

Parliamentary and Scientific Committee

'Building a Thriving UK Neurotechnology Ecosystem'

A meeting held in partnership with Newcastle University and NHS National Centre for Neurotechnology and Neurorestoration, Newcastle upon Tyne Hospitals

Recent advances in neurotechnology, such as Brain-Computer Interfaces (BCIs) and Neurostimulators, are ushering in a new era of research in the human brain and transforming treatments, to support patients across the full spectrum of neurological conditions; the UK stands ready to be a world leader in the research, development, and healthcare delivery of such transformative neurotechnologies. The meeting informed us of the latest developments in brain-implants, enabled us to hear directly from those who have received these devices and outlined strategies for the UK to lead in this area.

Chair of the P&SC, Sam Carling MP, introduced our 3 speakers, beginning with Dr Luke Bashford, Newcastle University, and Scientific Director of the NHS National Centre for Neurotechnology and Neurorestoration. Neurological disorders are the leading cause of overall disease burden worldwide; his laboratory uses implanted Brain-Computer Interfaces (BCIs) to investigate the neural mechanisms underlying human sensorimotor and cognitive function for basic science and clinical translation. He described the UK's R&D strengths, with the NHS 'living laboratory', our diverse regional research institutes, and a highly engaged regulatory body making us ready to be a world leader. However, weaknesses exist in translating research and fostering commercialisation, with public funding for long-term research programmes and regulatory processes being more favourable in other regions.

Describing himself as both a scientist and a patient, Dr J Galen Buckwalter is a research psychologist and neurobehavioural scientist, working in academic neuroscience, applied psychometrics and emerging neurotechnologies. Following on from a spinal cord injury in his teens, he became a neuroscientist, explaining how spinal injuries cause 'systems level disruption' affecting every aspect of life; BCIs aim to deal with this. He received a unique implanted BCI 2 years ago; his implants have provided him with meaningful restoration showing BCIs can become one of the greatest advances for people with damaged nervous systems. No longer science fiction, serious consideration is still needed when deciding to have implants. At the present time he considers technical aspects are better dealt with than moral or psychological issues; he discussed ownership of neural data, and issues of consent and protection of this data from secondary exploitation, which will become increasingly important as more people participate in clinical trials.

Justine Knowlson, both parent to a child with complex epilepsy, and a qualified paediatric nurse with specialist neurology experience, explained how 2 years ago her child was the first child in the world to have the insertion of a Picostim neuromodulation device through the UK CADET clinical trial. She spoke movingly of life before the implant; with an average of 350 seizures a day he was virtually housebound, with poor quality of life. Since the implant he can go to school, participate in sports and excursions and has gained new skills. This has affected not only his life, but the life of the entire family.

Both speakers with lived experience are passionate advocates for increased access to this research in the UK, to help others in similar situations. Immediately this can be realised through additional clinical research studies, fostering the translation of devices to standard care.

An enthusiastic Q&A session followed; responding to Sam's question about desirable government research support, Luke felt we ought to ease UK medical device research pathways, making advances useful for as many people as possible. Users need long term support, maybe for life; much of the technology is still at research stage, but treatment should not be withdrawn after completed trials, long term financial support is needed to at least maintain patient outcomes.

Translation from research to commercial development of devices continues to be an issue, initial work is underway to make it more streamlined. International companies are interested in UK research and investment; the NHS structure provides tremendous opportunities, although these are currently not fully utilized.

Security, IP and future usage of personal neural data were revisited; this is a critical leadership area as neurotechnologies develop and use cases broaden. It was stressed that our education system must be suitable to produce a feedstock of new young people to take on neuroscience research.

Parliament needs to think about funding mechanisms – Sam pointed out that life sciences is a key area in new science strategy. The bottom line in supporting neurotechnologies should be value rather than costs.

Sue Wharton

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