

## **UCL Centre for the Forensic Sciences – Written evidence (NTL0010)**

### **Summary**

There is clear value in utilising technologies in forensic science to not only detect materials but also to understand how decisions are made to evaluate what forensic science materials mean in a particular case context. This is a growing area of research with exciting potential to bring new approaches and tools for crime reconstructions and to assist the courts. However, the use of technology to enhance forensic science tools and approaches and develop new capabilities is at risk. Forensic science is not currently within a specific remit of any of the UKRI research councils. As such forensic science research proposals tend to 'fall between the cracks' and there is a distinct lack of research that is needed to establish an evidence base for how technologies can be deployed effectively, ethically, reproducibly, and robustly in forensic science. The UK needs a thriving and sustainable research culture to ensure that new tools are developed with an appropriate evidence base for deployment within the justice system. If this is not addressed, it is likely that the value and capabilities that new and existing technologies can bring to crime reconstruction will, at best, not be fully realised.

### **Introduction**

The use technology in forensic science is well established, particularly with regard to the detection and classification of materials of interest. More recently we have witnessed the emergence of technologies from a range of other disciplines that offer opportunities for increasing the accuracy and reliability of the detection and classification of materials (physical traces, images, and electronic and digital data). An area that has often been overlooked to date is the value that new and emerging technologies can have in gaining greater insight and understanding of how experts interact with forensic science materials, how evaluative interpretations are made, and how conclusions are reached by scientists and experts working in a justice context.

### **UCL Centre for the Forensic Sciences research**

Our focus at the UCL Centre for the Forensic Sciences is to address this issue of how we interpret what forensic science evidence means. As such, we have two well established research themes (trace evidence dynamics and the interpretation of evidence). In the last five years we have been developing an additional area of research activity that addresses the use of technologies, and how we can harness the power of technologies to assist in enhancing the transparency, reproducibility and value of forensic science intelligence and evidence.

For example, we are developing capabilities to harness the power of eye tracking technology to understand how experts interact with crime scenes and with forensic materials such as skeletal remains. The work is looking to develop a baseline from which we will be able to identify key trends and patterns of gaze to further our understanding of how experts go about visual tasks when applying methods used in crime reconstructions. This approach is enabling us to measure the decision strategies used in complex tasks empirically, in addition to

generating large datasets of gaze patterns that will enable us to demonstrate more transparently how inferences have been reached and the basis for the conclusions made in forensic interpretations (Nakhaeizadeh et al. 2020).

Technological tools offer exciting opportunities to explore how this kind of information can be captured and stored so that it can be reassessed at a later date, thereby enhancing the transparency of the decision-making processes. There is also the potential for using these technologies to develop deep learning approaches that could pave the way for the creation of new methods and decision tools that could augment expert decision making and the communication of critical decisions at every stage of the forensic science process (from crime scene to court).

### **The need for an evidence base**

These developments, and others like it, are generating valuable insights and new opportunities. However, a key issue that remains concerns how we can ensure that we have a sufficient evidence base that lays a strong foundation for not only utilising technologies in a forensic science context, but also for developing new capabilities. Currently forensic science is not represented specifically within the remit of any UKRI research council (Morgan and Levin 2019). This is highly problematic for ensuring that foundational research is being carried out that will ensure that forensic science is able to harness the power and potential of new technologies now and in the future. Forensic science operates within a very specific context and it is generally not possible to translate findings generated in other disciplines directly into forensic science tools and approaches (Morgan 2019). As a result, there is arguably insufficient support for creating and developing the evidence base that is needed to underpin the use and development of technologies in crime reconstruction.

Forensic science has suffered from a scarcity of resources, particularly in the last 20 years. This is due, in part, to the disparate identity of forensic science to date, which has led to a discipline without a clearly articulated 'home', and a resultant lack of 'strategic oversight and accountability' (House of Lords Science and Technology Select Committee 2019) for the development and resourcing of the discipline. It is salient to note that when it comes to research to underpin forensic science tools and approaches, the amount of UKRI funding for specific and dedicated forensic science research 2009-2018 stood at £17.2m (less than 0.003% of the total stated UKRI budget over this time period of c. £6bn) (Morgan and Levin 2019). Over that time, the focus of funded research has predominantly been on the development of technological and analytical detection tools (£15m) with much less funding (£2.2m) being allocated to foundational research (such as getting answers to how and when a trace transfers, how evidence is evaluated, and how experts reach conclusions in a case context) which is critical to be able to assess not only what a material 'is' but also what it 'means'. Where there has been investment in research, the focus has increasingly been on cybercrime and digital evidence, while the role of technology to enhance the more traditional forms of evidence (such as fingerprints, DNA and other traces) and human decision making, has been neglected (Morgan and Levin 2019).

This is a cause for concern if we are to have state of the art, cutting edge tools and applications of technology to address the whole forensic science endeavour

in crime reconstruction. Dedicated funding for forensic science research is needed. That funding needs to address both the development of new tools and approaches (including issues of ethics), and also the foundational research that is needed to underpin the use and application of current and emerging technologies in forensic science.

## **Conclusion**

We believe that funding for research in this space is a foundational issue. The lack of a robust evidence base is a source of many of the challenges being encountered in the use of existing and new technologies in forensic science, and the utilisation of science in the justice system more broadly. Ensuring that the UK has a thriving and sustainable research culture is critical to ensuring technologies can be deployed in ways that assist justice and are fit for purpose. Such a research culture would re-position the UK as a pioneer in breaking new ground in the development of new technologies, in harnessing the potential of existing and emerging technologies, and critically doing so in ways that incorporate the needs of the justice system, science and society.

*1 September 2021*

## **References**

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## **The UCL Centre for the Forensic Sciences**

The UCL Centre for the Forensic Sciences (CFS) was founded in 2010 as a flagship interdisciplinary research centre. The CFS draws together the expertise across UCL and beyond in the sciences, social sciences, arts and humanities, to offer a unique, pioneering approach to forensic science. The CFS was seen as a timely and strategic unit given the National Academy of Sciences report on the validity of forensic science in 2009, the Law Commission report on admissibility of evidence in 2011, and the closure of the UK Forensic Science Service in 2012. The CFS is dedicated to engaging with the strategy that governs forensic science and establishing the validity of the science. Our vision is to undertake pioneering and innovative research that addresses the entire forensic science

process (crime scene, analysis, interpretation, and presentation to investigators and the courts) in a holistic manner that has impact in policy and in society. We have a particular focus on undertaking the research that will underpin reliable, transparent, reproducible interpretation of evidence and/or intelligence that can be implemented in forensic science practice to contribute to the detection of crime and crime reconstructions. We offer an MSc Crime and Forensic Science, and an interdisciplinary PhD programme.