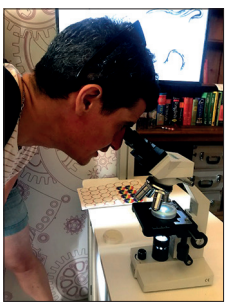
Exhibition

The science of today is all about tomorrow



Published **Online**
September 21, 2018
http://dx.doi.org/10.1016/S1474-4422(18)30358-2

The Royal Society Summer Science Exhibition
July 2–8, 2018
London, UK

For more on the **summer exhibition at the Royal Society** see https://royalsociety.org/science-events-and-lectures/2018/summer-science-exhibition/

For the **interactive online exhibition** see https://royalsociety.org/assets/sse-extra/index.html

Perhaps some remember science lessons at school as intimidating, or even boring, associated with something out of reach: esoteric or mysterious. Making science relevant, meaningful, or accessible to the non-scientist is important if you want to engage "the ordinary visitor", a term used by the previous director of what is now known as the Science Museum (London, UK), Colonel Sir Henry Lyons. So, in 1931, he opened a Children's Gallery to demonstrate scientific principles in a fun format, in today's parlance—hands-on and interactive. The aim then was much the same as it is today: to provide a space to observe, reflect, and represent the expediency of progress and innovation in science, technology, industry, and medicine.

The Royal Society, an independent scientific academy in the UK, hosts an annual Summer Exhibition in London showcasing cutting-edge scientific research that is shaping our future. Is it like going back to the classroom? Not when you understand that science is everywhere, and part of everything that we experience as 'ordinary visitors'. Will it reach new audiences? Hard to tell, but some real-life phenomena will interest one person, but not another, and with 22 exhibits a lot of ground is covered at the Royal Society's week-long event. From DNA sequencing to prosthetics, the ExoMars Trace Gas Orbiter mission to precision radiotherapy, stem cells to soil, bacteria to vaccines; answers to mind-boggling questions, global solutions to ecological problems, or even cures for diseases could all spring from current research being featured at the summer event.

The seven rooms housing the exhibits were busy, predominately with family groups, many with children, but there was ample opportunity to get up close to an exhibition stand of choice. Scientists involved in the various research were manning the stations, eager to explain the meaning of their work. Admittedly not all were scientists, some were communication specialists who had gained enough expertise to disseminate or demonstrate the concepts, and for a lay-person they were particularly helpful for grasping the complexities of the science, without the jargon.

So how engaging were the two exhibitions that featured the brain? *Race against the ageing clock* is led by Wolf Reik and his team from the Babraham Institute (Cambridge, UK), who are researching the ageing process, asking what causes it: is it "an accumulation of wear and tear, affecting each of our organs differently, or is there a single, underlying biological process?" The explanation lies in the genome, explains Reik, represented by the enthusiastic student who is eagerly waiting to talk all about the epigenetic clock, a computer model that can predict a mouse's biological age by studying DNA methylation changes that occur.

There were no mice models at the exhibition, but there were nematode worms (*C. elegans* species) in petri dishes that could be examined under a microscope to demonstrate how the influence of changes in lifestyle, such as a healthy diet, can slow down the ageing process. This was achieved by asking visitors what the worms were doing in their respective dishes (admittedly it was hard to understand the relevance or benefit of this exercise). However, digging deeper into what Reik and his team are studying is more interesting. If it is possible to reverse or reset the epigenetic clock, by making cells younger, and creating stem cells, Reik is hopeful that, " [I]n the future, a weak heart, damaged liver or cancerous lung could be replaced with a new younger version grown from the individual's own cells. This could revolutionise healthcare and allow older people to live healthier, less dependent lives."

The next stop was *Quantum sensing the brain*, a presentation by researchers from the Institute of Mental Health and the Sir Peter Mansfield Imaging Centre (University of Nottingham, Nottingham, UK) and University College London, who are collaborating in the fields of physics and advanced neuroscience to increase understanding of mental health with a new, prototype quantum brain scanner that can measure brain waves with unparalleled accuracy. This new helmet brain scanner is around four times more sensitive than conventional magnetoencephalography (MEG) and can be worn as different tasks are performed so that brain function can be studied under different conditions. The real helmet was not there but a 3-D printed MEG scanner cast with multi optically-pumped magnetometer devices producing multichannel MEG recordings did the trick, and it was well presented by the scientists involved in the project. In addition, there were interactive elements encouraging you to play, such as a virtual programme that showed you how you could make things happen by harnessing the power of your mind.

All in all, as a visitor, the take-home message is that scientific study is peeking into our incredible planet and beyond where many mysteries still await discovery. The scientists shared their passion with the visitors, and there was no sense of being hustled about. They were not trying to sell you anything, apart from perhaps the chance to either re-evaluate preconceptions, and the chance to get more involved in the future, whether in the laboratory, the hospital, or just by looking at the world with an inquisitive eye.

Jules Morgan