Cambridge Brain Sciences (CBS) is the most advanced fully online cognitive assessment battery in the world. It shares much of its DNA with The Cambridge Neuropsychological Test Automated Battery (CANTAB), as both were developed on the back of similar classic human and experimental cognitive paradigms, yet while CANTAB is optimized for the supervised one-on-one testing, CBS was created specifically to enable large scale studies of the relationship between clinical, physiological and behavioural variables and cognition. I was one of the original developers of CANTAB, but by the mid 2000s realized that many lab-based studies of cognitive function were woefully under-powered. The science was literally being hampered by issues of costs, logistics and the need for dedicated equipment and trained personnel. Through grants from the MRC in the UK and a $10M Canada Excellence Chair (CERC) award in Canada, I spent 7 years developing and testing CBS to address these road blocks in the traditional road to cognitive assessment. Key features include:

1. Fully enabled remote testing of cognition (memory, attention, reasoning, decision-making, planning etc) on any platform (desktop, tablet etc), with an internet connection.

1. ii) Fully unsupervised assessment through the inclusion of training packages and comprehensive interactive online guides for users. Our comparisons between supervised data collected in the lab and unsupervised data collected ‘at home’ yields exceedingly high levels of correlation.
2. iii) A fully secure, web-based research portal and user-interface for data collection, storage and analysis (CBSTrials). Participants can be sent automated scheduled ‘reminders’ to test themselves at any interval, the system can track compliance and alert researchers to ‘missing sessions’ etc.
3. Infinite repeatability. Each test has built in proprietary algorithms that generate a unique set of problems for each assessment, facilitating longitudinal studies with minimal ‘practise effects’.
4. Access to a comprehensive set of data ‘norms’ for 75,000 individuals, with complete demographic details as well as CBS test scores, plus a larger population database of more than 8 million tests that have been taken over 7 years.
5. Full access to a technical support team at *Cambridge Brain Sciences Inc*, in Toronto, and scientific support from my large and active cognitive assessment lab at the University of Western Ontario, Canada.

The CBS battery has now been used for 300+ successful academic (e.g. MRC, Baycrest, Toronto, Cambridge) and industrial (e.g. Roche, Pfizer) trials, yielding numerous peer-reviewed academic publications (including Owen et al., *Nature* 2010, Hampshire et al., *Neuron* 2012). The sheer volume of data that can be collected efficiently and cost-effectively, without the need for supervised lab-visits, makes it the only choice for large scale, population based clinical and behavioural studies whether conducted over weeks, months or years. As a current example, my lab has recently completed a comprehensive study of the sleeping habits of 40,000 participants and their effects on cognitive function. All 40,000 participants were tested in the space of several weeks in the autumn of 2017 and four separate papers are now under review in *Science*, *The Lancet*, *Sleep* (now in press), and *PNAS*.