Royal Society – Written evidence (FRS0094)

Key points:

- Both the research community and the judiciary benefit from bridging the gap between them. A positive relationship is mutually beneficial, supporting the judiciary to apply scientific findings effectively within the judicial system, and helping the research community to identify and co-create research priorities.
- The Royal Society and the Royal Society of Edinburgh have undertaken a unique collaboration with members of the judiciary to produce judicial primers, designed to assist the judiciary when handling scientific evidence in the courtroom. These apply principles of evidence synthesis to present an easily understood and accurate position on the scientific topic in question, as well as considering the limitations of the science, challenges associated with its application and an explanation of how the scientific area is used within the judicial system. These have been very successful, clearly demonstrating the value of such a resource within the judiciary. Evaluation of this project might inform future approaches to better support the use of forensic science within the Criminal Justice System.
- The research and development ecosystem for science that supports the justice system is highly fragmented. The Science and Justice Forum – established by the Home Office – is investigating what research is currently being funded, where and how. This is chaired by the Royal Society’s Executive Director, Dr Julie Maxton CBE, in an independent capacity. Dr Maxton is separately submitting evidence to highlight early themes emerging from Forum discussions that are relevant to the Committee’s inquiry.

Introduction

1. The Royal Society welcomes the opportunity to submit evidence to the Committee’s inquiry into forensic science. The Society is the National Academy of Science for the UK and the Commonwealth. It is a self-governing Fellowship of many of the world’s most distinguished scientists working across a broad range of disciplines in academia and industry. The Society draws on the expertise of its Fellows and Foreign Members to provide independent and authoritative scientific advice to UK, European and international decision makers.

2. This submission draws on the Society’s work on Science and the Law, undertaken jointly with the Royal Society of Edinburgh, and our ongoing work to identify and build on best practice in evidence synthesis and the development of highly effective science advice and funding ecosystems.

Understanding and use of Forensic Science in the Criminal Justice System

3. Forensic science plays an important role in the Criminal Justice System. As a former Government Chief Scientific Adviser observed in his report of 2015

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while forensic science has a vital role to play in the courtroom, its role within the Criminal Justice System goes far beyond, and even before, the courts themselves.

4. Action is necessary to maintain public confidence in the provision of high quality forensic science and ensure that this is used effectively within the criminal justice system. Both research and the judiciary can benefit from bridging the gap between them.

5. For example, the Society’s work in the areas of forensic gait analysis - a relatively new form of evidence in the UK criminal courts - has highlighted that the scientific evidence supporting forensic gait analysis, as currently practised, is extremely limited. It also highlights that a wide range of professionals may present as a Gait Analyst, which is not a legally protected title, therefore the professional or academic background, qualifications or professional registration of an individual is unlikely to give unambiguous confirmation of their competence to act as an expert witness in relation to forensic gait analysis evidence. This demonstrates the importance of effective use and understanding of science as enablers for justice.

6. Once forensic science reaches the courts, comprising the plaintiffs, judges, lawyers and jurors, they must be able to understand the weight of the forensic evidence in the context of all the other evidence presented. The judiciary needs access to the best scientific evidence in the courtroom. As part of its work, the Society has undertaken a unique collaboration between the members of the judiciary, the Royal Society and the Royal Society of Edinburgh to produce judicial primers. There are designed to assist the judiciary when handling scientific evidence in the courtroom.

7. The primers have been written by leading scientists and members of the judiciary, peer reviewed by practitioners, and approved by the Councils of the Royal Society and the Royal Society of Edinburgh. Each primer presents an easily understood and accurate position on the scientific topic in question, as well as considering the limitations of the science, challenges associated with its application and an explanation of how the scientific area is used within the judicial system. The way scientific evidence is used can vary between jurisdictions, but the underpinning science and methodologies remain consistent. The first two primers on Forensic DNA analysis and Forensic gait analysis were launched on 22 November 2017. The primers are distributed to courts in conjunction with the Judicial College, the Judicial Institute and the Judicial Studies Board for Northern Ireland.

8. Channels of communication are also needed between scientists, lawyers and the judiciary, and resources to increase the understanding of forensic science with the criminal justice system. The Society has held a number of events, focused on bridging the gap between research and the judiciary. These include:

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2 Royal Society and Royal Society of Edinburgh (2017) Forensic gait analysis: A primer for courts
A series of science and the law seminars in partnership with the Judicial College on relevant scientific topics for senior judges. Each seminar is chaired by a Fellow of the Royal Society or Senior Judge and speakers are drawn from the judiciary and the science community to cover each side of the topic. Seminars are attended by up to 70 judges (mainly drawn from the Supreme Court, Court of Appeal and High Court), barristers and scientists. Topics have covered Memory in Testimony, Uncertainty and Probability, Mental Capacity, Pain, Machine Learning, Substance Addiction, Genome editing in humans, Causation, and Robotics.

In October 2017, the Society partnered with the Judicial College to run a pilot CPD seminar for over 160 Circuit Judges and Recorders as part of the Judicial College criminal training prospectus. Sir David Spiegelhalter OBE FRS led a seminar on Probability and the law. We are working with the College to develop a programme of CPD seminars, talks and regional lectures to be held as part of their professional development programme.

The Society has hosted and supported a series of regional lectures held in Manchester, London and Birmingham, for tribunal and circuit judges and legal professionals in partnership with the Judicial College as part of their professional development programme. The first lecture was delivered by Professor Ray Dolan FMedSci FRS FRS on ‘Fact and Fiction in Brain Imaging’ (October 2016); the second by Dr Steve Fleming on ‘What makes a decision autonomous’ (November 2016); and the third by Professor Gilean McVean FMedSci FRS on ‘Techniques of DNA analysis’ (February 2017).

Lord Neuberger PC FRS, former President of the UK Supreme Court, spoke at the Royal Society exploring ‘Science and Law: Contrast and Cooperation’ in November 2015. His lecture considered the similarities and differences in method between legal professionals and scientific researchers, as they strive to reach conclusions using data and evidence. The text of Lord Neuberger’s speech is available on the Supreme Court’s website.

**Digital forensics**

9. The fastest growing domain of criminality is cyberspace. However digital forensics is not currently well defined, lacking a common lexicon among the community of practitioners. As a result, this is a challenging area in which to provide an accurate position on the limitations of the science and challenges associated with its application.

10. As the Government Chief Scientific Adviser highlighted in 2015, there are several challenges for forensic computer science.

   "The first is a skills shortage. Rapidly enlarging markets for digital goods and service provision provide fertile territory for cybercrime, increasing the demand for computer forensic technologists. The second is the global nature of cybercrime, which demands global collaborations to enable the investigation and prosecution of..."

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3 [https://www.supremecourt.uk/docs/speech-151124.pdf](https://www.supremecourt.uk/docs/speech-151124.pdf)
perpetrators. The third is the sheer scale of digital forensic investigations, coupled with encryption of data and opportunities to erase or damage digital evidence. The fourth challenge is the interface between digital information and physical information, which may require collaboration between different types of experts. The fifth challenge is the challenge of communicating this highly technical information throughout the justice process.”

However it also presents opportunities such as digital ‘watermarking’. The Royal Society’s report on cybersecurity\(^5\) made recommendations to improve the resilience of the digital environment through effective research and translation.

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