961 Twitter followers
1,794 tweets



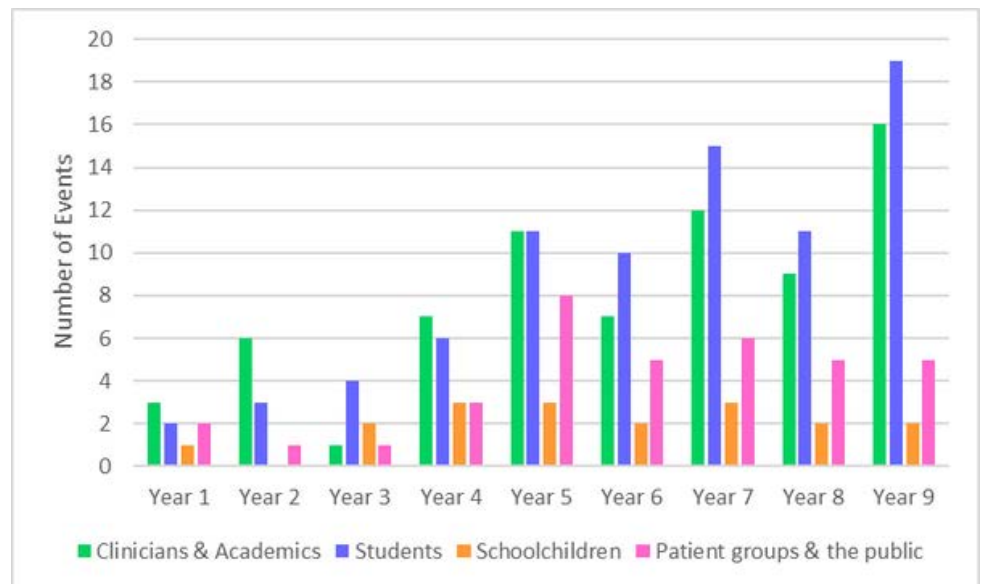
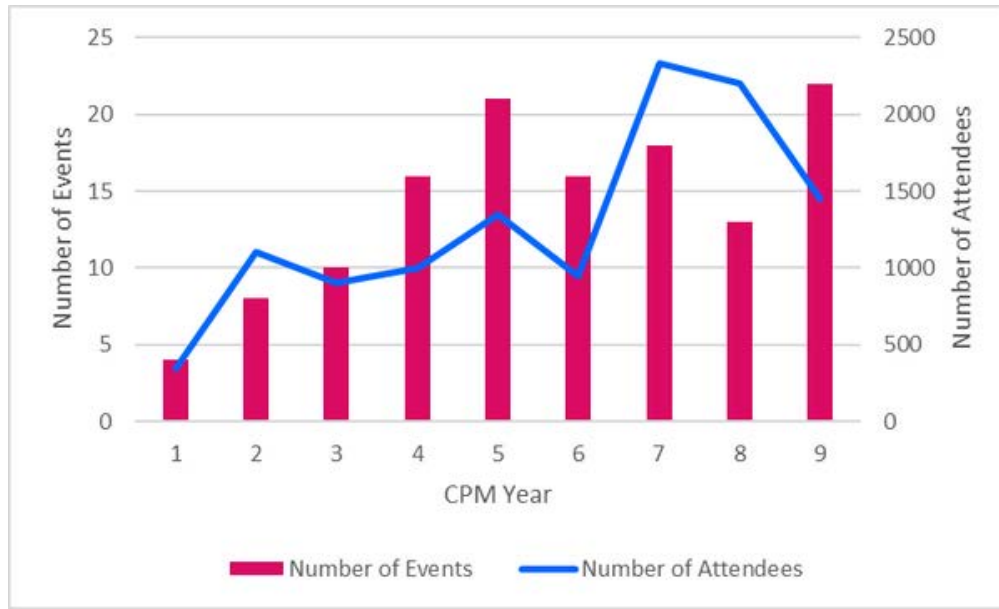
**St Anne's
College**
University of Oxford



**wellcome
centre
ethics+
humanities**



Statistics



Events List

Since its inception in October 2013, the CPM has hosted events on a wide range of personalised medicine-related topics:

2021

- June** Guest lecture by Cristen Willer
 - June** Health disparities conference
 - May** Personalised Medicine in Practice seminar on Genes, behaviour and metabolic health
 - April** Reproducibility in science fireside chat
 - April** Oxford Genomics Centre and CPM forum: spatial transcriptomics
 - March** OUPM Annual Symposium
 - March** Inaugural Dr Stanley Ho Memorial Lecture by Professor Jennifer Doudna
 - February** Annual Lecture by Dr Adam Rutherford
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2020

- November** Guest lecture by Professor Eran Elinav
- November** Palliative medicine webinar
- October** Freshers' introduction
- May and June** Oxford SARS-CoV-2 Lecture Series
- March** OUPM symposium
- March** St Anne's outreach event
- February** Science Subject Family Evening
- February** Debating data: A citizen's jury with WEH and Ethox
- February** Personalised medicine and risk prediction for GPs
- February** Colorectal cancer meeting, Royal Society of Medicine
- February** SIU STEM Personalised Healthcare: From bench to bedside
- January** NDPH / WHG talk by George Davey Smith

2019

- December** GMS Neoplasia disease day
- November** Annual Lecture by Professor Dame Sue Hill and VIP dinner
- November** Talk by Dr Tim Morris on Personalised Education
- November** Science Subject Family Evening
- October** Richard Doll Society lecture given by Dr Jason Torres
- October** NIH-Oxford Michaelmas welcome dinner
- October** CPM introduction for WHG new DPhil students
- October** Freshers' introductory talk
- September** Oxford Gardens Primary outreach event
- July** Talk by Dr Chandler Gatenbee on colorectal cancer
- June** Summer School in Padua: Translational and personalised medicine: From bench to bedside
- May** Pint of Science: New genes?
- April** Sponsorship of Biochemistry Society's conference BMP signalling in cancer
- March** Symposium with academics from Pearl River Delta region
- March** Personalised medicine: The social challenges conference
- March** Outreach event for local primary school children, East Hanney, Oxfordshire
- February** Subject Family Evening on Biomedical applications of CRISPR
- February** St Anne's College student visit to WCHG labs
- January** St Anne's College Alumnae event, Old Operating Theatre, London

2018

December The importance of genomics in cancer research

November CPM Annual public lecture with Professor Charles Swanton

October Disease biomarkers talk for Biochemistry students

October St Anne's Freshers' induction

September PM in Practice Series Seminar 4: Neuroscience

September St Anne's supporters' day outreach event

June Talk by Professor Joseph Sung on GI cancer

June Resource allocation conference with Ethox and HERC

May Pint of Science: Stopping the spread of disease

May Discussion evening for St Anne's students

May Panel discussion of theatre collaboration as part of the Settlers exhibition

April Information day on rare disease genomics

April Theatre collaboration preview

March Strawberry DNA extraction activity for children

February Subject Family Evening on Artificial Intelligence

January Radley School Science Festival

January Stanley Ho Foundation medical symposium, Macau

January CUHK seminar, Hong Kong

2017

November Padova meets Oxford outreach event, University of Padua

October Adult Education Talk on PM

October Green Templeton Talk on PM at a Future of the NHS meeting

October Prostate cancer support group lecture

October New St Anne's Library building formal opening and CPM showcase

October St Anne's student introduction

September Evening lecture at the King's Fund on the future of PM for cancer

September Lecture by Professor Dennis Lo on prenatal diagnosis

September Strawberry DNA event for Grenfell children

September PM in Practice Seminar Series 3: IBD

July UNIQ Programme for Year 12 students

June Intellectual property, ethics and the market in personalised medicine

May Pint of Science Oxford

March Lecture to Oxford Brookes University MSc Genomic Medicine students

March Q&A session with Cancer Research UK

March Genomics talk to school children

March Personalised medicine in practice seminar 2: Reproductive health

February Student debate on medical data sharing

February Iris festival of ancient and modern science

January Subject family evening on the immune system

2016

November Personalised medicine in practice seminar series 1: Cancer

November Big data research: Governance, security and ethics with Big Data Institute

November 3rd CPM annual public lecture with Dr David Altshuler



October Freshers' event for St Anne's students

September Career workshop on science communication

September Personalised medicine: The promise, the hype and the pitfalls conference with Healthcare Values Partnership

July UNIQ Programme for Year 12 students

July CUHK public lecture

June Big data, ethics and the market conference & workshop

March Subject family evening on implementing personalised medicine in the NHS

January Student workshop exploring ethical issues in personalised medicine

2015

November Historical perspectives on the genomic revolution in medicine

November Medicine for the 21st century student symposium

April Personalized Medicine World Conference with PMWC

April 2nd CPM annual public lecture with Anne Wojcicki

April Integrating genetics into clinical practice GP education seminar

March 2015 Personalised medicine and resource allocation conference

2014

October 10 years on: Oxford and Chinese University of Hong Kong global collaboration seminar

October Personalised medicine: from science to clinical decisions, Hong Kong

October Ethical and public health implications of personalised medicine, Hong Kong

June Cheltenham Science Festival panel debate

March Inaugural CPM annual public lecture with Patrick Vallance

March Seminar with Professor Dennis Lo

January CPM launch event at WTCHG

2013

November CPM launch event at St Anne's College



The Sheldonian Theatre was the venue for this year's Annual Lecture

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WHG Business Manager and Deputy Business Manager

St Anne's College Academic, Bursary, Conference, Development and Finance Offices

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