Executive summary

Personalised medicine is a cutting edge field that encompasses all aspects of healthcare, from health promotion, risk stratification and screening through to clinical diagnosis, prognosis and treatment. The term typically refers to the application of new technologies to tailor healthcare at the individual level. Other terms, such as genomic medicine, individualised medicine or precision medicine, are also used to refer to similar or identical concepts. Moreover, the integration of personalised medicine into current practice carries significant clinical, ethical, legal, economic and societal challenges.

The Centre for Personalised Medicine (CPM) is a partnership between the Wellcome Centre for Human Genetics (WCHG) and St Anne’s College at the University of Oxford. It was formed in 2013 as a communication and engagement vehicle for students, academics, clinicians and the public to explore the benefits and challenges of personalised medicine. The Centre runs engagement events throughout the academic year, from small College-based lectures and seminars to conference series, public lectures and international symposia.

The CPM was successfully re-funded in 2018, with the ambition of increasing the scope of its work outside Oxford, to engage wider national and international audiences. It has already begun to fulfil this ambition by increasing its research interaction with colleagues in Hong Kong, Macau and the Pearl River Delta, initiating a Dr Stanley Ho Scholarship to Oxford and developing a new engagement partnership with the University of Padua in Italy.

This report outlines and reviews the activities of the CPM in Year Six and considers the strategic direction of the Centre as it looks ahead.

Simon Leedham
Director, Centre for Personalised Medicine
People

Year Six saw some hellos and some goodbyes. Dr Ron Zimmern, who joined the External Advisory Board back in 2013, resigned from the EAB due to time pressures. We welcomed three new EAB members: Professor John Mattick, formerly CEO of Genomics England, and now attached to St John’s College and Green Templeton College in Oxford; Professor Joseph Sung of the Chinese University of Hong Kong and member of the Dr Stanley Ho Medical Development Foundation; and Ian Huen, CEO of Aptorum Group and member of the Dr Stanley Ho Medical Development Foundation.

The CPM welcomed Professor Julia Hippisley-Cox to the Steering Group in February 2019. Julia is Professor of Clinical Epidemiology & General Practice in the Nuffield Department of Primary Care Health Sciences and Professorial Fellow St Anne’s College, and she brings with her a wealth of experience in primary care. Dr Ingrid Slade, Steering Group member, is on maternity leave; the Centre has benefitted in her absence from the knowledge of Dr Nina Hallowell, a medical sociologist in the Ethox Centre and Big Data Institute at Oxford.

Dr Padraig Dixon has been appointed as the CPM’s Junior Research Fellow (JRF) in Social Sciences at St Anne’s College. This new post complements the work of the existing Medical Sciences JRF, focussing on social aspects of personalised medicine such as big data, ethics, law, policy, health economics, etc. The post will lead to an increase in fruitful collaboration between the St Anne’s College community and the CPM. Padraig is a Research Fellow in Health Economics at the University of Bristol. His post began in August 2019.

Peter Donnelly, Co-founder of the CPM and Co-chair of its Steering Group, was awarded a knighthood in the 2019 Queen’s Birthday Honours for services to the understanding of human genetics in disease. He said:

“I feel thrilled and tremendously honoured to have been awarded a knighthood by Her Majesty The Queen. This honour is recognition not just of my work but also that of the outstanding researchers I have collaborated with over many years in pursuit of new insights into human genetics and its role in common diseases.”

More information about our people can be found on the website: cpm.well.ox.ac.uk/content/about-us

Administration Team

Catherine Lidbetter, CPM Programme Co-ordinator

Thea Perry, CPM Administrative Officer
Steering Group

Professor Simon Leedham, Director of the CPM

Professor Sir Peter Donnelly, Co-Chair, CPM Steering Group

Helen King, Co-Chair, CPM Steering Group

Dr Padraig Dixon, CPM Junior Research Fellow (Social Sciences)

Dr Jason Torres, CPM Junior Research Fellow (Medical Sciences)

Dr Nina Hallowell

Dr David Harris

Professor Julia Hippisley-Cox

Professor Cecilia Lindgren

Dr Gabriele De Luca

Dr Ingrid Slade

Dr Francis Szele
External Advisory Board

Dame Mary Archer, Chair of the EAB

Professor Sir John Bell

Professor Geert Blijham

Professor Gary Ford

Tim Gardam

Richard Girling

Ian Huen

Professor Dennis Lo

Professor John Mattick

Dr Magdalena Skipper

Professor Joseph Sung
# Events overview

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>2019</td>
<td>July</td>
<td>Talk by Dr Chandler Gatenbee on colorectal cancer</td>
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<td>June</td>
<td>Summer School in Padua: Translational and personalised medicine: From bench to bedside</td>
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<td>May</td>
<td>Pint of Science: New genes?</td>
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<td>April</td>
<td>Sponsorship of Biochemistry Society’s conference BMP signalling in cancer</td>
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<td>March</td>
<td>Symposium with academics from Pearl River Delta region</td>
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<td>March</td>
<td>Personalised medicine: The social challenges conference</td>
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<td></td>
<td>March</td>
<td>Outreach event for local primary school children, East Hanney, Oxfordshire</td>
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<td></td>
<td>February</td>
<td>Subject Family Evening on Biomedical applications of CRISPR</td>
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<td></td>
<td>February</td>
<td>St Anne’s College student visit to WCHG labs</td>
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<td></td>
<td>January</td>
<td>St Anne’s College Alumnae event, Old Operating Theatre, London</td>
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<tr>
<td>2018</td>
<td>December</td>
<td>The importance of genomics in cancer research</td>
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<td></td>
<td>November</td>
<td>CPM Annual public lecture with Professor Charles Swanton</td>
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<td></td>
<td>October</td>
<td>Disease biomarkers talk for Biochemistry students</td>
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<td>October</td>
<td>St Anne’s freshers’ induction</td>
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<td>September</td>
<td>PM in Practice Series Seminar 4: Neuroscience</td>
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<td>September</td>
<td>St Anne’s supporters’ day outreach event</td>
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<td>June</td>
<td>Talk by Professor Joseph Sung on GI cancer</td>
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<td>Resource allocation conference with Ethox and HERC</td>
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<td>May</td>
<td>Pint of Science: Stopping the spread of disease</td>
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<td>Discussion evening for St Anne’s students</td>
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<td>May</td>
<td>Panel discussion of theatre collaboration as part of the Settlers exhibition</td>
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<td>Information day on rare disease genomics</td>
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<td>Theatre collaboration preview</td>
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<td>Strawberry DNA extraction activity for children</td>
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<td>February</td>
<td>Subject Family Evening on Artificial Intelligence</td>
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<td>January</td>
<td>CUHK seminar, Hong Kong</td>
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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 with WTCHG 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
Key to demographic groups:
- Clinicians and academics
- Students
- Schoolchildren
- Patient groups and the public

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
Year Six summary of activities 2018–19

Key to demographic groups:
● Clinicians and academics
● Students
● Schoolchildren
● Patient groups and the public

St Anne’s supporters’ day event ● September
The CPM’s Junior Research Fellow, Jason Torres, led an afternoon session extracting DNA from strawberries for supporters of the College and their families.

Personalised Medicine in Practice Seminar: Neuroscience ● September 2018
Francis Szele from St Anne’s College and the CPM’s Steering Group curated a half-day conference in the series Personalised Medicine in Practice, focusing on applications in neuroscience and gathering an exceptional line-up of speakers from Oxford, Cambridge and Harvard. The programme of this seminar can be found in Appendix A.

Freshers’ induction ● October
Dr Jason Torres, CPM Junior Research Fellow, introduced all new St Anne’s Medicine and Biochemistry students to the CPM, and invited interested students to sign up for a tour of WCHG labs.

Disease biomarkers ● October
The first evening of talks for the academic year was organised by Jason Torres for St Anne’s Biochemistry and Medicine students. Dr Matt Kelly, Head of Innovation and Clinical Science at Perspectum Diagnostics, brought to life the work he has been doing on non-invasive imaging technology for detecting early signs of liver disease, while former St Anne’s Fellow Professor Jon Dilworth, Emeritus Professor of Chemistry, explored nanomedicine and the use of metallic compounds to differentiate tumours.

Centre for Personalised Medicine Annual Lecture ● November
Professor Charles Swanton FRCP, FMedSci, FRS is a clinician scientist at the Francis Crick Institute. His work focuses on understanding the challenges inherent in the management of metastatic cancer and their drug resistant and incurable nature. His multidisciplinary team has discovered that HLA loss of heterozygosity, cancer cytotoxics, DNA replication stress, cancer genome doubling events and the APOBEC3B cytidine deaminase precipitate cancer diversity. This cacophony of risk factors accelerates cancer evolution and provides the substrate for cancer drug resistance and treatment failure. Professor Swanton addressed a packed audience at the Mathematical Institute in Oxford for the CPM’s flagship annual lecture on the subject TRACERx: Tracking cancer evolution, immune predation, escape and metastases. The lecture was preceded by a celebratory drinks reception in recognition of the renewal of funding for the Centre. A dinner was held afterwards for 60 VIPs in the Sculpture Gallery, Ashmolean Museum.
The importance of genomics in cancer research ● December

This two-day workshop, collaborating with the CRUK Oxford Centre at the WCHG was aimed at DPhil / PhD students and it had a focus on colorectal cancer. Speakers included John Bell, Simon Leedham and other experts from in and around Oxford. The course was extremely well-received and was over-subscribed, showing that there is an appetite for such collaborative events. The programme can be found in Appendix B.

St Anne’s Alumnae evening ● January 2019

The CPM was invited by St Anne’s College to participate in one of their new series of events for Alumnae, St Anne’s in the City. The setting for the evening was the Old Operating Theatre Museum, London, Europe’s oldest surviving operating theatre, housed in the attic of the early eighteenth-century church of the old St Thomas’ Hospital. The evening included a tour of the venue which afforded a unique insight into the history of surgical practice. Bringing the gathered audience right up to date, the talks were given in the Operating Theatre itself by the Simon Leedham and Cecilia Lindgren. They were perfectly pitched introductions to human genetics and genomics in the context of the research areas of the speakers, cancer and obesity. As the CPM further embeds itself into the life of the College, it is gratifying to be able to participate in this kind of event.

Visit to WCHG labs ● February

3rd year medical student and CPM student representative, Eleanor Beard, writes:

“Medics and biomedical sciences students from St Anne’s had the opportunity to visit the labs at the Wellcome Centre for Human Genetics. We were given a tour of some of the labs by Christine Blancher, who showed us the machines and robots used for DNA sequencing. Later, Robert Esnouf gave a presentation about the technology used at the Oxford Big Data Institute, and showed us some of the computers used for this facility. It was impressive to see how much data was being stored and processed in one building, not to mention how loud the machines were! The event ended with a chance to have a chat with the researchers over tea and coffee, which was a great chance to discuss their research and find out more about possible career opportunities. Overall, it was an inspiring visit that helped us to understand the real-life application of the science we have learned throughout our studies, and we’re all very grateful for the researchers and the staff at the Centre of Personalised Medicine for arranging this event!”
Subject Family Evening on Biomedical applications of CRISPR  ●  February

Jason Torres chairs an evening of talks for students of all disciplines at St Anne's College. The speakers were Dr Nicole Krentz and Dr Ben Davies, both of the WCHG. The audience was hugely appreciative of the talks, which explored some current applications of CRISPR technology in a way that was accessible to all of the students, scientist or not.

Hands-on science activity  ●  March

CPM Administrative Officer Thea Perry led an afternoon session extracting DNA from strawberries and building DNA origami with pupils from East Hanney Primary School in Oxfordshire. This outreach event was organised with Dr Emma Jaeger from Simon Leedham's lab at the WCHG.

Personalised medicine: the social challenges  ●  March

This one-day conference at St Anne's explored the social challenges surrounding personalised medicine. It was a joint event with colleagues from the University's Department of Primary Care Health Sciences and the Biomedical Research Centre and it encompassed a wide range of viewpoints including the ethics and social practices of data sharing; university, industry and National Health Service partnerships; and the challenges of achieving disruptive changes at scale in healthcare systems. The event brought together renowned speakers from the social sciences and humanities, clinical research, industry, healthcare professions and health policy. The audience included academics, policy advisors and members of the public. The programme can be found in Appendix C.

Pearl River Delta / Oxford symposium  ●  March

Our most high-profile event of the year drew academics from the Chinese University of Hong Kong (CUHK), University of Macau (UM) and Sun Yat-sen University (SYSU) to Oxford for a collaborative roundtable discussion at St Anne's College with key academics from the University of Oxford, convened by the CPM. It also included a visit to Oxford's Perspectum Diagnostics, a company delivering digital technologies that help clinicians to deliver better care for people with liver disorders. Five potential projects areas were identified for further discussion and development by interested academics. Professor Joseph Sung from CUHK subsequently met with leadership at SYSU and with Professor Simon Leedham to discuss how to proceed. In each of these projects, a Principal Investigator (PI) contact person was identified from Oxford, CUHK and SYSU. They have been invited to submit proposals of their research projects over the summer 2019. There will be seed funding support from SYSU to support these projects.

1. Hepatocellular Carcinoma and Immunotherapy
2. Colorectal Cancer: Sessile Serrated Polyp and Microbiome
3. Inflammatory Bowel Disease and Risk prediction
4. Multi-parametric (Q-risk) profiling and cohort studies
5. Diabetes and Multi-organ Imaging

It is proposed that SYSU will call a workshop inviting investigators from Oxford and CUHK to Guangzhou in March 2020. The collaborators will hold an investigator meeting to update the progress of the five studies, with a longer-term goal to host public lectures for the promotion of Personalised Medicine. Further information about the five projects can be found in Appendices D and E.
**BMP signalling in cancer**  
April

The Centre for Personalised Medicine and St Anne's College were pleased to sponsor and host a 3-day Biochemistry Society conference on the role of the BMP pathway in cancer, co-organised by CPM Director Professor Simon Leedham. This pathway has an increasingly recognised role to play in cancer initiation in numerous organs, and with the increased use of cancer molecular phenotyping, the BMP pathway is increasingly used as a molecular biomarker, and as a possible therapeutic target for drug manipulation. The CPM sponsored this international conference bringing a multidisciplinary faculty to St Anne's to present state-of-the-art research and develop new collaborations at this well attended conference.

[biochemistry.org/home/events-and-training/past-events](http://biochemistry.org/home/events-and-training/past-events)

**Pint of Science**  
May

Dr Nicole Krentz and Dr Ben Davies revisited the talks they gave to this year’s Subject Family Evening by presenting an evening entitled “New Genes?” at a local pub. As ever, this was a popular, sell-out evening for members of the public and students from Oxford’s universities, bringing some of the questions about CRISPR gene editing in humans to a wider audience.
CPM Summer School, Padua • June

The summer school Translational and personalised medicine: From bench to bedside was a joint programme between the Department of Surgery, Oncology and Gastroenterology of the University of Padua and the Centre for Personalised Medicine of the University of Oxford. During the week-long programme, postgraduate students from both Oxford and Padua met in the city of Padua and had the chance to attend exceptional research talks and visit various medical research institutes. The goal was to explore the challenges and advances of translational research from the perspective of researchers at the bench and clinicians at the bedside.

The daily morning lectures were whistle-stop tours traversing the diversity of research undertaken at both institutions. The topics ranged from the minutiae of signalling pathways in cancers, organoids, immunology and stem cells, to the bird’s eye view in transplantation, surgery techniques and digital pathology. The afternoons were reserved for visits to research centres dotted around central Padua, such as the Veneto Institute of Oncology and the Venetian Institute of Molecular Medicine. These visits allowed students directly to engage with researchers, and discover innovative research in various disciplines. Ending the day were state-of-the-art lectures presented by researchers working at the cutting-edge of their specific field.

The summer school was a success and received positive feedback from all students. Lauren (1st year DPhil student in Oxford) described her experience with the following words:

“Being a cardiovascular medicine doctoral student, I found the lectures a challenge but at the same time a unique and exceptional chance to expose myself to research methodologies, reporting and presentation in other fields of research. Presenters were all very well-prepared, and the discussion sessions with audience questions really augmented the teaching experience of the summer school. Furthermore, the state-of-the-art lectures were particularly interesting, considering the diversity of topics covered and the high academic level of invitees.”

Similarly, Nina (1st year DPhil student in Oxford) stated the following:

“I really enjoyed the lectures in the summer school, where it covered a broad range of medical sciences topics and the Padova organisers were very hospitable, with nice food and sightseeing tours.

Along with the positive comments came important feedback for the future, with some of the students asking for a bit more focus on their field of interest.

“As a first-year student training in genetics and epidemiology to study cardiometabolic conditions (especially type 2 diabetes), I’m glad to have seen some discussions of metabolism within our summer school lectures. I was most interested in the liver-, kidney- and organoid-related lectures, and would be keen to see (and help recommend) more speakers focusing on cardiometabolic disease.”

Overall the summer school was a fantastic opportunity for postgraduates from both Padua and Oxford to engage with cutting-edge research and have a scientific, intellectual and cultural exchange, experiencing and demonstrating the importance of interdisciplinary and European relations and collaborations.
**Guest lecture**  ●  July

Dr Chandler Gatenbee: *Niche engineering drives early passage through an immune bottleneck in progression to colorectal cancer*. Dr Gatenbee, from the Integrated Mathematical Oncology unit at Moffitt Cancer Centre in Florida, discussed his interesting work using multiplex imaging, molecular data and mathematical modelling to explore the role of immune evasion in the transformation of colorectal adenomas to cancer. This discovery work raises interesting questions about the use of immunophenotyping to stratify surveillance in patients with adenomas and use in early detection of high risk disease.

**Website and social media**  ●  ●  ●  ●

After some delay, the new CPM website finally went live in May 2019. The content has a clear structure and it is visually appealing. Explore the content at: [cpm.well.ox.ac.uk](http://cpm.well.ox.ac.uk)

**Education**  ●  ●  ●  ●

Year Six has seen an exceptional variety of events aimed at educating our key demographic groups. Highlights included the Old Operating Theatre outreach event for College Alumnae, the first time the Centre has specifically presented to that group; the disease biomarkers talks for Biochemistry students; the RUK collaboration on Genomics in cancer research; and the two evenings focusing on CRISPR applications. The CPM’s educational reach went international with the first Dr Stanley Ho Scholarship student from CUHK coming to Oxford and ten Oxford students attending the summer school in Padua.

**Scholarships**  ●

With the help of its funders, the CPM has established the Dr Stanley Ho Scholarship programme to welcome young medical science investigators from the University of Macau and the Chinese University of Hong Kong to St Anne’s College and the University of Oxford for customised and bespoke student experiences, to learn new techniques and establish international collaborations. Our first Scholar was Dr Rashid Lui, a Gastroenterologist from CUHK. Rashid spent a month in Oxford, splitting his time between clinical commitments in the John Radcliffe Hospital and the research labs at the WCHG. During this time, he joined endoscopy lists, clinics and ward rounds, engaging with Oxford Gastroenterologist colleagues. He was able to learn some basic lab techniques and developed a clinical research project to compare and contrast the incidence and detection of colorectal sessile serrated lesions in Oxford, Hong Kong and a collaborating mainland Chinese hospital, to try and understand the differing lesion prevalence in these different hospital populations. Rashid was welcomed to St Anne’s college as a Visiting Fellow and enjoyed College life for the duration of his stay. Rashid said of the experience:

“I wanted to give my heartfelt thanks to the CPM team and St Anne’s for their unwavering enthusiasm and hospitality which ensured a comfortable and seamless stay. A notable mention would also be the very well organised [...] conference on social challenges that I attended, where I got to meet many leaders in this field and to see it from various perspectives. [...] I’d also like show my gratitude to Jason [Torres] for showing me around and providing the excellent orientation when I first arrived.

Last but not least, hats off to my co-supervisors at the WCHG and the [John Radcliffe Hospital], Simon [Leedham] and James [East] for their teachings, mentorship and sharing throughout the past month. [...] It was a pleasure to take part in the myriad of activities set out, at the wet lab, the mouse work, endoscopy, clinics, and the multidisciplinary meetings etc., just to name a few. It was all very balanced and there’s always so much going on never was there a dull moment. I am hopeful that our proposed research projects will bear fruition and will be a step towards further collaboration amongst our institutes.”
**Year 6 Impact Statement**  
2018–19

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

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<th>Year</th>
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771 Tweets  
522 ‘Likes’  
466 Followers

3,335 views in the last year  
9,746 ‘lifetime’ views

2 International symposia  
5 Public Lectures

**Collaboration**
Strategic Plan 2019–20

The CPM will continue to fulfil its commitment to engage with four key local demographic groups, with a range of regular and ongoing Oxford-based activities aimed at clinicians and academics, students, schoolchildren, and patient groups and the public. This will include Pint of Science, regular student events, subject family evenings, science fairs and school activities.

It will also continue to increase national and international partnerships, including a seminar on cancer at the Royal Society of Medicine in London and a joint Oxford and Pearl River Delta group meeting in Guangzhou, whilst planning an Oxford–Padua Summer school in Oxford for 2021. The Centre will also welcome its second Dr Stanley Ho Scholar from the University of Macau to Oxford’s research groups during the year.

The CPM will continue to expand its interest in the multidisciplinary aspects of personalised medicine with the recruitment of Padraig Dixon as the social science based Junior Research Fellow to lead on aspects of data ethics, commercialisation and health economics.

With the Centre welcoming Julia Hippisley-Cox to its Steering Group, and an increase in interactions with the Department of Primary Care Health Sciences, it will look to run events for general practitioners around aspects of data use and security.
Year 7 Summary of planned activities

Key to demographic groups:
● Clinicians and academics
● Students
● Schoolchildren
● Patient groups and the public

Introductory event  ●  October 2019
The Junior Research Fellows will introduce the CPM to new St Anne’s students and begin to explore with them the power of genomic and medicine.

Health disparity seminar  ●  October
The CPM hopes to host a collaborative event with Green Templeton College and the Nuffield Department of Primary Care Health Sciences to explore personalised medicine, machine learning and disparity between data sets.

Annual Lecture  ●  November
The annual lecture will be delivered by Professor Dame Sue Hill, Chief Scientific Officer for England. A VIP dinner will follow the lecture.

Data sharing public engagement event  ●  January
This collaboration with the Wellcome Centre for Ethics and Humanities will comprise a deliberative democracy debate to gauge public views of data sharing, including the sharing of genomic data, with experts on hand to present the science.

Colorectal cancer meeting  ●  February 2020
This academic meeting in London, aimed at senior clinicians, will see the CPM collaborate with the Royal Society of Medicine.

Genomics and personalised medicine: Is it going to change my management?  ●  Spring
This meeting follows on from the initial meeting between CUHK, SYSU and the CPM. It is planned that the collaborators will hold an investigator meeting to update the progress of the five studies.

Guangzhou workshop  ●  Spring
This meeting follows on from the initial meeting between CUHK, SYSU and the CPM. It is planned that the collaborators will hold an investigator meeting to update the progress of the five studies.

Pint of Science  ●  May
This meeting follows on from the initial meeting between CUHK, SYSU and the CPM. It is planned that the collaborators will hold an investigator meeting to update the progress of the five studies.
Acknowledgements

The CPM acknowledges with thanks the Dr Stanley Ho Medical Development Foundation and the Wellcome Trust, for their ongoing funding of the Centre.

Patrick Huen, Ian Huen, Professor Joseph Sung and the Dr Stanley Ho Medical Development Foundation

Colleagues at the Chinese University of Hong Kong, Sun Yat-sen University and the University of Padua

Dame Mary Archer, Chair of the CPM External Advisory Board

Professor Sir Peter Donnelly and Helen King, Co-Chairs of the CPM Steering Group

WCHG Business Manager

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

Appendix A

*Personalised Medicine in Practice Seminar: Personalised neuroscience: from molecules to medicine*

Programme

Professor Richard Gilbertson, University of Cambridge & CRUK Cambridge Institute: Mapping the origins and treatment of brain tumours

Professor Robert McLaren, University of Oxford: Single gene correction in the retina to prevent inherited blindness: A clinical trial update on the perfect example of personalised medicine

Dr Andrea Németh, University of Oxford: Therapeutically tractable cerebellar ataxias

Dr Sally Cowley, University of Oxford: Disease modelling using human induced pluripotent stem cells

Professor Francis Szele, University of Oxford: Personal neurones generated from patient stem cells to help explain Schizophrenia

Dr Brent Ryan, University of Oxford: Identifying mutation-specific therapies for Parkinson's disease

Professor Caleb Webber, University of Oxford: Stratifying Parkinson's disease

Professor Jeffrey Golden, Harvard Medical School: A journey from computational pathology to precision medicine

Appendix B

*Genomics in Cancer Research*

Programme

Genomic medicine and the UK: Professor Sir John Bell

Translating Whole Genome Sequencing into the clinic for cancer patients: Professor Jenny Taylor

Molecular stratification in colorectal cancer: Professor Simon Leedham

Molecular biomarkers in early detection: Professor Simon Leedham

Interpretation of results: Systems genomics approaches: Associate Professor Francesca Buffa

Web-based tools for cancer data: Andy Blake

Technologies and advances in epigenetics: Dr Chunxiao Song

The chemistry of sequencing: Dr Christine Blancher

Predicting response to immune checkpoint blockade using peripheral blood samples: Dr Ben Fairfax

Ultramutation and immune priming: Dr David Church

Health economics of genome sequencing: Professor Sarah Wordsworth

Whole genomes and evolution, including opportunities arising from GEL and PCAWG: Dr David Wedge
Appendix C

Personalised Medicine: The social challenges

Programme
Introductions and welcome: Professor Simon Leedham, University of Oxford
Opening of event and series: Professor Helen McShane, University of Oxford
Keynote: Personalised medicine: Empowered patients in the twenty-first century: Professor Barbara Prainsack, University of Vienna
Policy and systems challenges
Health policy and systems challenges: Dr Nick Fahy, University of Oxford
Personalised Medicine: A policy perspective: Tom Fowler, Genomics England
Health service delivery and patient experiences of personalised cancer care: Professor Sophie Day, Imperial / Goldsmiths, London
The translational research challenges
Precision medicine in airways disease: Professor Ian Pavord, University of Oxford
Professor Paresh Vyas, University of Oxford
Industry challenges of personalised medicine: Liam Curren, Genomics PLC
Ethical, philosophical and social dimensions of Personalised Medicine
All for one, and one for all? The ethics of data sharing in personalised medicine: Professor Michael Parker, University of Oxford
The promise of precision: Theology and the social challenges of precision medicine: Professor Joshua Hordern, University of Oxford
15.40–15.55 Wrap up of day: Dr Mark Sheehan, University of Oxford
Farewells and final announcements: Simon Leedham, Alex Rushforth, Nick Fahy

Appendix D

Pearl River Delta / Oxford Symposium Agenda

Introductions and preliminary discussion
Professor Peter Donnelly, Professor Simon Leedham, Professor Joseph Sung, Professor Haipeng Xiao
Breakout session 1
Metabolic Medicine, Seminar Room 6, Convenor: Dr Jason Torres
Presenters: Professor Cecilia Lindgren, Dr Jason Torres, Professor Ronald Ma, Professor Haipeng Xiao
Cancer, Seminar Room 5, Convenor: Professor Simon Leedham
Presenters: Professor Xin Lu, Professor Mark Middleton, Professor Stephen Chan, Professor Alfred Cheng, Professor Ming Kuang
Breakout session 2
Big Data / Public health, Seminar Room 6, Convenor: Dr Jason Torres
Presenters: Professor Peter Donnelly / Dr Jason Torres
Professor Joseph Sung, Professor Haibo Wang
Gastroenterology / Liver disease, Seminar Room 5, Convenor: Professor Simon Leedham
Presenters: Professor Paul Klenerman, Professor Vincent Wong, Professor Sunny Wong, Professor Minhu Chen
Lunch in Dining Hall
Chinese delegate group visit to Perspectum Diagnostics (Imaging and AI)
Wrap-up meeting with Simon Leedham, Peter Donnelly and Helen King, Seminar Room 5
Pre-dinner drinks in Lower Common Room
Dinner in Upper Common Room, hosted by Helen King, Principal of St Anne’s College
Appendix E

Pearl River Delta / Oxford Symposium Projects

a) Hepatocellular carcinoma and immunotherapy
PIs: Paul Klenerman (Oxford), Ming Kuang (SYSU) and Stephen Chan (CUHK)
Others: Ellie Barnes (OU), Alfred Cheng (CUHK), Nick La Thangue (OU), Xin Lu (OU), Vincent Wong(CUHK)
Research Questions: can we undertake molecular phenotyping of the immune and epigenetic landscape in HCC to predict immunotherapy efficacy and look for predictive biomarkers of HCC conversion in cirrhotic patients? Is MDSC / innate immune cell populations a good biomarker of risk in HCC and predictor of response to immunotherapy? Human immune discovery initiative phenotyping of immune landscape in pre- and post-immunotherapy HCC sample. Epigenetic landscape in HCC using Oxford TAPS technology including epigenetic drug targeting.

b) Colorectal cancer: Sessile serrated polyp and microbiome
PIs: Simon Leedham (Oxford), Rashid Lui (CUHK), Xu RH (Cancer hospital SYSU) or Chen (6th hospital SYSU)
Others: Joseph Sung (CUHK), Tim Maughan (OU), Fiona Powrie (OU), William Wu (CUHK)
Research Questions: Are there differences in prevalence between sessile serrated lesions in the West compared to the East? If so, is this through detection mismatch or population / environmental based pathogenic variability. What is the microbiome pattern of SSP compared to other types of colonic polyps? What is the difference in microbiome pattern of the left colon versus the right colon? Microbial phenotyping of right sided adenomas including SSL to look for spirochaete colonization. Models to assess functional significance of bacterial colonization.

c) Inflammatory Bowel Disease and risk prediction
PIs: Simon Travis (Oxford), Min-hu Chen (SYSU) and Sunny Wong (CUHK)
Others: Siew Ng (CUHK)
Research Questions: Can machine learning be applied to simple measurement of IBD activities in both Western and Eastern patient cohorts to predict future hospitalization risk? The system has already been under construction in Oxford. This risk prediction system will be used in GZ and / or HK.

d) Multi-parametric (Q-risk) profiling and cohort studies
PIs: Julia Hippisley-Cox (Oxford), Joseph Sung (CUHK), Haibo Wang (SYSU),
Others: Xin Lu (Oxford) Li YB (Endocrine, SYSU), Freddie Hamdy (OU), Steve Yim (BDDA CUHK)
Research Question: Hippisley-Cox developed the QResearch database and the QD score in predicting the development of various disease conditions, osteoporosis, cancers etc. Would it be possible to use the QDscore to predict the cohort in HK Jockey Club multi-cancer screening program?

e) Diabetes and multi-organ imaging
PI: Rajarshi Banerjee (Perspectum Diagnostics, Oxford), John Todd (Oxford), Ronald Ma (CUHK) and Li YB (Endocrine SYSU)
Others: Haipeng Xiao (SYSU), Jason Torres (Oxford), Julia Hippisley-Cox (Oxford), Haibo Wang (SYSU), Vincent Wong (CUHK)
Research Questions: Can large collaborative projects involved in DM and its complications be used to predict inter-individual variation in progression of diabetic kidney disease with a genetic risk score? Professor John Todd is interested in addressing confounding in T2D studies by misdiagnosed T1D subjects using T1D GRS. Sync up efforts with Oxford work to de-convolute T2D GRS into process-specific GRS to further stratify patients to identify those most vulnerable to progression of complications and or amenable to drug interventions. Liver Multi-Scan is noninvasive and characterises liver tissue by providing accurate and quantitative measurement of liver fat, and correlates of iron, fibrosis and inflammation. Can noninvasive liver imaging enable early detection of liver disease complications in diabetic patients and improve health outcome. There was a lot of interest in establishing collaborations between CUHK/SYSU and Perspectum Diagnostics to profile livers from individuals with T2D to identify those with NAFLD stratify patients to assess health outcomes.