

Research Integrity Annual Statement 1st January 2020 – 31st December 2020

1. Introduction

Research Integrity is a bedrock for trust in NPL, our impartiality, probity and the rigorous accuracy and reproducibility of our research. Everyone at NPL is required to act with integrity and comply with our code of conduct and our ethics policy. We are committed to the principles of the concordat to support research integrity:

1. upholding the highest standards of rigour and integrity in all aspects of research
2. ensuring that research is conducted according to appropriate ethical, legal and professional frameworks, obligations and standards
3. supporting a research environment that is underpinned by a culture of integrity and based on good governance, best practice, and support for the development of researchers
4. using transparent, timely, robust and fair processes to deal with allegations of research misconduct, should they arise
5. working together to strengthen the integrity of research and to review progress regularly and openly

As the UK's National Metrology Institute, NPL is keen to have a flagship role amongst Government laboratories and is applying to be a signatory to the concordat to support research integrity.

2. Key achievements supporting and strengthening research integrity

2.1 Policies, processes and systems

There have been significant efforts this year to ensure that our systems and processes meet the expectation of the concordat. We have established a new Knowledge Management System (KMS) for publications. For each manuscript being prepared a Responsible Author must be identified and that person has responsibility for the research integrity of that paper. This includes obtaining at least one independent technical review within NPL, ensuring that any potential IP is checked out, deciding on authorship (using our new guidelines) and ensuring that the listed authors are properly ordered to reflect the author contributions. We have also made author contribution statements mandatory. This data, along with other metadata, is recorded in the KMS. The system is automated to ensure that green copies of the manuscripts from publicly-funded research are freely available. We also encourage sharing of the data on domain relevant repositories or ensuring that they are archived openly.

We have updated NPL's code of practice to include research misconduct and have explicitly stated what constitutes research misconduct based on the definition from the concordat. NPL's Ethics policy was revised in 2019, combining two previous policies – one for broader ethical considerations (including "business ethics") and the other related solely to "science ethics". The policy specifically highlights NPL's commitment to adhere to the Universities UK Concordat to Support Research Integrity and references The Government Office for Science's Universal Ethical Code for Scientists. In 2019 NPL also formalised its Human Materials Policy which clearly specifies the limited conditions under which NPL will undertake work seeking to analyse human material that is considered "relevant material" under the Human Tissue Act 2004. In 2020 the ethics committee received and considered 2 "ethical issues" raised by staff in line with the ethics policy.

In the last year NPL has increased its emphasis on the quality of its output and on the internal quality infrastructure by appointing 'Quality Leads' for each scientific group. These quality leads are the source and first point of contact for quality control and scientific best practice locally. They are responsible for ensuring the integrity and completeness of data on NPL's new Compliance Management System and more generally in ensuring compliance with NPL's Quality Management System. The Quality Leads also drive local improvements in data assurance, quality control, new tools and processes. As a community the Quality Leads ensure sharing and dissemination of best practice and act as an internal auditor for other areas of NPL whilst also driving implementation of best practice across NPL.

2.2 Training and awareness

The chief executive of UKRIO gave a discussion seminar to Science Leaders on what ethics and integrity mean for our research. This highlighted the impact 'research culture' can have on the environment and ethos of research organisations and on the quality and ethical standards of research. Complex issues such as *"do incentives and competition improve the conduct of research or increase mistakes and other problems?"* were discussed.

We have raised awareness of topics relating to research integrity through our leadership blogs including quality systems and competencies. These drew attention to demonstrating competence through participation in interlaboratory comparisons and proficiency testing schemes and proving the replicability and reproducibility of our research. It was also highlighted that open self-assessment, comparison and systematic cross-checking is an essential quality of all researchers concerned with reproducibility. We also emphasised the importance of professional membership and chartership. Naturally, reproducibility is of constitutional importance to NPL and we discussed some of the reasons why research can fall short. A fundamental problem is that as humans we cannot help being more willing to accept data that supports our hypothesis rather than the data that rejects it. Bias is intrinsic to being human and it is important to recognise that everyone has it. We highlighted the perils of a "progression-seeking" culture, for example getting a paper published in 'such and such' journal or by a certain deadline and the virtues of a "truth-seeking" culture that follows the science. In everything we do, accredited services, measurement services, instrument development and our research, we must be "truth-seeking". Integrity is core to NPL.

All staff and students have conducted mandatory General Data Protection Regulation (GDPR) training.

2.3 External memberships

- NPL is a member of the UK Research Integrity Office (UKRIO)
- We actively participate in the UK reproducibility network

3. Research Misconduct

3.1 NPL provides assurance that the processes in place for dealing with allegations of misconduct are transparent, robust and fair and that they are appropriate to the needs of the organisation.

Research Misconduct is defined in our code of conduct. Allegations can be made to our science leadership team escalating from Science Area Leaders (33 groups), Department Heads of Science (9 departments) to the Office of the Chief Scientist or they can be made directly to the Office of the

Chief Scientist (see our Research Integrity webpages for contact details). NPL also has a whistle blowing policy. Investigations are conducted using our disciplinary procedure.

3.2 The NPL Statement on any formal investigations of research misconduct that have been undertaken.

In 2020, NPL has received one allegation of research misconduct. This case is an authorship dispute and does not involve UKRI funding. It was investigated using our disciplinary procedure and the allegation was not upheld. A summary is provided in Table 1 showing the number of formal investigations completed in this period and of those, the number which were upheld (either in whole or in part).

NPL confirms that we have fulfilled any requirements to make reports to external bodies, including regulatory and professional bodies, regarding the initiation or completion of a formal investigation.

Professor JT Janssen
Chief Scientist
National Physical Laboratory (NPL)

Table 1 Research Integrity Statement – January 1st 2020 to December 31st 2020

	Number of allegations for which an investigation has been undertaken	Number of allegations upheld (in whole or in part)
Fabrication	0	0
Falsification	0	0
Plagiarism	0	0
Misrepresentation	0	0
Breach of Ethics	0	0
Breach of Duty of Care	0	0
Authorship disputes	1	0
Other e.g. unprofessional behaviour relating to research misconduct	0	0