Beyond the genome
Showcasing Sanger Science

• Celebrating 20 years of Sanger Institute
• DNA sequencing technologies
• Sanger Institute research:
  – Tracking hospital outbreak of MRSA
  – Mapping drug-resistant malaria parasites
  – Cancer genome sequencing
  – Sequencing 1000s of genomes in UK10K
  – Identifying genetic causes of developmental disorders
• Exploring the ethical issues of DNA sequencing
Scientific stakeholders

- Julia Willingale-Theune – Public Engagement
- Steve Scott – Public Engagement
- Don Powell – Media and PR
- Cordelia Langford – DNA sequencing
- Julian Parkhill / Matt Holden – MRSA
- Julian Rayner – Malaria
- Serena Nik-Zainal – Cancer
- Dawn Muddyman – UK10K
- Anna Middleton – Ethics
Our stand

Designed by Nick Bell Design and Nick Coombe Architecture
Activities

Zoom into your genome
Activities

Zoom into your genome
Activities

Try your hand at sequencing
Activities

Try your hand at sequencing

Built by Machineshop
Activities

You vs. machine

Created by Nicholas Tieman (freelancer via elance.com)
Activities

You vs. machine

The Human Genome Project

In 1990, an international project was launched to sequence the first human genome. The Sanger Institute was one of 20 institutes from 6 countries that were involved. We contributed the largest amount of sequence data to the project.

The first complete human genome sequence was published in 2003, 50 years after the discovery of the structure of DNA by James Watson, Francis Crick, Maurice Wilkins and Rosalind Franklin. The Human Genome Project delivered 2 years ahead of schedule and cost £3 billion. This was under budget.

The first human genome provides scientists with a reference for the study of human genetics. Scientists are now on the quest to understand what all that information means, and what role it plays in human health and disease.
Activities

Build DNA

- Circular 200mm diameter x 15mm thick MDF cover panel, to conceal steel plate 10mm king at bottom.
- 76mm diameter wooden balls from Woodworks Craft Supplies (Tel: 01633-400847).
- Drilled and threaded through vertical tube between spacers. Balls need to be glued fixed, so that they do not rotate. 20mm balls each, to be painted red, yellow, blue and green (80mm total).
- Approximately 160mm balls in fixed through the vertical rod. Colour arrangement for the fixed balls on the vertical rod, to be agreed with the Sanger Institute.
- Vertical 20mm diameter thick-walled steel tube.
- Horizontal 10mm diameter stainless steel rod. All with rounded ends.
- Spacers. 10mm high spacers (PVC tubing sleeved over tubes and rods), glued in position to vertical tube, and to horizontal rods.
- Rubber sheet tubing used as facing on MDF 'shell' surface of the stand.
- Detail sectional elevation.
- Face of upstand below.
- Balls. 76mm diameter wooden balls. The loose balls are to be drilled 80% of the way through, to sleeve through 10mm diameter horizontal rods.

Floor level
Activities

Build DNA
Activities

Game Jam – Bug outbreak

Created by Opposable Games via Royal Society
Activities

Your views

Film created by Paul Fenn Films
http://www.youtube.com/watch?v=XetPyb0X9x0
Activities

Transatlantic ethics poll

Thank you for voting!

- Yes: 30.95%
- Not sure: 54.76%
- No: 14.29%

Total Votes: 42
Further reading


Genes influence a person's appearance, characteristics and their susceptibility to disease. They can even help archaeologists identify long lost kings. Rapid advances in DNA sequencing are providing scientists with the ability to explore the human genome, or genetic code, in more detail. This is leading to new discoveries about the genetic causes of human disease and new ways to improve our health.

How it works

This exhibit demonstrates how the combination of expertise from science, technology, engineering and maths, utilising powerful computing, can uncover the changes in DNA that lead to a variety of human diseases. For example, the Cancer Genome Project compares DNA from tumour cells and normal cells to identify the genetic changes that drive cancer growth.
Blogging

Would you have your genome sequenced?

Your genome can tell you about your past, present and future health. It can also reveal a lot about your fertility and ancestry. It is one of the biggest medical breakthroughs of the last decade.

Blogging

Beyond the Genome

Introducing the ‘father of genomics’: Fred Sanger

The Sanger Institute takes its name from the double Nobel Prize winner, Sir Fred Sanger. The techniques Fred and his team developed in the 1950s are still being used today in all areas of science. In 1953, Sanger’s team was the first to use the technique of DNA sequencing to break down the code for a protein. This technique paved the way for the exploration of whole genomes, both in research and in health care.

Blogging

Beyond the Genome - the week so far

We’ve been busy this week at the Sanger Institute, working on a number of projects, including the development of new sequencing technologies. We’ve also been working on a project to sequence the genomes of a large number of people, which will help us understand more about the genetic basis of disease.

We’ve also had some great news for those interested in the future of sequencing. The US government has committed $100 million to a new initiative to develop new sequencing technologies.

The Royal Society SUMMER SCIENCE EXHIBITION 2018

Insight
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<th></th>
<th>Morning</th>
<th>Afternoon</th>
<th>Evening</th>
<th>Overnight</th>
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<tbody>
<tr>
<td>Sunday</td>
<td></td>
<td></td>
<td></td>
<td>Group A</td>
</tr>
<tr>
<td>Monday</td>
<td>Group A (10:00-14:00)</td>
<td>Group B (14:00-18:00)</td>
<td>Group A (18:00-22:00)</td>
<td>Group B Group A</td>
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<tr>
<td>Tuesday</td>
<td>Group B (10:00-14:00)</td>
<td>Group C (14:00-17:30)</td>
<td>Group B (17:30-21:00)</td>
<td>Group C Group B</td>
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<td>Wednesday</td>
<td>Group C (10:00-13:30)</td>
<td>Group D (13:30-17:00)</td>
<td>Group C (19:00-22:00)</td>
<td>Group D Group C</td>
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<td>Thursday</td>
<td>Group D (10:00-13:30)</td>
<td>Group E (13:30-17:00)</td>
<td>Group D (19:00-22:00)</td>
<td>Group E Group D</td>
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<td>Friday</td>
<td>Group E (10:00-13:30)</td>
<td>Group F (13:30-17:30)</td>
<td>Group E (17:30-21:00)</td>
<td>Group F Group E</td>
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<td>Saturday</td>
<td>Group F (10:00-13:30)</td>
<td>Group G (13:30-17:30)</td>
<td>Group F (17:30-21:00)</td>
<td>Group G Group F</td>
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<tr>
<td>Sunday</td>
<td>Group G (10:00-12:30)</td>
<td>Group H (12:30-15:30)</td>
<td>Group G (15:30-1800)</td>
<td>Group H</td>
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78 staff expressed interest and 55 attended
## Budget

<table>
<thead>
<tr>
<th>Work Package</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Stand Design and Build</td>
<td>£55,780.34</td>
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<tr>
<td>AV hire</td>
<td>£2,231.76</td>
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<tr>
<td>Digital content</td>
<td>£2,842.94 (Game Jam = £2,000.00)</td>
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<tr>
<td>Accommodation for 55 explainers (Queen Mary, University of London)</td>
<td>£4,982.00</td>
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<tr>
<td>Travel for 55 explainers (Cambridge&gt;London &amp; around London)</td>
<td>£3,551.66</td>
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<tr>
<td>T-shirts (80) and wrist bands (2,500)</td>
<td>£2,215.20</td>
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Sponsors

Wellcome Trust
Sanger Institute

ESGI

Deciphering Developmental Disorders

UK 10K

RARE GENETIC VARIANTS IN HEALTH AND DISEASE

MRC Centre for Genomics and Global Health
Tips

- Plan with Royal Society early
- Plan stand build early
- Delegate responsibility
- Provide training for volunteers
- Be prepared to compromise
- Have lots of explainers
- Have giveaways with website on for more information
- Make it a memorable experience!
Legacy

- Physical exhibit on campus
- Reinvigorated staff
- Enthusiasm for public engagement
- New perspectives
- Community of researchers
- Increased interest in our research
Life after the RSSE
Life after the RSSE
Credits

- Exhibit designed by Nick Bell Design with Nick Coombe Architecture
- Built by Van Rooij & Griffiths
- Graphic production by Albermarle Graphics
- Films and falling letters by Paul Fenn Films
- AV equipment from Creative Staging
- Sequencing interactive by Machineshop
- You vs. machine app by Nicholas Tieman (freelancer via Elance.com)
- Bug outbreak by Opposable Games (via RS)