Statement on research values and practices

Promoting the right culture for ethical and high quality scientific research

High quality research [has been described](http://nuffieldbioethics.org/project/research-culture/the-findings) by UK researchers as *impactful*, *original/creative*, *rigorous, transparent/open, ethical* and *collaborative/multidisciplinary.* Here I identify example research practices that support these values and that I commit to implementing in my work and those of my team.

# Impact

# I've outlined the ways in which neuroscience can have a positive impact on people living with chronic pain. My research is focussed on developing practical and cost-effective clinical tools for the recognition of brain processes contributing to the persistence of chronic pain, which in the longer term will facilitate innovative treatment strategies to tackle the problem. We involve people living with chronic pain in our research by consulting with them on our aims and approach.

# Originality

As well as addressing areas of unmet need in society, scientific research needs to be driven by curiosity about the unknown in order to make new discoveries. On the one hand, clinical research requires a responsible approach that is rigorous and accurate when testing specific hypotheses (see below), relying on standardised and replicable research methods. On the other hand, research must also leave itself open to unexpected findings that can drive the field forward, often requiring an exploratory approach involving newer, more innovative methods which carrier a greater risk of failure. I therefore seek an appropriate balance of standardisation and innovation.

# Rigour

In practical terms, my approach to scientific rigour focusses on the two aspects of study design and statistical modelling. In both cases, a rigorous approach involves fully developing detailed plans, and obtaining feedback via peer review, prior to collecting data. Such plans include fully explicated hypotheses, thoroughly piloted experimental designs, sample size calculation based on a rough power analysis (to avoid conducting studies with low statistical power), *a priori* rules about the end of data collection, and consideration of time and cost implications. In the case of confirmatory (hypothesis-driven) research, these plans would be publicised, for example by pre-registration. However, when research is more exploratory, rigour can be maintained through a “replicate and extend” approach in which some aspects of the research design are replications of previous work – this provides confidence in novel findings from more exploratory aspects of the study. The reproducibility of research can also be enhanced by analysing data using standardised software where possible (to ease comparison between studies), or when new approaches are needed, analyses should be conducted (and figures generated) using computer code that other researchers can use to replicate the findings.

# Collaboration

Increasingly, innovation in science requires teamwork across individuals with a range of disparate expertise. It is important to recognise that not every scientist is good at everything, and so group work makes up for individual shortcomings to protect against possible project failures. In addition, we must recognise that over-competitive research environments carry the risk of reducing collaboration. With the right incentives in place, we can work towards fostering a greater sense of a research community with common goals, and in doing so achieve far more than we can individually.

# Transparency

Scientific rigour is promoted by transparent and open research practices. An example already given is that of publicising research plans (study design and analysis methods) before data is collected. Other aspects of transparency include the sharing of data and analysis materials (computer code) once it has been collected. Publicised materials should include all relevant methods, including documented explanations of the decision-making that went into the study design and any changes that occurred during the study, as these can feasibly impact on the nature or interpretation of the results. Such information must be sufficiently detailed for the findings to be reproduced. Likewise, publicised results should be comprehensive, including all relevant results, and not selectively publishing certain results that have higher “impact”. For example, results must be reported in cases where their implications are inconsistent with a favoured theory. Still, publications can be organised in such a way as to make them as accessible and understandable as possible, for example by highlighting the most impactful findings, while at the same time making less impactful findings accessible. Accessibility is also promoted by open and early access policies, e.g. publishing preprints via to publication in a journal. Ethical journals should be favoured who have open science policies.

# Ethical research practice

Science must be conducted for the public good. As scientists it is our responsibility to highlight and promote ethical research practice. This means conducting research in a way that is collegial and kind (e.g. to research participants) as well as adhering to the highest standards of confidentially and security in handling participant data. But ethical practice also means conducting research with rigour and transparency. It is important to recognise that some incentives in academia have the potential to promote unethical behaviour (for example, selective reporting of results to enable publication in more prestigious, high impact-factor journals, for purposes of career progression). I therefore advocate putting systems in place that reward ethical and rigorous research practices. I have signed the Declaration on Research Assessment (DORA), which proposes that the content and quality of research outputs are more important than the venue they are published in.

# Ethical research culture

Ethical collaboration (and ethical support of junior colleagues and students) means paying attention to the whole person rather than just attending to their role in the project. A healthy research culture means avoiding overloaded working schedules and the lack of sense of control that fosters. It means providing time and support to junior staff to allow them to reflect on their own priorities, direction and career development needs beyond the immediate project. Importantly, there must be attention to work-life balance and not allowing the sacrificing of mental and physical health of researchers for the “greater good” of the project; aside from being unethical, it is also unsustainable. Good health promotes good research practice. Facilitating this requires acknowledgement and reflection on the impact of power structures on individuals across different stages of their career. It is important to enable a safe environment for honest communication of the impact of unethical actions/practices of those in power on more junior staff/students.