

Annual Review 2017/18

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DIRECTOR'S INTRODUCTION



The mission of Connecting Science is simple: to enable everyone to explore genomic science and its impact on research, health and society. Behind those simple words is considerable complexity. The science itself is complex and ever-changing, with new technologies being continually developed and put into practice in both research and healthcare. The work that we do is also deceptively complex, reaching audiences from primary schools to research scientists, NHS staff to patients and their families; it spans the globe, and everything we do involves constant collaboration with institutions and colleagues.

During a typical week, Connecting Science might be organising and delivering a cutting-edge conference on single cell biology, leading visits to the Campus from secondary school teachers one day and patient interest groups the next, running a week-long practical training course on genomic technologies in Ghana, or analysing responses from a survey about attitudes to genomic data sharing that has been translated into multiple different languages.

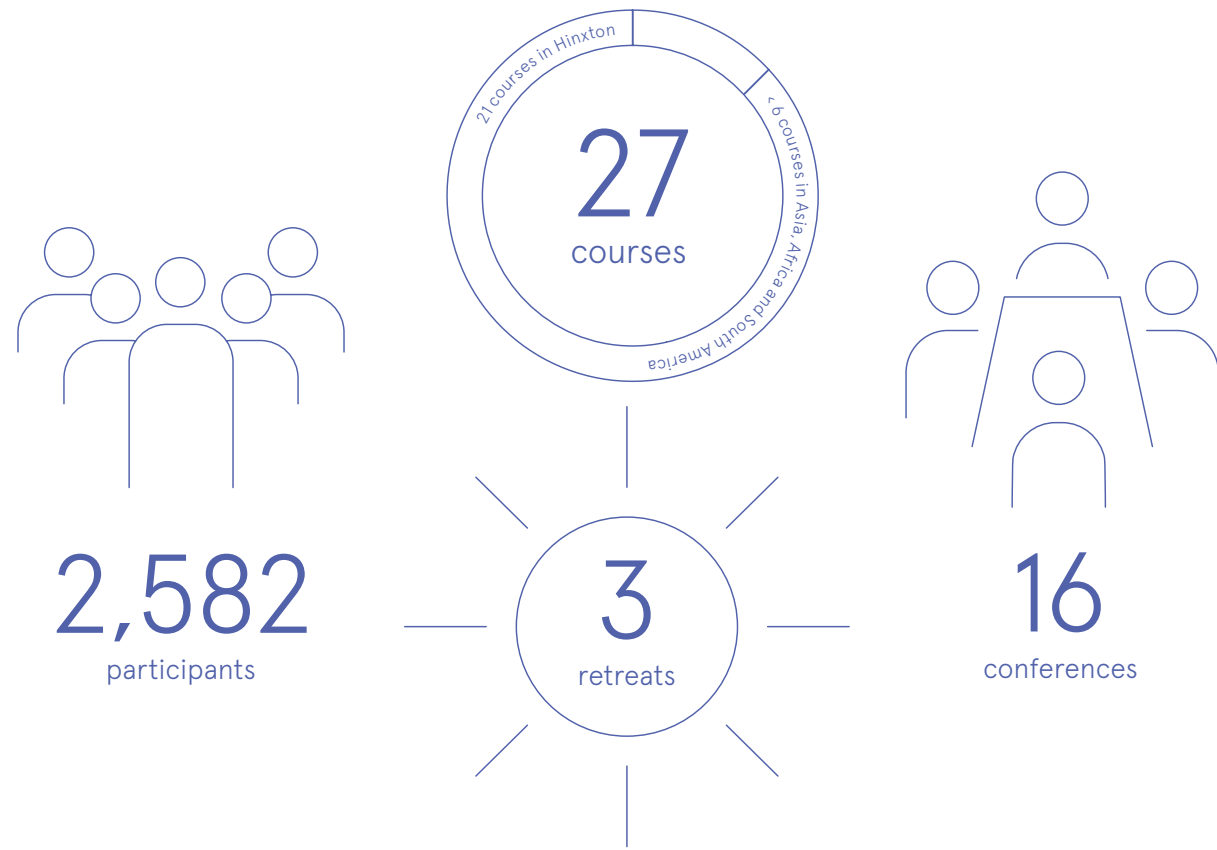
The fact that Connecting Science is able to deliver this incredible diversity of activities, at such high quality, week in and week out, is testament to many things: the professionalism and seemingly bottomless energy of our

team, the commitment and support of our many partners and collaborators, and the financial support and encouragement of Wellcome. I am personally very thankful for all of those things, and know that this support and energy often translates into life- or career-changing experiences for the tens of thousands of people we engage with directly every year.

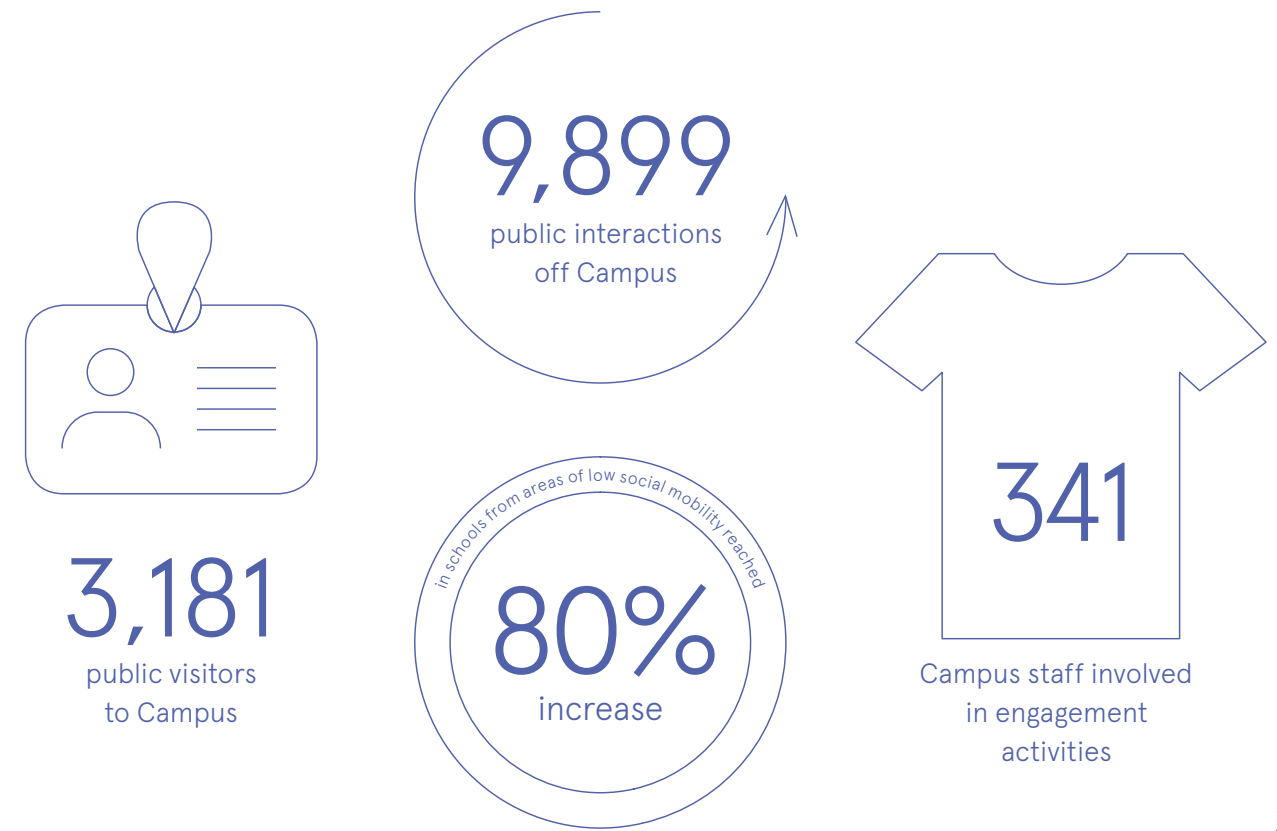
I hope that some of the stories highlighted in this Annual Review give you a sense of the excitement we have in all that we do. Genomics is changing so many things about our understanding of the world, and our place in it, both as a species and individuals. At Connecting Science we are committed to involving everyone in that change and democratising this most universal of sciences. We are proud of our work over the past year, but even more excited about the year to come – just like genomics, we are just getting started.

Dr Julian Rayner
Director, Connecting Science

Advanced Courses and Scientific Conferences

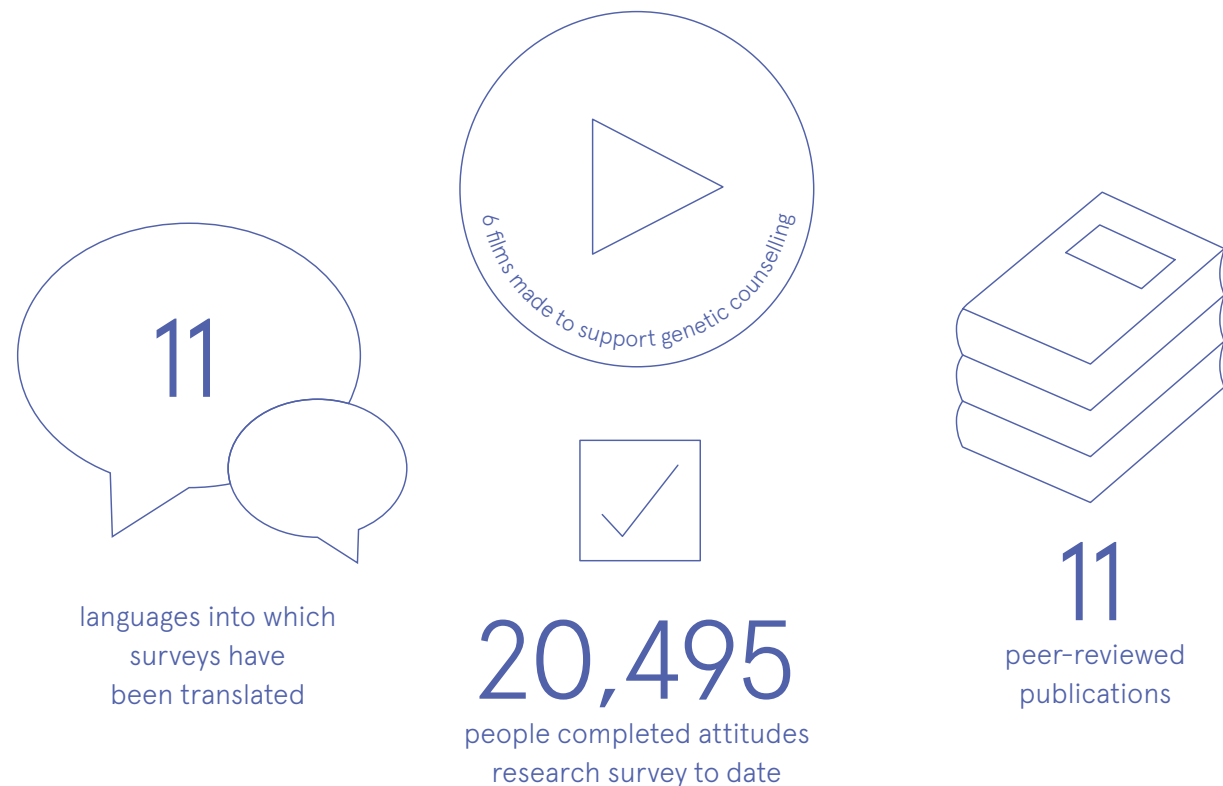


Public Engagement

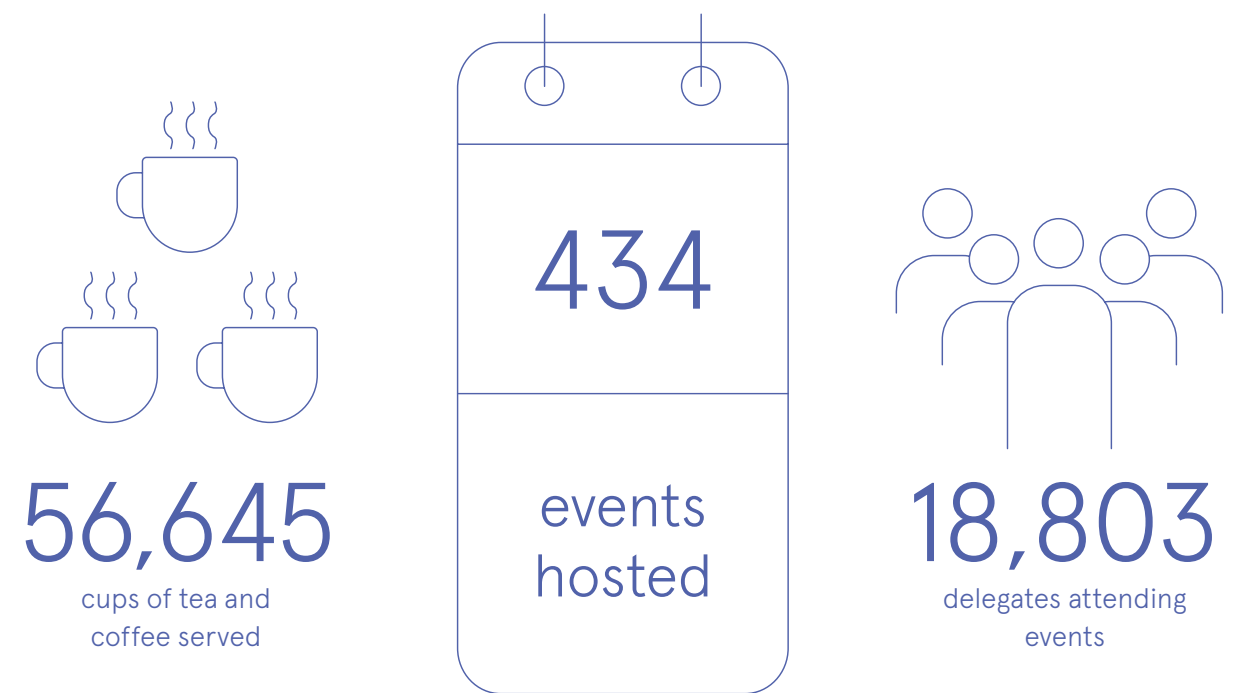


CONNECTING SCIENCE

IN TWELVE MONTHS



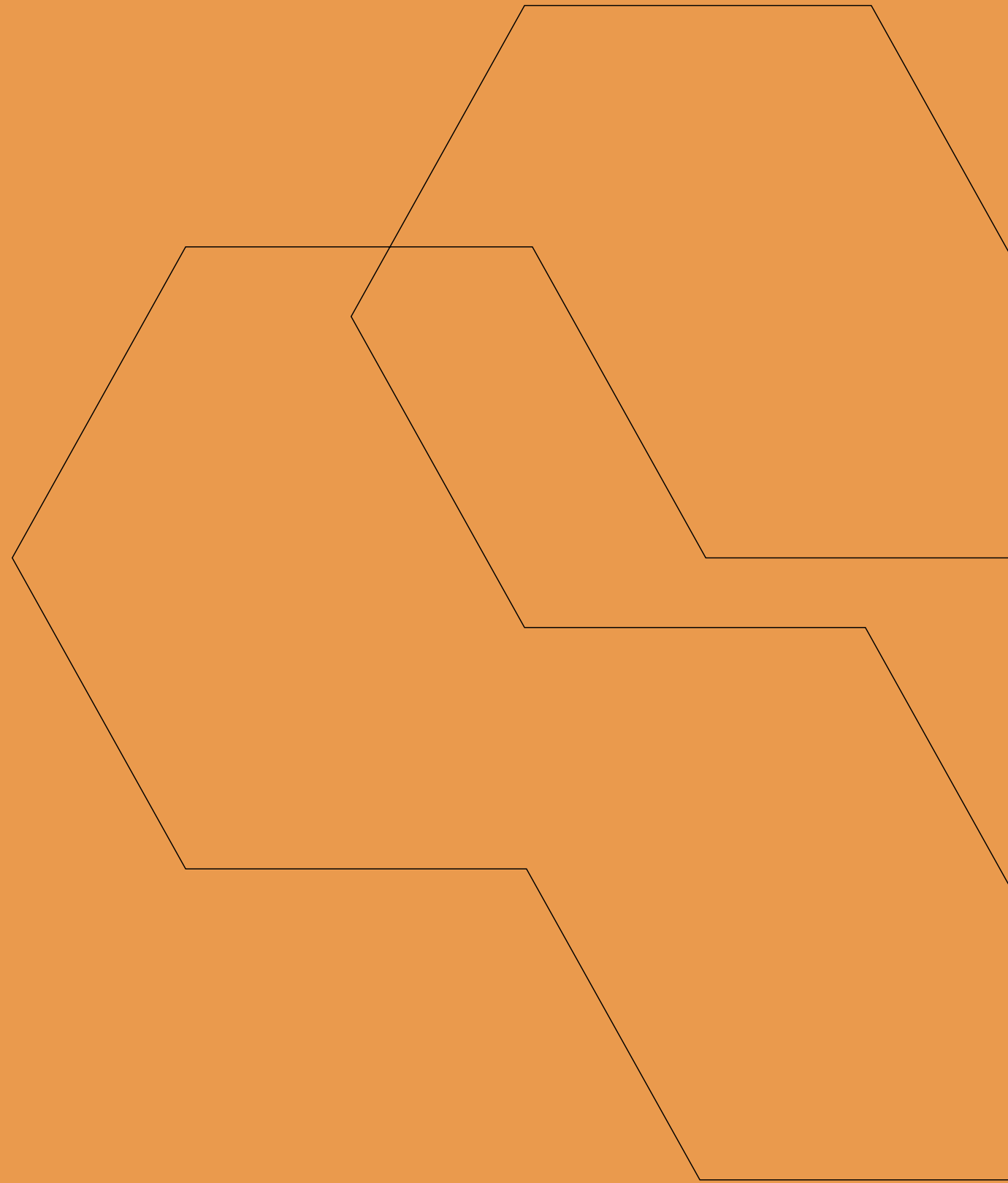
Society and Ethics Research



Conference Centre



Global ambitions



Genomic science has the potential to affect us all, no matter where in the world we are.

We seek to inspire new thinking around both its applications and its implications, and ensure this discussion is heard. We strive to support global health and research, making sure the best people have access to the best training, and to gather opinions from across the world.

The importance of public engagement and gathering public opinion discussed by @adthoro at ethics and consent session at #humancellatlas general meeting. Nice to see @genomethics #yourdnayoursay shown as an example

🐦 @WGCengage

Want to know more about our @ACSCevents activities in low and middle-income countries? We have a fascinating Q&A with Overseas Courses Development Officer, Alice Matimba @alicepn on our website

🐦 @ConnectingSci

We won! We're honoured to be awarded in the comics category @ISNTD_Press #ISNTDfestival. A big thank you to all of our #WormHunters. Remember the hunt, and beating the #whipworm continues!

🐦 @WormHunters



HAVE YOU HAD YOUR SAY ON YOUR DNA?

Genetic research has the potential to unlock many questions relating to health, medical diagnoses, and treatment. This process can only be successful, however, if DNA and other health data is donated by thousands – ideally millions – of people, and then stored in online databases where it can be accessed by scientists, clinicians and researchers from all over the world.

But how do people feel about their genomic data, their entire blueprint, which is more personal than a fingerprint or an iris scan, being incorporated into 'big data'? The Your DNA, Your Say project aims to find out.

"There is a huge evidence gap for us globally. At the moment there's a risk of policy being made about how data is shared without having a clear public voice on the issue."
– Anna Middleton, Head Society and Ethics Research

First launched in 2016, the project is a global online survey gathering public attitudes towards genomic data sharing. Surprisingly, asking people for their opinion on what happens to the information contained in their DNA has never happened on this scale before!

Supported by the Global Alliance for Genomics and Health (GA4GH), this novel survey was designed by our Head of Society and Ethics Research, Dr Anna Middleton, together with GA4GH's Participant Values Task Team. The survey is based around nine short films which were all created and scripted by Anna, and her collaborators, Dr Heidi Howard, Uppsala University, and Emilia Niemiec, University of Bologna.

Findings from previous projects such as Socialising the Genome have allowed Anna to use metaphors to find words which are meaningful to people when discussing subjects they may not have encountered before, such as genomics, genes and DNA. But of course these words only apply to the English language! To explore attitudes on a global scale, Your DNA Your Say has been translated into multiple different languages allowing people from across the world to give their opinion. This task has been made possible by working with a network of international collaborators, mostly social scientists and genetic counsellors, who have translated and culturally adapted the survey for their own countries.

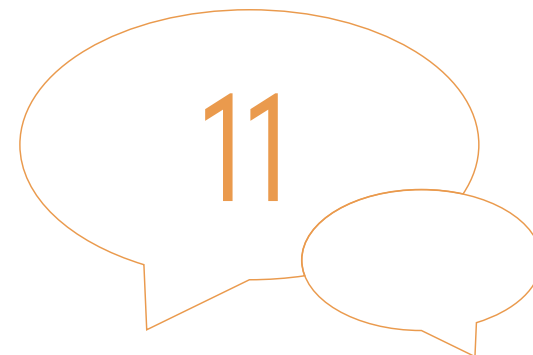
The work has come with its own unique challenges: As Anna says, "The translation process has been fascinating! Where no language for genomics currently exists we are having to describe what the concepts mean for the first time. We have also had to think about whether the third person references in the survey should have a gender – masculine or feminine. Which is the most pertinent persona for certain languages? Projects like this really highlight the complexity and importance of cultural adaptation."

Today, Your DNA Your Say is active in 11 languages, including Russian, Japanese, Icelandic and Arabic, and has had over 20,000 participants from over 20 countries.

The initial findings from approximately 10,000 English-speaking participants has been that representative publics in UK, USA, Canada, Australia are mostly unfamiliar with the concepts of DNA, genetics and genomics. However, when asked if they see DNA as different to other sorts of medical information, they say that it is in the way that it links them to their relatives, and is passed onto children. When asked if they would donate their DNA for research, only half of the sample said yes, with suspicions about who would get access to their data and why. People were most concerned about pharmaceutical companies making profits from a free donation of data.

As Anna and her team continue to launch new versions of Your DNA Your Say in languages such as Mandarin Chinese, Zulu and Hindi, they are confident that their findings will offer a genuinely global public voice to policy addressing genomic data and its sharing.

Have your say: www.yourdnayoursay.org



languages into which surveys have been translated

There is a huge evidence gap for us globally. At the moment there's a risk of policy being made about how data is shared without having a clear public voice on the issue.

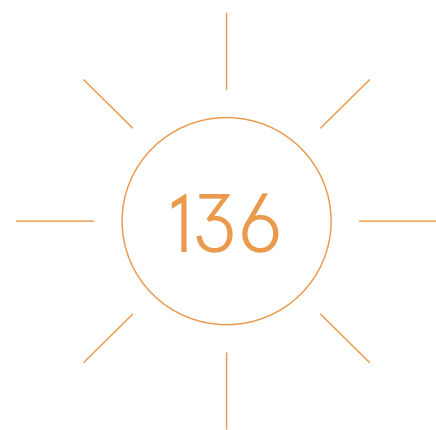


INCREASING GLOBAL IMPACT BY TAILORING TRAINING NEEDS

Overseas Courses have long been a key part of the learning and training activities delivered by the Advanced Courses and Scientific Conferences (ACSC) team.

Started in 2006, and aimed primarily at biomedical research scientists and health professionals in low- and middle-income countries (LMICs), Overseas Courses initially focused on teaching how to analyse human and pathogen genomes using computational methods. Over time, they developed laboratory and informatics-based courses applying techniques in molecular biology, clinical microbiology, genomic surveillance, and sequence data analysis for use in research and clinical diagnostics.

Scientific advances and new genomic technologies have created immense opportunities for increasing our understanding of health and disease. Yet many countries across Africa, Asia and South America lack capacity, thereby creating a barrier in the research community to the uptake of these advanced tools and resources. Overseas Courses seek to bridge this gap by developing and organising courses tailored to regional interests and needs.



Overseas Courses participants in 2017

STEP ONE

Fully understand the needs of varying regions

The ACSC team have adopted a number of approaches to achieve this, from conducting surveys targeting individuals in subject-specific regional societies or research groups, to working with leading regional scientists to help identify local needs. The team are also setting up an expert panel to consult regularly on advances in technology, and opportunities for capacity development across genomics, health research, and public health interventions. Dr Alice Matimba, who joined ACSC as its first Overseas Courses Development Officer in 2017, is building upon these well-established efforts to develop a pipeline to expand the activities, geographical reach, diversity and impact of Overseas Courses.



"There are massive gaps in capacity for genomic science research and education in most LMICs in Africa, Asia, and Latin America and the Caribbean. By understanding the barriers faced by scientists in accessing funding and expert mentorship, the Overseas Courses play an important role in tackling some of these challenges."

— Alice Matimba, ACSC

STEP TWO

Identify the training to match the need

Having laid this groundwork to develop a strong evidence base for the areas of greatest demand, it is easier to assess and decide on the training courses and other actions which may address them. Once a course topic has been identified, a team of prospective instructors submit a proposal to the ACSC Steering Committee outlining not only the course's activities, but also how it will incorporate regional collaboration and sustainability, and its potential impact. But identifying strategic need is only part of the equation. The practical considerations of how a course will be delivered and made accessible to regional participants is just as important.

STEP THREE

All hands on deck!

The ACSC team facilitate instructor meetings and the development of training materials, as well as locating suitable venues with appropriate facilities and local academic and administration support. Key to the success of Overseas Courses is the commitment from renowned scientists and health professionals who are prepared to give up their valuable time to share their expertise with talented up-coming scientists in these regions.

The instructor teams largely consist of collaborative teams of experts, from the UK and the targeted regions, who ensure contextual details are incorporated in teaching materials. In 2017 this approach led to the development of new courses in Viral Genomics and Antimicrobial Resistance, which will take place later this year in Vietnam and Kenya, respectively. The courses will also subsequently rotate across Asia, Africa, and South America, broadening their international reach.

To ensure that financial barriers do not prevent the most suitable applicants from attending, Overseas Courses are free and participants are also supported by travel and accommodation bursaries.

"The bursary supported my fees and accommodation in full. I could not have participated in the course without this kind of support."

— Participant, Malaria Experimental Genetics, Ghana, 2017

Post-course feedback from participants clearly indicates a high level of satisfaction for Overseas Courses, with over 80% feeling "Very satisfied". Participants also provide useful information about their needs and expectations which guides continuous improvement of course organisation and delivery.

STEP FOUR

Widening impact and skills

Introducing more courses

Having identified gaps and taking into account recommendations from various research leaders, the ACSC team and selected partners are also developing regionally-tailored courses for a variety of human genomics topics, drug discovery and microbiome-host interactions. They plan to increase the number of Overseas Courses delivered annually to eleven per year by 2020.

Seed funding projects

In 2017 ACSC launched a pilot for the integration of research projects into courses, providing an opportunity for participants to apply the knowledge and skills obtained from the week-long course to a real-life scenario. Participants from Genomics and Epidemiological Surveillance of Bacterial Pathogens were awarded small grants to study genomic diversity and antimicrobial resistance in *Salmonella enterica* and *Klebsiella pneumoniae* by applying epidemiological methods and whole genome sequencing techniques. By collaborating, participants gained experience in networking and implementing projects of public health relevance as a team, at a regional level and with global impact.

"The best part about the course was the funding to do a research project with the other participants. It is an excellent opportunity for networking and for applying what we learned on the course."

— Participant, Genomics and Epidemiological Surveillance of Bacterial Pathogens, Costa Rica, 2017

Learning and sharing

Another valuable addition is the Train the Trainer element, developed and piloted by Dr Pamela Black, ACSC's Education Officer. This provides participants with pedagogical skills to enhance their approach to learning and teach others when they return to their home institutions.

"The Train the Trainer workshops were very helpful and gave us time to reflect on our aims for the week and developing skills for the future."

— Participant, Working with Pathogen Genomes, Vietnam, 2017

Maximising the impact and reach of the training they deliver in low- and middle-income countries is a key priority for the ACSC team, so their approach to evaluating and catering for regional needs is constantly under review. It is encouraging that these methods are backed up by long-term participant feedback, which consistently confirms that this training benefits not just those attending but their extended communities too.

"The course helped me to widen my scope, and to get in touch with training which was otherwise almost impossible to access. This has allowed me to write new proposals that benefit my institution directly."

— Participant, Working with Parasite Databases, Uruguay, 2016

I could not have participated in the course without this [bursary] support.

WORM HUNTING IN COLOMBIA

Dr María Duque-Correa is an NC3Rs Fellow in the Wellcome Sanger Institute's Parasite Genomics group, where she is studying the human whipworm (*Trichuris trichiura*).

This parasitic worm invades the gut causing abdominal pain and diarrhoea, and potentially also affects the intellectual and physical development of infected children. An estimated 700 million people are affected across many parts of Asia, Africa and South America. The disease is spread through ingesting food or water that has been contaminated by whipworm eggs and, for populations without access to clean water or sanitation, they are often caught in a cycle of repeated reinfection after treatment. María has been working with collaborators at the University of Antioquia in Colombia to establish a programme to collect whipworm eggs from infected children so that she can investigate the parasite further.

The Worm Hunters assemble!

María developed the Worm Hunters project with the Public Engagement team, to produce an integrated whipworm egg collection and schools engagement programme. The project took place in Ciénaga, a town on the Caribbean coast of Colombia, where the whipworm infection rate in children is 50%. Combining sample collection and engagement activities, the project aimed to treat school children with gut parasitic infections, while explaining how the parasite is transmitted, how future infection could be avoided, and how they were contributing to María's research.

A comic book to tell science stories

For any public engagement project to be effective, it is important to gain a full understanding of the people you will be working with. The Worm Hunters project took advantage of María's Colombian background, and the knowledge of her collaborators at the University of Antioquia, to explore the situation in Ciénaga; combining this with the Public Engagement team's experience of developing engagement and education projects. It soon became clear that a mixture of approaches was required to effectively engage the community in Ciénaga with María's research, and encourage participation in her study. The team decided to develop a comic book that the children could work through in school and that would be used alongside complementary, hands-on activities in the classroom. The children used microscopes (for the first time ever!) to look at whipworms and their eggs, and used a glitter hand gel to explore how hand washing can prevent the spread of infections. This approach helped the children to explore the worm's biology and understand why María needed stool samples from them. In addition, it enabled them to share what they learnt with their families, increasing the likelihood of them providing samples for María's study, and helping them to avoid whipworm infection in the future. The comic book was designed by Public Engagement's Laura Olivares Boldú, and contains a combination of information about the human whipworm and activities to reinforce learning. It also includes a comic strip featuring María, her research collaborators and the school children themselves, describing her research project and how she would use their samples. Laura and the team had to think carefully about the elements of the comic, and how the children might feel about being infected with whipworm or other parasites:

"We didn't want them to be scared. The comic takes the children on a journey from feeling unwell and being diagnosed, to understanding more about the infection and how it can be treated and prevented. We wanted the language, characters and illustrations to feel familiar to the children in Colombia, so we used characters in the comic that looked like them and talked like them, all in a style that would be attractive and appealing."

— Laura Olivares Boldú, Public Engagement

Out in the field

The blended approach to the Worm Hunters project not only resulted in a fun, engaging experience for the researchers and pupils who took part, but also had a number of other benefits. Previous deworming programmes run in the same community have had a participation rate of 50%. In contrast, participation in this project was around 90%. This has demonstrated to María's collaborators how an intense programme of public engagement activities can not only benefit the communities they work with, but also have a direct impact on the success of their research.

"In my opinion, when delivering the information to children in a simple way in which they can identify themselves, which is what we tried to do with the comic, they feel they are part of the research too. Moreover, they are more open to sharing their experiences about getting sick, they agree to blood being taken, drinking the medicine (which can taste horrible!), bringing the stool samples and, importantly, they return to continue learning and involving the rest of their family and friends."

— María Duque-Correa, Wellcome Sanger Institute

It's clear that the Worm Hunters have had a substantial impact on the community in Ciénaga, not only in terms of whipworm but also in sparking interest in what a scientist does, and how science may affect their lives.

"Through the comic, we tried to explain to the children why their samples are so important to understand how the worms infect us and to develop new medicines and vaccines so all children can live happily without worms. I think this idea was very well received even if they had never heard about scientists or laboratories. The children were very curious about what we were going to do with the samples and also asking when we would be back."

— María Duque-Correa

And beyond this local impact the Worm Hunters team have used blogs, videos and social media to share their experiences with a wider audience, including other parasite researchers interested in how this approach could benefit them and their research practice. It's also enabled the team to continue sharing what is happening with the research now they are back at the Wellcome Sanger Institute, where they are harvesting whipworms from the eggs they collected in the samples from Colombia.

An intense programme of public engagement activities can not only benefit the communities they [scientists] work with, but also have a direct impact on the success of their research.



We have been delighted to be part of this project. The Worm Hunters projects has demonstrated how engaging school children with scientific research can not only benefit that community but also improve public participation in research, leading to better research data, and ultimately better health interventions.

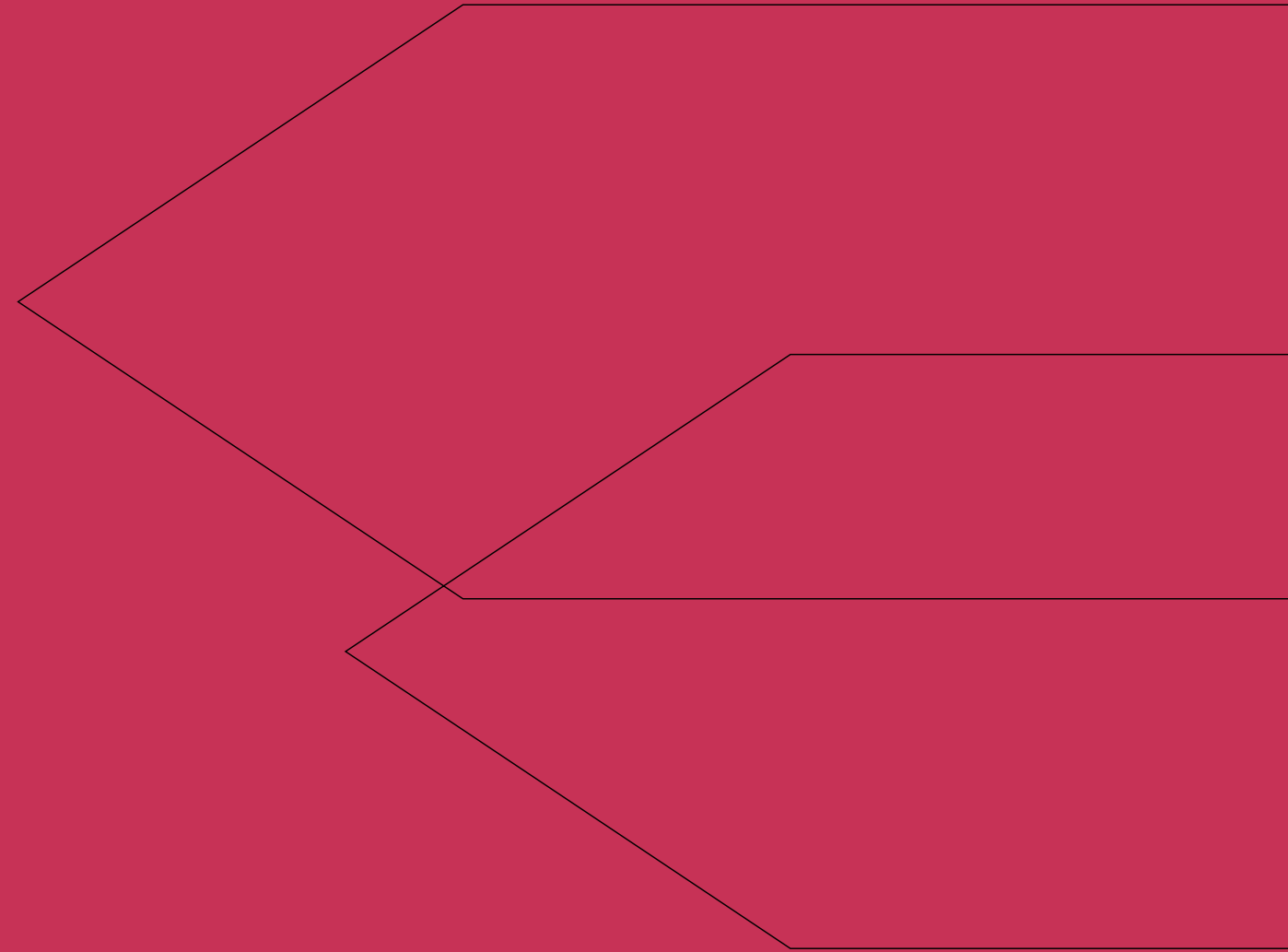
María's journey to Ciénaga in February 2018 and her experiences of undertaking sample collection, delivering deworming treatments, and inspiring the next generation of Worm Hunters are documented on the project website www.wormhunters.org

Follow the continuation of the Worm Hunters project on Twitter and Facebook via @WormHunters



The Worm Hunters comic has won the comic showcase award at the International Society for Neglected Tropical Diseases Festival 2018 in March!

Catalysing collaboration



We champion collaboration and conversation across borders, disciplines and communities. We are uniquely placed to bring together relevant understanding and expertise, to deliver a diverse range of activities with genuine impact.

Our partnerships and networks are amongst our most valuable assets.

Excited that avatars worked well in our training course in Jan. Great collaboration #genomicmedicine with @Cambridge_ICE @emblebi @sangerinstitute @ConnectingSci. Also supporting #WomenInScience with gender policy <http://bit.ly/2oKv0GN> and grants <http://bit.ly/2CSYsiH>

🐦 @ACSCevents

What an amazing world congress. So wonderful to share with some of the amazing Aussie gc [genetic counselling] community. Thank you to the organisers #wcgc17

🐦 @Lucinda_Freeman

What an amazing day #genomedecoders @WGCengage @sangerinstitute @ResearchInSch Fantastic @TaptonSchool1 @Fran_Gale & also on @BBCWorldatOne

🐦 @ProfBeckyParker



BRINGING TOGETHER SCIENTIFIC PARTNERS

Advanced Courses and Scientific Conferences (ACSC) have a well-established track record of bringing together leading research and clinical professionals to create new and innovative learning and training events. By working with experts in their fields, the team ensure that participants at their events are exposed to both cutting-edge research techniques and the latest thinking on a topic.

In February of this year, 18 virologists arrived at the Wellcome Genome Campus to take part in one of ACSC's newest courses, Genomics and Clinical Virology. Viral genome sequencing and sequence-dependent detection methods have been applied to the diagnosis and management of viral infections for many years. Now whole genome sequencing of hundreds of microbes can be undertaken in hours, enabling real-time genomics for diagnostics, transmission investigation, and infection control.

The Genomics and Clinical Virology course, created through a collaboration between the ACSC team, Public Health England, the MRC–University of Glasgow Centre for Virus Research, and University College London, offered both laboratory and bioinformatics-based training in the use of whole genome sequencing for detecting and identifying viral infections.

"Next generation sequencing will soon revolutionise our ability to diagnose both known and previously unrecognised viral pathogens in the healthcare setting, but it is a method that requires specialised laboratory set-up and bioinformatic expertise. This new course delivers practical experience from those who use it routinely for research and those who have implemented it in clinically-validated pathways. There is a large unmet need for transition from the research laboratory to routine healthcare and this course, expertly co-ordinated by Advanced Courses and Scientific Conferences is, starting to bridge that gap."

— Dr Emma Thomson, lead course instructor and Clinical Senior Lecturer, MRC–University of Glasgow Centre for Virus Research

As expected, demand for the course was huge, with over 60 applications from across the world for the 18 available places, reflecting the increasing use of whole genome sequencing for diagnostic purposes.



This level of demand is part of the general trend seen by ACSC in relation to all of its courses in pathogen genomics, whether held on the Campus or in low- and middle-income countries.

Participants prepared and sequenced genetic material from hepatitis C infected patients using different approaches and technologies, before moving on to bioinformatic analysis and data interpretation. The week concluded with the opportunity to apply their training to group projects based around clinical scenarios of viral outbreaks in the UK and Africa. The two different scenarios were designed to reflect the diversity of the group, with half of them from outside the UK. Ten countries were represented overall, with trainees travelling from as far afield as Kenya, Argentina and Singapore.

The ACSC team are confident that their approach leverages the expertise of all its partners to deliver training courses

The course on Genomics and Clinical Virology has directly led to the development of an additional course with instructors from the MRC–University of Glasgow Centre for Virus Research, together with collaborators from Singapore and Vietnam.

that both meet existing demand and have a wider impact. This first course on Genomics and Clinical Virology has directly led to the development of an additional course on Viral Bioinformatics and Genomics with instructors from the MRC–University of Glasgow Centre for Virus Research, together with collaborators from Singapore and Vietnam. Specifically designed as an Overseas Course for those in low- and middle-income countries, the course will take place in September, in partnership with the Oxford University Clinical Research Unit, in Ho Chi Minh City, Vietnam.

These new virology courses will complement the existing programme of bacterial and parasite genomics training events currently running in the UK and overseas, and continue to provide much needed training for scientists and healthcare professionals around the world. Advanced Courses and Scientific Conferences are delighted to share in this endeavour with its networks of partners, collaborators, and alumni!

FIRST GLOBAL EVENT FOR GENETIC COUNSELLORS

Advanced Courses and Scientific Conferences

They put together a Scientific Programme Committee of international experts and develop a meeting proposal for an event based around the patient journey through the genetic counselling process. This is presented at the ACSC Steering Committee for funding approval.

Dr Anna Middleton, Head of Society and Ethics Research, has had many years of practice as a genetic counsellor within the NHS and is also now the Vice-Chair of the UK Association of Genetic Nurses and Counsellors.

Anna had become...

Increasingly aware of the lack of a forum for genetic counsellor and nursing leaders world-wide to share learning and experiences. She also saw a challenge that she could address with her Connecting Science colleagues!



Anna approaches Advanced Courses and Scientific Conferences (ACSC), who constantly seek to identify new areas of scientific interest and unmet demand.

Dr Treasa Creavin
ACSC Scientific Programme Manager

Dr Christine Patch
King's College London and Genomics England

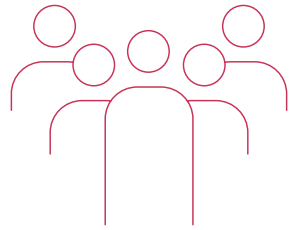
Professor Barbara Biesecker
National Human Genome Research Institute, USA

Scientific Programme Committee



The first World Congress on Genetic Counselling was held at the Wellcome Genome Campus on 4-6 October 2017, bringing together 220 delegates from 24 different countries.

CATALYSING COLLABORATION



15 speakers...

...from both researchers and clinical practice, explored the evidence that guides genetic counselling and the communication of genetics in mainstream medicine.

The Congress...

...successfully delivered a programme designed by genetic counsellors for genetic counsellors; a global community wanting to better understand how to communicate genomic information to publics, patients and wider society. For Connecting Science it was also a collaborative success, an example of how combining the skills and expertise held within the programme can deliver truly exciting and innovative events.



Sophia Tirelli
Conference and Events Organiser, Conference Centre
Manages the delivery of the event by the Operational Team.

Dr Anna Middleton
Head of Society and Ethics Research

Conference Centre Operational Team
Work with Sophia and Laura to deliver the delegate experience.

Laura Hubbard
Conference and Events Manager, ACSC
Provides speaker, delegate and venue logistics as well as administrative support.

The Programme Committee and Treasa develop the conference topics in detail, invite speakers, and identify external financial support to provide bursaries for delegates.

Delegates enthusiastically shared their thoughts on Twitter! Take a look at #WCGC17

CONNECTING SCIENCE

DECODING GENOMES TOGETHER

It's not often that sixth formers are asked to help out established research scientists, but that's exactly what the Genome Decoders project does. A collaboration between the Institute for Research in Schools, Wellcome Sanger Institute, EMBL-European Bioinformatics Institute (EBI), and coordinated by Wellcome Genome Campus Public Engagement, this project has recruited around a 1,000 enthusiastic Genome Decoders based in schools across the UK to contribute to the analysis of the *Trichuris trichiura* genome.

T. trichiura, or the human whipworm as it's more commonly known, is a parasitic worm which causes diarrhoea, abdominal pain and malnutrition in around 700 million people each year. Whipworm infection has a chronic impact on the communities affected, but there is currently no vaccine available and existing treatments are often ineffective or too expensive for many areas.

All the DNA contained in the whipworm genome has recently been sequenced but, although this data has been generated, understanding what it all means is another task altogether. Computer programs can predict genes and their location in their genome, but the best way to accurately identify them, and the variations within them, is through a process called manual genome annotation. This involves a real person analysing DNA sequences with bioinformatics tools to find the markers that indicate the boundaries of a gene, comparing the data to gene sequences from similar organisms, and looking at the proteins they make. All of this evidence is used to definitively find the location of different genes and predict what their function might be. This 'gold standard' of annotation eventually results in a fully-curated genome that can be used by researchers around the world to better understand key genes involved in the infection cycle and potentially find new vaccine or drug targets.

As you might expect, manual annotation is a labour-intensive and time-consuming process, which is where the Genome Decoders come in. So far students from over 50 schools have been working on the *T. trichiura* genome as part of various science clubs and after school activities. Having received training developed by the Public Engagement team and scientists at the Wellcome Sanger Institute and EBI on the publicly available Apollo browser curation tool, students are now able to carry out annotation activities from around the UK on their own computers. At the time of writing we estimate that the students have annotated around 10% of the whipworm genome. These annotations are reviewed by Campus scientists and will ultimately be hosted and shared with the wider scientific community through the public WormBase parasite resource.

What has been particularly interesting is the different ways schools have approached Genome Decoders. For some

this has been a teacher-led initiative, where a teacher has taken the lead and guided the students through the process; but for other schools the students are the champions for the project, directing and managing teams of students to carry out the annotations. As this is likely to be an initiative spanning over two years, it is anticipated that there will be a legacy within the schools involved, where the project is handed to a new cohort of students to continue the great work achieved this year.

"It is one of the most exciting, fun, interesting, challenging and wholly engrossing things I have ever done in my professional life. I've been overwhelmed by the enthusiasm and commitment from the students (more than 75 at the last count!), but I've also loved everything that I've learned myself about using Apollo and annotating a genome. If this is a long-term project - and I very much hope it is - I'd like to be first in the queue for further involvement!"
— Teacher, Oxford High school

Genome Decoders has placed a spotlight on the technical and practical challenges of implementing a large-scale genome annotation project in schools. These include internet access issues in schools, upskilling of students and teachers, the allocation of work between the many schools involved and the robust assessment of contributions across the cohort. To address some of these issues the WormBase team created an email hotline, where students and teachers can request help with deciphering complex data or report any technical issues. It has been interesting to see the email exchanges between students and scientists discussing hard to interpret sections of sequence!

"We can often underestimate what young people are capable of. Projects like Genome Decoders show that, given appropriate training materials and opportunities, students can rise to the challenge of working alongside scientists to carry out technically-demanding informatics work. Our Campus has ambitious plans in this area, and Genome Decoders will hopefully be the first of many participatory research projects engaging schools and public with genomic research."
— Francesca Gale, Education Development Lead, Public Engagement


As the first mass-participation genome annotation project of its kind, Genome Decoders is a perfect example of the collaborative and often distributed nature of scientific research. By taking part students have gained an extended opportunity to experience the research process first-hand, perhaps influencing their future career choices. But like many scientists, often the motivation for students to become a Genome Decoder is as much about making a positive difference to the world, as it is about career development.



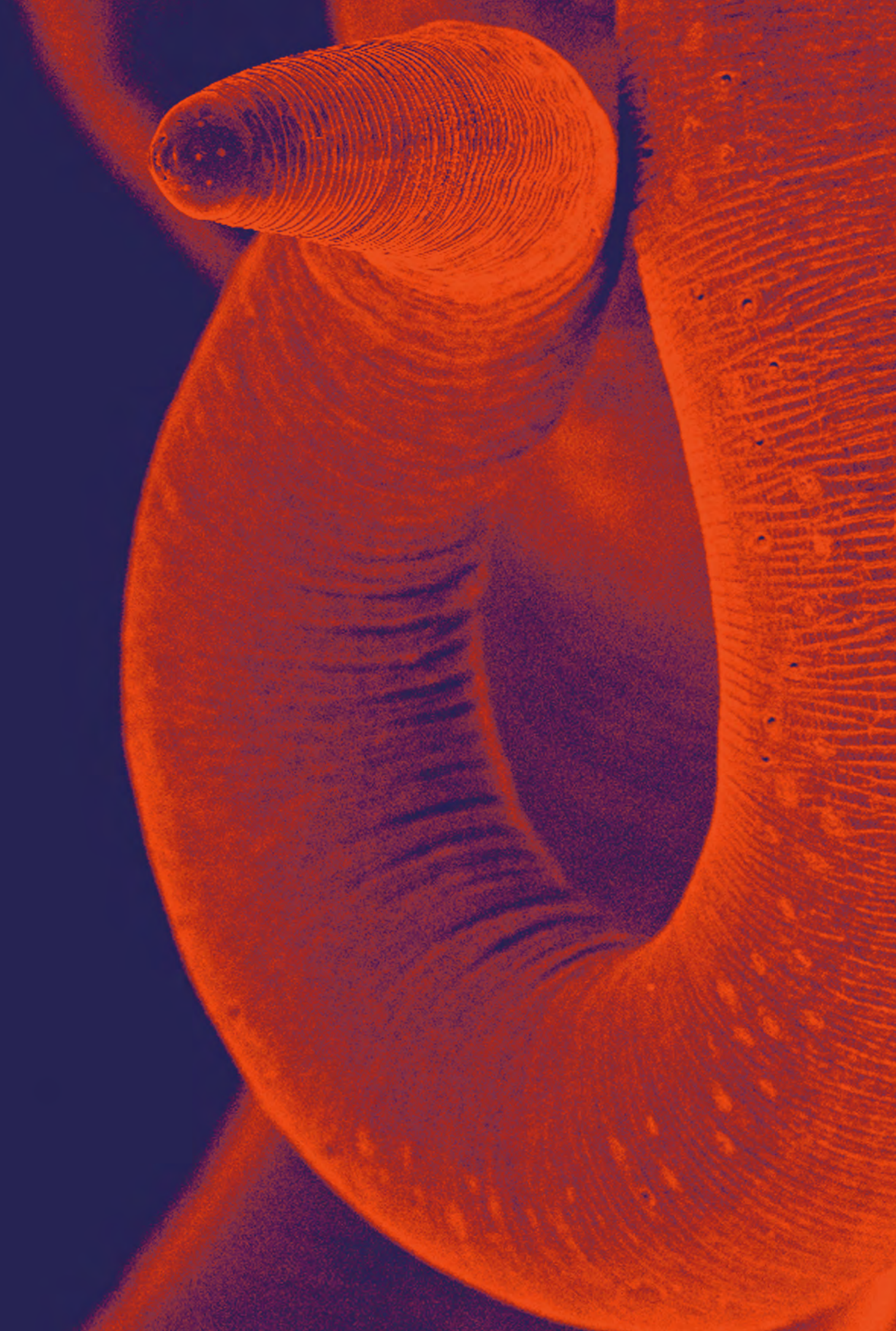
It is one of the most exciting, fun, interesting, challenging and wholly engrossing things I have ever done in my professional life.

Snapshot

This [#HumanEvol17] has been such a wonderful event - and combining a cutting edge conference from @ACSCevents with a packed public engagement evening from @WGCengage is every @ConnectingSci dream come true....




 @rayner_julian


May 2017
April 2018






2017


MAY

-  Applied Bioinformatics and Public Health Microbiology conference
-  Fungal Pathogen Genomics course
-  Malaria Experimental Genetics course takes place for the first time in Ghana




 Your DNA Your Say survey launched in Russian


JUNE

-  Translational Bioinformatics conference
-  Genome Gallery – Hidden Lives exhibition opens
-  Public Engagement Masterclass course



 Conference Centre Event Management service opens for business


JULY

-  Proteomics Bioinformatics course
-  Genomics and Epidemiological Surveillance of Bacterial Pathogens course in Costa Rica
-  Conference Centre hosts ON Helix 2017




 Overseas Course seed funding pilot project initiated in Costa Rica


AUGUST

-  Human and Vertebrate Genomics: Bioinformatics Tools and Resources in South Africa
-  Wayne McGregor researches Autobiography on Campus



 ACSC-policy statement on germline editing published




SEPTEMBER

-  Animal Genetics and Diseases conference
-  Orkney International Science Festival
-  Molecular Approaches to Clinical Microbiology course in South Africa





 Genome Decoders gets underway


OCTOBER

-  Next Generation Sequencing Bioinformatics course
-  Working with Parasite Database Resources course in Malawi



   First ever World Congress on Genetic Counselling


NOVEMBER

-  Human Evolution: Fossils, Ancient and Modern Genomes conference
-  Working with Pathogen Genomes course in Vietnam
-  Conference Centre hosts Biodata World Congress 2017
-  Your DNA Your Say survey launched in Iceland

 Engage Week on Wellcome Genome Campus



DECEMBER

-  First festive family film screening in Conference Centre
-  Derivation and Culture of hiPSCs course



 Target Validation Using Genomics and Informatics conference

2018

JANUARY





-  Healthy Aging: From Molecules to Organisms conference
-  Fundamentals of Clinical Genomics course


FEBRUARY

-  Café Sci Cambridge launched
-  Genomic Practice for Genetic Counsellors



 Worm Hunters team arrive in Colombia


MARCH


-  Cambridge Science Festival
-  Single Cell Biology conference
-  Conference Centre hosts Human Cell Atlas General Meeting
-  Worm Hunters comic wins International Society for Neglected Tropical Diseases Festival award


 Genome Gallery – Genomic Expressions exhibition opens


APRIL

-  Genomics of Brain Disorders conference
-  Malaria Experimental Genetics course in Thailand

 Music of Life project begins

 Learning

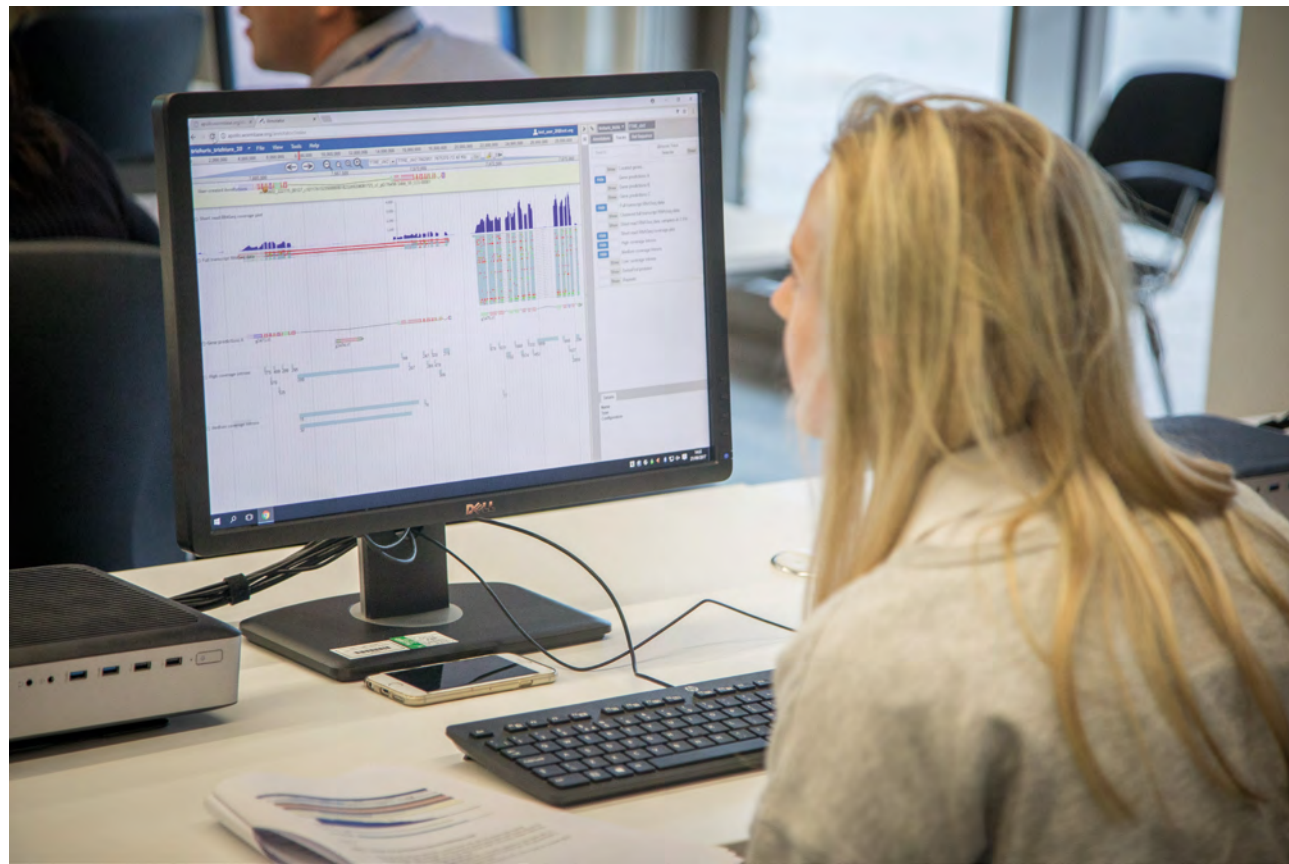
 Research

 Engagement

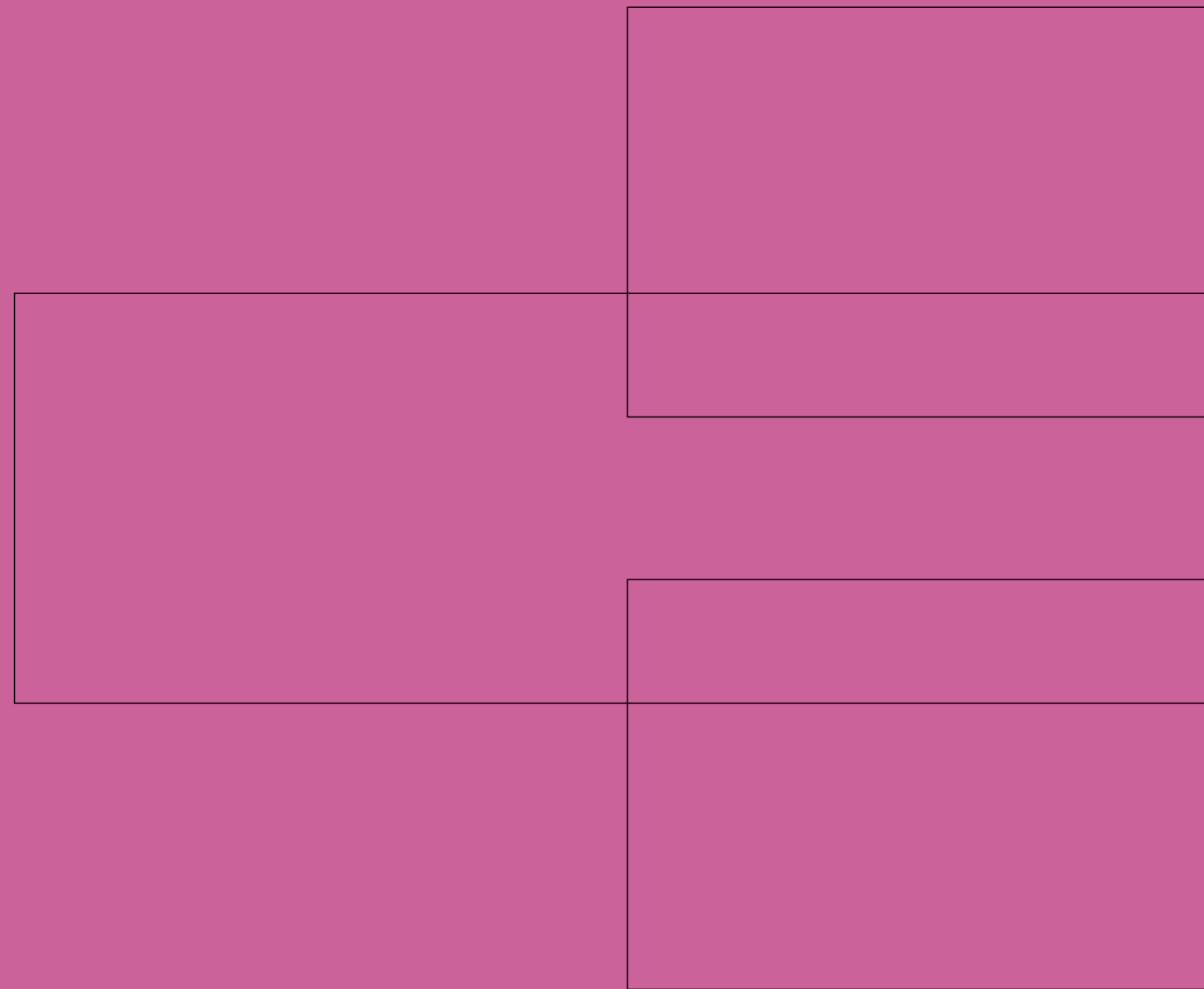
 Space

Wonderful insight into the human side of genetic testing. Genomics will bring these dilemmas to many many more of us, often with less binary outcomes and even harder choices. @ConnectingSci is committed to engaging everyone in this complex subject, learning together.

 @rayner_julian



Democratising genomics



Genomics is about us, and we believe it should be for everyone. Our work aims to spark new and interesting conversations, and places equality at its fore.

Congratulations to Treasa Creavin @ACSCevents for receiving the @wellcomegenomecampus Best Practice Award for supporting #WomenInScience with gender policy! <http://bit.ly/2oKv0GN> @ConnectingSci @sangerinstitute @TADG_Creavin #WomensDay

🐦 @ACSCevents

Paper written with @Genomethics now up, ready for open peer review: Genetics in the 21st Century - reflecting upon some of the ways that #Genomic data may touch us as patients, consumers and citizens. #Sequencing #PrecisionMedicine on @F1000Research

🐦 @TheSarcasticOwl

The 'hidden lives' exhibit at the wellcome genome campus is great. my kiddo has gone 3x. we also love the trees on the wall behind.

🐦 @marakat

I'd like to find out...
~~Who~~ Who was the ~~first~~ First
human To live.

Isla
6

Hidden Lives exhibition
visitor contribution card

BLOOD, SWEAT AND SUCCESS – IMPLEMENTING A GENDER BALANCE POLICY

Scientific Programme Manager, Dr Treasa Creavin, shares her perspective on developing and applying a gender balance policy for Advanced Courses and Scientific Conferences.

Gender issues in science, research and the wider world have been under close scrutiny – most recently due to the legal requirement to report gender pay gap data in the UK this year. The ‘leaky pipeline’, well-known in academia, describes a situation where men and women are represented equally at undergraduate and PhD level in the biomedical sciences, but where there are fewer females in academic research at the more senior, professorial level. The reasons why women leave academic research are many and complex. Are women less attracted to academic research because of a specific organisational ‘culture’ in academia? Or is the timeline for progress and promotion to a permanent academic position not conducive to family life? Recent research has shown that identical CVs with male names were rated more highly and more likely to be hired than those with female names¹. Several studies have shown that female teachers or lecturers are rated lower than their male counterparts, leading some to suggest that these type of evaluations are a better measure of implicit bias than of teaching quality².

This general pattern is reflected at many scientific conferences, with a majority of male programme organisers and invited speakers. Although the highlighting of all male panels and active calling out on social media (follow the twitter hashtag #YAMMM for some examples and reactions) shows this is becoming less acceptable for the community.

Previously, Advanced Courses and Scientific Conference (ACSC) hadn’t mandated a set number of female speakers, although we encouraged scientific organisers to invite a diversity of speakers and not just the ‘big names’ in the field. It is important for us to consider the rising stars, and the next generation of researchers, and to give them an opportunity to present their work at our conferences. This increases the visibility of their research, and allows them to gain from the extensive networking and other opportunities associated with being an invited speaker at an international meeting. Across our conference programme in 2015/16 our average percentage of invited female speakers was 34% – although this varied across specific fields and meetings (for example, we achieved 50% female speakers at The Biology of Regenerative Medicines,

but only 21% at Genomics of Common Diseases). However, it’s true to say the committees on the whole found it easier to suggest male speakers than female speakers, highlighting that male scientists are more ‘visible’ to committees than females. Potential male and female speakers were also not evaluated in the same way, with some committee members often more willing to give a male scientist an opportunity to speak, but seeking reassurance that a particular female scientist was a good speaker before a similar offer would be extended, reflecting unconscious bias.

In November 2016, ACSC adopted a new policy of mandating that 50% of our invited speakers be female – in order to bring gender balance to our conference programme. As the funder and organiser of an internationally-recognised conferences and courses programme, we thought it important to take a lead on this issue. Given that our audiences were approaching gender parity, we thought that those on the stage should reflect the community sitting in the seats. We also wanted to open up more speaking opportunities to female researchers, and play our part in encouraging them to stay in research.

The reaction to this new policy from our conference programme committees varied. Several committees were completely supportive, taking the policy on board by suggesting female speakers, and being very pro-active in ensuring slots for female speakers were considered first to ensure we achieved our quota. Others were more challenging, expressing concerns such as there “*not being enough women in senior positions, junior women can reduce the credibility or quality of the meeting*”, “*...most professors of X are male, by inviting more females we’re discriminating against men*”, to the fact that our new policy was “*putting too many constraints on speaker choice*”.

We certainly had lots of lively conference calls when putting various conference programmes together, as we encouraged committees to stay on track with gender balance. However after 18 months of discussions and deliberations, we have achieved our 50% target across the conference programme. Indeed for the majority of our committees, gender balance is now firmly on their radar and they are much more forthcoming in making

Addressing gender bias at conferences is an important step in increasing the visibility and careers of talented female scientists.



suggestions for female speakers and considering diversity when putting a scientific conference programme together. However, when a female speaker cancels within a couple of months of a conference, some committees revert to type by thinking they could not possibly get another female to fill in with such short notice!

Since our meetings have hit our gender balance goal, delegate feedback from those attending has remained consistently positive, and registration numbers stayed stable.

So what lessons have we learned?

- Female researchers are there if you look for them
- Committees need time to get used to a new policy especially if it involves a major change from previous practice
- Funders should not shy away from having challenging conversations in order to improve gender balance and encourage more women to stay in research (due to a range of cultural and societal reasons it’s unlikely to happen without a steer from the gatekeepers of science)
- Although they may not be popular, quotas do work

“This is a real achievement for ACSC as addressing gender bias at conferences is an important step in increasing the visibility and careers of talented female scientists, benefitting research as a whole”.

– Professor Sir Mike Stratton, Chief Executive, Wellcome Genome Campus, and Director, Wellcome Sanger Institute

We’re always looking for new opportunities to continue to support women and men in science, and we have recently introduced our carer grant to support childcare, or extra care costs for dependents, while delegates attend one of our conferences or courses. We’re now also rolling our gender balance policy out to the courses side of the programme, and are looking forward to applying our experiences and learning.

References

- 1 Science faculty’s subtle gender biases favour male students. Moss-Racusin CA *et al.*, 2012, PNAS 109, 16474-16479.
- 2 What’s in a name: exposing gender bias in student ratings of teaching. MacNell L *et al.*, 2015, Innovative higher education , 40: 291-303

SCIENCE COMMUNICATION: REMEMBERING TO LISTEN

Listening to people's concerns, their interests and their passions. It is this that allows us to take the concept of dialogue beyond rhetoric and into meaningful practice.

My research initially set out to explore the following question: *How do we engage people with genetics who are not interested in genetics?* In other words, I wanted to find out how to engage people who don't see genetics (and science in general) as 'for me'. In hindsight this turns out to be quite a difficult topic. Mostly because this is an empirical question and as such I needed data. This put me somewhat in a catch 22 situation: I couldn't find out how to engage the uninterested until I had got data, and I could only get this data by engaging the uninterested.

While this was a significant challenge, there were some places I could start. First was research that demonstrates the effectiveness of viewing people positively, by what they know, are interested in, and enthusiastic about. This relates to a well-known challenge in science communication of avoiding characterising people who are not interested in science by their deficits. So often people are viewed as not knowing enough about science, not positive enough about science, or not interested enough about science.

A second place for me to start was to explore research that demonstrates the value of thinking about science,

not just as knowledge about the world but also as a form of culture. This means that in some respects science engagement functions in the world in the same way as things like classical music concerts or visits to art galleries. The significance here is that with forms of culture the barriers to engagement are rarely knowledge. Instead it is social factors that prevent participation: the hidden rules and esoteric language, the subtle ways that people are excluded or encouraged to see something as 'not for me'. Seeing science as a form of culture demonstrates the limitation of education as a tool for engagement. Imagine a group of teenagers totally uninterested in classical music. It is clear that they are unlikely to be enthused by classical musicians telling them that they would appreciate classic music if only they were better educated about it. The same is true for science. In fact, this has been demonstrated empirically. People who don't like science are rarely persuaded otherwise by well-meaning people trying to educate them.

So, to return to my question above - how do you engage the uninterested? My answer is that successful communication relies on listening. Listening to people's

concerns, their interests and their passions. It is this that allows us to take the concept of dialogue beyond rhetoric and into meaningful practice.

In my research I found that both pop culture (films, TV shows, books and video games) and family stories (especially those of spotting similarities and differences) were important resources that participants used to articulate their beliefs about opinions of genetics. In my PhD thesis I argue that it is when these ways of knowing come into contact with expert knowledge that something interesting can happen. We can move away from educational goals of trying to replace lay knowledge with expert knowledge since this approach is simply ineffective at engaging the uninterested.

Instead, we can understand (and value) how people make sense of science in their own terms, using their own interests and passions. This, I argue, allows for a genuine conversation to take place. In short, as we go about our business of science communication we have to remember to listen.

Jonathan Roberts is a genetic counsellor who is currently studying for a PhD. His project is a collaboration between Wellcome Genome Campus Public Engagement, Wellcome Genome Campus Society and Ethics Research, Wellcome Sanger Institute and King's College London. His research uses both qualitative and quantitative methods to explore family communication and genomics. He is particularly interested in the representation of genetics, inheritance and DNA in popular culture and his research explores how people's knowledge and enjoyment of pop culture can be used to facilitate engagement with genomics.



EXPLORING OUR WORLD IN THE GENOME GALLERY

The Genome Gallery is situated in the Conference Centre as a space to engage visiting members of the public, and Conference Centre delegates, with exhibitions exploring themes from Wellcome Genome Campus science. Here, Becky Gilmore, Exhibition Curator within the Public Engagement team, reflects on the gallery's most successful exhibitions, and outlines its future plans.

Hidden Lives: a story of discovery (June - December 2017)

In June 2017 we opened an exhibition thousands of years in the making! Developed in collaboration with archaeologists and Campus scientists, Hidden Lives was a step-change in our programming, demonstrating the potential of exhibitions in sharing and connecting with genomic science – for both our Campus community and the public.

On display were skeletons excavated at the Campus, alongside archaeological artefacts. The earliest objects discovered were 5,000 flint blades, dating from a time when our ancestors were hunter-gatherers. The exhibition charted the passage of time from these flint tools to Anglo-Saxon inhabitants. Campus scientists sequenced the genomes of five of the skeletons excavated from our own site, along with five other remains found nearby. Comparing this DNA to hundreds of modern-day samples revealed that the population of the East of England derives about a third of its ancestry from the Anglo-Saxons.

The exhibition invited visitors to respond to the question "If you could find out one thing from your DNA, what would it be?" Of the 124 responses collected, 42% of these were categorised as personal statements about physical traits or sense of self. These contributions added to the richness of the exhibition but also provided interesting learning about how our visitors reflect upon, and relate to, the science that takes place here.

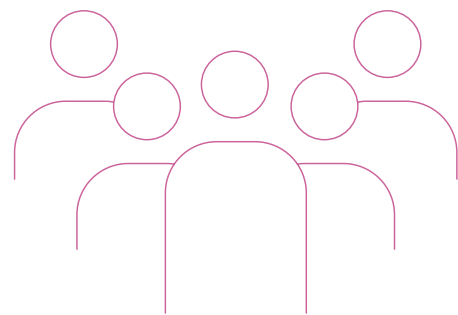
I'd like to find out...

"What does my extra chromosome do? (I have 47)"
"Why I am so tall when my family are average height?"
"If my genome has information to predict my future"

If you could find out one thing from your DNA, what would it be?

A schools and events programme was also developed in conjunction with the exhibition, enabling us to engage with 480 primary school pupils, and adult community groups who may not normally consider visiting.

1,500



Public visitors to Hidden Lives;
x 4.5 more visits than
previous exhibitions



The average dwell time for
an Open Saturday visit



"As a historian and amateur archaeologist the findings and possibilities of genome research are fascinating"
– Open Saturday visitor

Genomic Expressions (February - June 2018)

As humans our genomes are 99.5% identical, and therefore genomics is a subject that connects us all. It is also a subject that we talk about often, even without realising it: my mother's eyes, that funny family chin, or our likelihood of developing a certain disease. In February 2018 we opened Genomic Expressions – an exhibition centred on an open call to the Campus community to respond to the question "What does genomics mean to you?" It features sixteen creative responses from across our workforce: lab assistants, administrators, software developers, and senior scientists. They all approached the question in unique, creative and candid ways, and it has been wonderful to share these responses with visitors. Genomic Expressions is the first exhibition staged as an open call, leading to involvement from staff who have not previously worked with us starting their public engagement journey. We are also inviting visitors to respond to the same question and it's been fascinating reading their answers. We have built on our

growth in visitor numbers and so far Genomic Expressions/ Open Saturday attendance has outpaced Hidden Lives!

What's next?

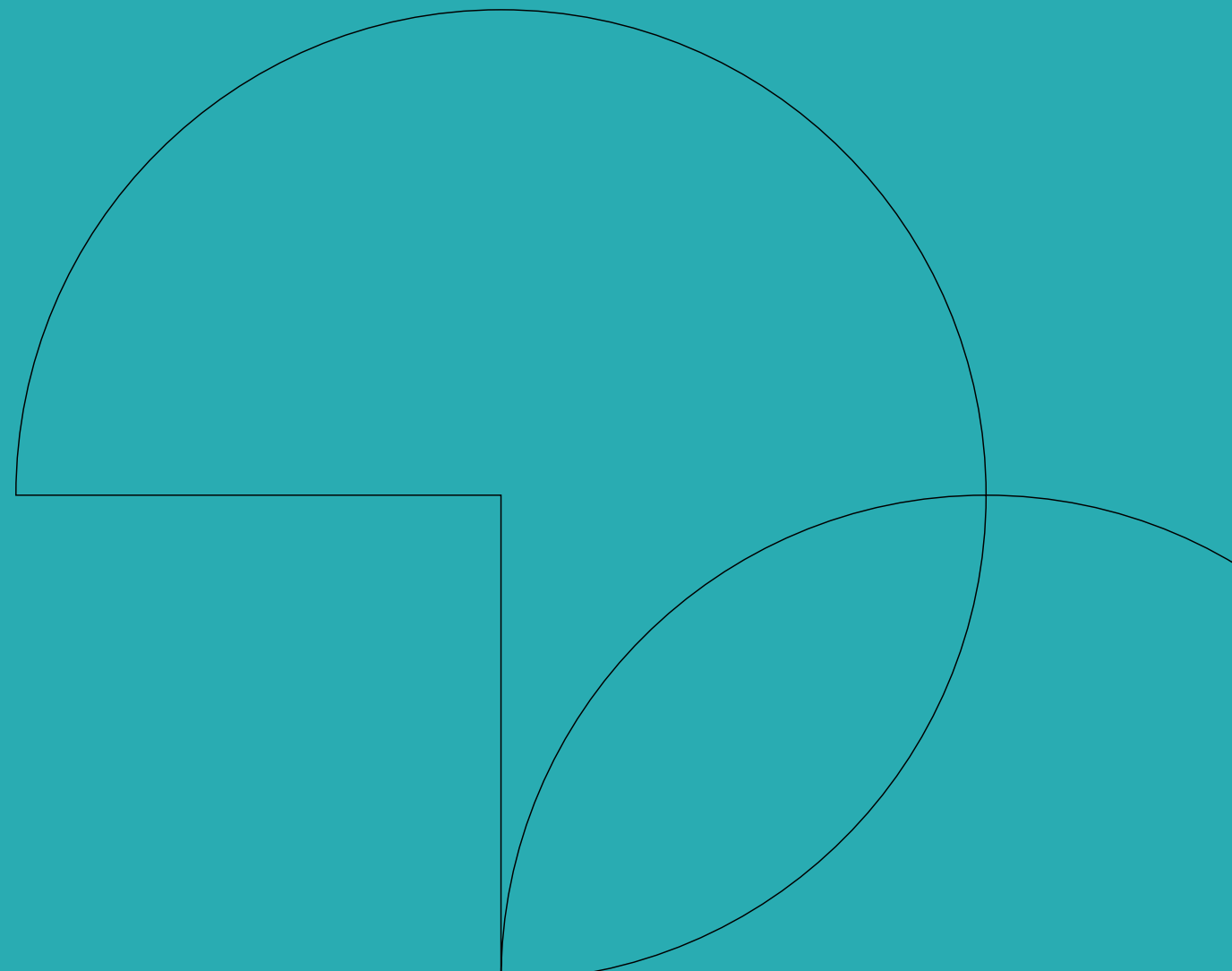
In July 2018 we will launch an exhibition exploring the Wellcome Sanger Institute's landmark 25 Genomes project. This will be a fantastic way to share research as it's happening, and like Hidden Lives, it will examine the different contexts and potentials of genomics research. In shaping the future programme for 2019 and beyond, we will be exploring ways to further co-create content with our Campus community, and with our audiences.

As Open Saturdays become embedded as both a part of Campus life and a visitor opportunity, we will seek to further enrich the experience- creating more interactions with the science and our scientists, and peeling back the Campus' layers to reveal more of its research and history.

The Genome Gallery is a self-directed, reflective space, at the heart of Public Engagement's monthly Open Saturdays. These events are free for anyone to join on the third Saturday of each month. wgc.org.uk/engage/events

Wellcome Genome Campus

A hub of knowledge, learning, and engagement



We are open and accessible to all, sharing knowledge, resources and ideas. We are committed to making our Campus a leader in the field of professional learning and public engagement with genomics, extending the reach and impact of the research which takes place here.

Great to see us feature on @BBCLookEast last night during an interview for the @humancellatlas meeting currently taking place in the conference centre.

🐦 @WGCConfCentre

Did you know our programme is turning 30 this year? To celebrate we're awarding 30 free places on our upcoming 2018 courses and conferences at the Wellcome Genome Campus!

🐦 @ACSCevents

Off to Comberton Village College today to talk about #WomenInScience #sciencejobs #malaria to years 7-13, with lots of aids from The Wellcome Genome Campus public engagement team! @WGCengage

🐦 @love_kitkat

Yesterday we welcomed back @Connect_EB to enrol a new group of #STEMAmbassadors. We now have 70 Ambassadors from @sangerinstitute @embi @wellcomegenome @ConnectingSci to lead #STEM engagement with young people!

🐦 @WGCengage



CREATING SPACES FOR THINKING

The Wellcome Genome Campus Conference Centre is the physical hub for many of the diverse activities and events that are organised, coordinated and delivered by Connecting Science. Whether they are hosting the first ever global meeting of genetic counsellors, accommodating researchers looking to relax after an intensive fortnight developing their mathematical modelling skills, or becoming the home for two of the Campus' oldest residents during the display of skeletal remains as part of the Hidden Lives exhibition, the Conference Centre thrives on the variety of projects it delivers on a daily basis.

The Conference Centre is a valuable venue for both the Wellcome Genome Campus and wider life science research communities: They regularly hosts EMBL-EBI training events and industry programme dinners, symposia, retreats, and Sanger Institute meetings. Their strong relationship with those working in genomics, genetics and large-scale data outside the Campus is also evidenced by the repeat business and retention of external clients such as Cancer Research UK, Illumina, Kymab, and numerous departments from the University of Cambridge.

It is the quality of the Conference Centre's services and resources, together with its spectacular spaces, that attract delegates and meeting organisers. But in Cambridge's competitive venue environment, keeping existing clients and attracting new ones is not easy. The team therefore strive to constantly deliver new ways to support their guests. The Event Management Service, for example, has now enjoyed almost a full year of operation, providing a completely standalone service to conference organisers, from managing speakers to abstract submissions (and everything in-between!). New audio-visual technologies have also been adopted, allowing the live-streaming of many meetings and events, and facilitate the involvement of remote participants.

"May I thank you and the Wellcome Genome Campus Conference Centre team for your first class professionalism hosting our Healthcare Partner annual conference. I've received so many positive comments about our event, which is fantastic. Unless clients have the support of the staff and facilities at the venue, delivering a successful event is spectacularly difficult. The exceptional quality of

the Conference Centre team made it easier for us; thank you for all your patience and guidance before the event, and the front office and floor team during it. It really has been a pleasure working with you."

– Event Organiser, WPA Healthcare Practice, 2017

The Conference Centre receives a consistently high level of positive delegate and organiser feedback. Behind this is the significant time invested into building relationships with the many contract staff working with the Sales and Events team. Time is taken to explain the role each individual plays in helping progress the understanding of genomic science by providing the optimal environment for networking, learning and collaboration.

"The Event Management Service team was involved in the planning and coordination of the international Human Cell Atlas meeting in March 2018. The service provided by the entire team was outstanding, ranging from their interactions with us as clients through to their hosting of the 270 delegates at the meeting. We have received glowing reports from the meeting attendees regarding the organisation of the meeting and acknowledge that this was crucial to the success of our meeting."

– Angela Macharia, Project Manager, Human Cell Atlas

Over the last year the Conference Centre has been reviewing operational processes with a view to improving efficiencies and has increased the size of the Sales and Events team to manage the increase in business which continues to rise year-on-year.

"Heading up the team at the Wellcome Genome Campus Conference Centre for a number of years, I have been privileged to work alongside many truly professional individuals across a diverse range of roles. From enquiry to delivery, the team work tirelessly to deliver a seamless service for our clients and their delegates. The conference and meetings industry, along with event needs, are constantly changing and therefore everyone is required to be flexible, proactive and above all else innovative in their thinking. I am proud to lead this dedicated team as they support the work of Connecting Science, the wider Campus and our external clients."

– Linda Prior, Business Manager, Wellcome Genome Campus Conference Centre

Unless clients have the support of the staff and facilities at the venue, delivering a successful event is spectacularly difficult.



THIRTY YEARS OF ADVANCED COURSES AND SCIENTIFIC CONFERENCES

Accelerating research and diagnostics through sharing knowledge in genomics.

The year marks the 30th anniversary of Advanced Courses and Scientific Conferences! Since its inception 38,859 scientists and healthcare professions from over 130 different countries have attended our events at the Wellcome Genome Campus, and another 1,493 at courses in Africa, Asia and Latin America. Feedback from delegates demonstrates that the programme has real impact, contributing to the acceleration of research and diagnosis of disease, as well as helping build careers.

The Advanced Courses and Scientific Conferences programme (ACSC) started out in 1988 with 12 participants wanting to learn about cutting-edge (pulse field gel electrophoresis and PCR) DNA Related Methods in Human Genetics at a summer school at Guy's and St Thomas' Hospital, funded by the Wellcome Trust. The expert instructors were Professors Kay Davies and Anna-Maria Frischauf, with speakers including Professors Ed Southern and Alec Jeffries. After several years of holding summer schools it became apparent that permanent training facilities were required, and so the programme moved to the Wellcome Genome Campus in 1998 and expanded rapidly. New initiatives included the Overseas Courses aimed at capacity-building in genomics in low- and middle-income countries, and specialist courses for healthcare professionals in genomics in the UK were initiated in 2005. In 2009 Advanced Courses joined with the Wellcome Trust Meetings Programme (established 1999) to form ACSC. New courses and conferences were born from synergies between the two programmes in topics such as viral genomics and single cell technologies.

The first course evolved into Functional Genomics and Systems Biology, and ran for 29 years until 2016, and our first conference – Genome Informatics – started in 2001 and is still very popular. But most early events have been superseded by the fast-paced changes in genomic methods and technology and the programme is constantly changing to ensure it remains at the cutting-edge.

Where are some of those first course participants now? Christine Van Broeckhoven is Professor of Molecular Genetics at the University of Antwerp, working on neurodegenerative brain disease, and Rajesh Thakker is the May Professor of Medicine at the University of Oxford researching the molecular basis of disorders of calcium

homeostasis. Professor Thakker recalls, "I remember the meeting very well as it was the first one and I learned a lot about pulsed field gel electrophoresis and jumping and linking libraries. Kay Davies and Anna-Maria Frischauf were fantastic tutors and it was great that Michael Morgan had the inspiration to initiate this type of summer school."

Professor Thakker notes that data produced on pulsed field gel electrophoresis was published in the Journal of Clinical Investigation (2005), and the linking libraries they made at the summer school were published in Human Genetics (1996). He still remembers the course as having "a major impact in my career". Since then we have held 374 courses and 259 conferences. Our events are intense and highly-productive, giving talented scientists the skills to accelerate their research, healthcare professionals tools to improve diagnosis of disease, as well as bringing together great minds to share knowledge and form important collaborations, creating the next generation of leaders in the field of genomics.

"I am very proud of the hard work my team has put into developing the programme over the past 30 years, and the impact the programme is having on research, diagnostics and developing scientific careers across the world."
– Rebecca Twells, Head, Advanced Courses and Scientific Conferences

Over the last 30 years, partnerships have been developed with international organisations and institutes, such as H3Africa and the Pan American Health Organisation, to address regional training needs. Some of our conferences are held with partners such as the European Molecular Biology Laboratory, Cold Spring Harbour Laboratories, and Nature Genetics, building on mutual scientific interests. We also work with local partners such as the University of Cambridge, EMBL-EBI, the Wellcome Sanger Institute, and Health Education England, to deliver training in genomic medicine to healthcare professionals within the NHS.

Currently we are expanding the programme even further and aim to reach another 20,000 scientists and healthcare professionals through our face-to-face events by 2021. A new online learning initiative for 2018 will continue to extend our international reach with a series of online courses in pathogen genomics, and one in genetic counselling. The first course – Bacterial Genomes: Disease Outbreaks and Antimicrobial Resistance – opened on FutureLearn this April.



First ever Advanced Course participants in 1988

Professor Thakker has helped us to identify Christine Van Broekhoven, Anna-Maria Frischauf, Kay Davies, Michael Morgan, Pelin Faik, David Bentley, and Kevin Gatter. If you spot yourself in this photo please let us know!



CHANGING TIMES, CHANGING CAMPUS, CHANGING CULTURE

The Wellcome Genome Campus brings together people from a diverse range of backgrounds to tackle some of the most challenging global issues involving human and animal health, biodiversity and big data.

And while science on the Campus is an exemplar for dynamic collaboration and multi-disciplinary working, we are determined that our public engagement with that science is equally bold and an embedded part of what we do. Engaging with schools and publics has been a part of Campus life for many years. However we're on a reinvigorated journey of change, with a mission to build a truly world-leading engaged research campus underpinned by the pioneering science we do and the relationships needed between us and external communities for our research to be of maximum benefit.

With this mission in mind, a key focus for our Public Engagement team is to enable and support a culture of engagement within and across the Wellcome Genome Campus. Importantly, our mission speaks to the whole of Campus – including the Wellcome Sanger Institute and European Bioinformatics Institute – and beyond. Given the nature of our busy and cosmopolitan environment, we're working alongside staff from all areas to understand motivational drivers, training needs and to reflect on audiences of interest. In doing this, we can better provide support and opportunities centred on empowering as many of our Campus community as possible to share ownership of our public engagement mission. Creating the conditions for staff to participate underpins our collective capacity to expand our engagement effort in ways which are relevant and meaningful to both our Campus and external audiences.

Our journey is fast-paced, same as the research and discovery happening across our Campus and, although our sights are set high and into the long term, we've already launched a number of initiatives to support culture change towards public engagement. We chose to spotlight these at the first ever Campus 'Engage Week' in November 2017. Among the initiatives highlighted were a comprehensive training programme, a new Enabling Fund, and the inaugural Connecting Science Prizes for Public Engagement.



A key focus for our Public Engagement team is to enable and support a culture of engagement within and across the Wellcome Genome Campus.

Providing support that reflects where staff are on their personal career and engagement journeys is very important to our mission. Our new suite of training and development modules provides multiple entry points and covers a wide range of skills: examples include introductions to public engagement, confidence building, performance skills, story-telling, and enhancing digital footprints. Some courses are more immersive, even incorporating a real public-facing event that inspires a wrap-around approach to reflective practice and evaluation.

"Attending the evening event directly after the training course was very good! It helped me feel very at ease and highlighted the relevance of the course material."
— Genomics in a Jiffy course attendee, during British Science Week, March 2018

The link between skills and practice pervades much of our training and support, and is exemplified by the STEM

Ambassador network across Campus which has grown from 2 to 72 in just six months through a series of inductions linked to follow-on schools and public activities.

"We're on an exciting journey to embed public engagement in the science and research across the Campus and it's vital we take our whole community with us. This means listening and responding to communities both on and off Campus while creating support mechanisms and through-roads that speak to all – from taking first steps to embedding engagement efforts within major research pursuits."

— Kenneth Skeldon, Head, Public Engagement

It has never been a more ambitious time for public engagement at the Wellcome Genome Campus. We are looking forward to pursuing our aspirations for the Campus and, together with our community and audiences, striving to reach exciting new heights over the coming years.



Wellcome Genome Campus Connecting Science's mission is to enable everyone to explore genomic science and its impact on research, health and society. We connect researchers, health professionals and the wider public, creating opportunities and spaces to explore genomic science and its impact on people. Connecting Science inspires new thinking, sparks conversation, supports learning and measures attitudes, drawing on the ground-breaking research taking place on the Wellcome Genome Campus.

Wellcome Genome Campus Advanced Courses and Scientific Conferences

fund, develop and deliver training and conferences that span basic research, cutting-edge biomedicine, and the application of genomics in healthcare.

Team led by Dr Rebecca Twells

Martin Aslett, Jemma Beard, Dr Pamela Black, Karon Chappell, Adam Crewdson, Dr Treasa Creavin, Lucy Criddle, Laura Hubbard, Dr Darren Hughes, Dr Alice Matimba, Sarah Offord, Julie Ormond, Dr Nicole Schatlowski, Nicola Stevens, Sue Taylor, Yvonne Thornton, Kate Waite, Zoey Willard

Wellcome Genome Campus Conference Centre

boasts world-class event and meeting spaces designed for knowledge sharing in the scientific research community.

Team led by Linda Prior

Kelly Butler, Tanya Hudgell, Rebecca Loffman, Kat Mace, Bart Siwek, John Suckling, Sophia Tirelli, Rebecca Webb, Nigel Whitham

Wellcome Genome Campus Public Engagement

supports sharing and discussion of the pioneering science that takes place on the Wellcome Genome Campus.

Team led by Dr Kenneth Skeldon

Mark Danson, Francesca Gale, Dr Steve Scott, Rebecca Gilmore, Dr Mike Norman, Laura Boldú Olivares, Emily Sullivan, Dr Louise Walker

Wellcome Genome Campus Society and Ethics Research

uses quantitative and qualitative research methods to investigate the psychological, social and ethical impact of genomics.

Team led by Dr Anna Middleton

Lauren Farley, Dr Kate Morley, Jonathan Roberts

Wellcome Genome Campus Connecting Science Director's Office

The Connecting Science Director's Office coordinates strategic projects, manages funding and governance, and provides marketing and communications support across the programme.

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African Society for Human Genetics

Association for Science Education

Association of Genetic Nurses and Counsellors

Association of Science and Discovery Centres

Babraham Institute

British Science Association

Café Scientifique

Cambridge Science Centre

Cambridge Science Festival

Cancer Research UK

China Research Institute for Science Popularisation

Cold Spring Harbor Laboratory, USA

College of Medicine, University of Malawi

Connect EB

FutureLearn

Genetic Counsellor Registration Board

Genomics England

Global Alliance for Genomics and Health

Global Genomic Nursing Alliance

H3Africa

H3ABioNet

Health Education England

Horizon 2020, European Commission

Human Cell Atlas

International Society for Neglected Tropical Diseases

Institute for Research in Schools

Institute of Hygiene and Tropical Medicine, Uruguay

International Congress of Human Genetics

Kenya Medical Research Institute, Nairobi, Kenya

King's College London

Royal College of Pathologists

Mahidol University, Bangkok, Thailand

Meet Cambridge

Meetings Industry Association

MRC Laboratory of Molecular Biology

MRC Unit The Gambia

Museums Association

National Coordinating Centre for Public Engagement

National STEM Learning Network

Nature Genetics

OCR

One Nucleus

Oxford University Clinical Research Unit, Vietnam

Pan American Health Organisation

Peterborough STEM Festival

Princes Teaching Institute

PulseNet América Latina y el Caribe

Royal College of Pathologists

Social Mobility Foundation

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Studio Wayne Macgregor

Transnational Alliance of Genetic Counsellors

UK Stem Cell Bank

University of Cambridge

University of Cape Town, South Africa

University of Costa Rica

University of Uppsala, Sweden

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