Biometrics and Forensics Ethics Group

Annual Report
2019 – 2020

Contents

Chair's introduction

In September 2019 I had the immense pleasure of becoming the Chair of the Biometrics and Forensics Ethics Group (BFEG). I would like to express my gratitude to Christopher Hughes, OBE whose energy and enthusiasm helped to put ethics at the heart of policy making.

Also in September 2019, the BFEG was pleased to welcome four new members to support its work. I would like to express my deep gratitude to all our members for their valuable contributions, passion, and hard work over this year.

The BFEG continues to provide valued advice on Data Protection Impact Assessments (DPIAs) in support of the Home Office Biometrics (HOB) programme and has made recommendations for improvements to the Home Office DPIA template to record increased detail on the proposal and decision processes to allow a more effective ethical review. Having made the case for consideration of potential ethical issues in HOB projects prior to DPIA completion, the BFEG will provide advice on HOB projects earlier in their development going forwards. There is significant value in early engagement with ethical review so that solutions to user need can be robust and ethically sound, and alternatives can be considered at an effective stage. I hope this early engagement with the BFEG for the ethical review of proposals will be reflected across all areas of our work.

The use of Live Facial Recognition (LFR) continued to be an area of focus for the BFEG and the proportional use of the technology and the size and construction of watchlists should continue to be carefully and independently monitored. I look forward to the forthcoming publication of the BFEG's report on the collaborative use of LFR between public and private organisations in autumn 2020.

In 19/20 the BFEG established a new working group to provide advice to projects using data-driven technology and has been reviewing two cases for the Data Analytics Competency Centre. This review has again identified the value of early engagement with ethics bodies and reinforced the benefits of well-designed and well conducted DPIAs. The BFEG will share its findings with the project team later this year. I look forward to the group beginning work on ethical guidelines for data science practitioners. The Covid-19 pandemic has increased public interest in the ethical application of data-driven technologies, and this will be an exciting and important area of work for the BFEG over the next year.

The importance of considering the ethical impact of Home Office processes, particularly on people with protected characteristics, has been highlighted by the publication of the *Windrush Lessons Learned Review* and I look forward to supporting the BFEG's important work in 2020/21.

Professor Mark Watson-Gandy
Chair, Biometrics and Forensics Ethics Group

What we do

The Biometrics and Forensics Ethics Group (BFEG) is an advisory non-departmental public body sponsored by the Data and Identity Directorate of the Home Office. It provides independent ethical advice to Home Office Ministers on issues related to the collection, use, and retention of biometric and forensic material and on the use of large and complex datasets and projects using artificial intelligence.

> The BFEG is commissioned to consider the ethical impact on society, groups, and individuals from:
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> * the use of large datasets within the Home Office, including the implementation of systems using machine learning and artificial intelligence;
> * the collection, retention and use of human biometric identifiers, such as DNA, fingerprints, and facial recognition;
> * the retention and use of forensic data such as extracted digital forensic material;
> * policy and projects from the Forensic Information Databases Strategy Board; and
> * relevant projects from the Home Office Biometrics programme, including advice on Data Protection Impact Assessments.
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> The BFEG also considers:
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> * issues raised by key stakeholders such as the Forensic Information Databases Strategy Board, the Biometrics Commissioner, and the Forensic Science Regulator; and
> * issues raised by members of the BFEG as part of its self-commissioned work (roughly 30%).

2019/20 Commission

In April 2019 the Biometrics and Forensics Ethics Group (BFEG) was asked to organise working groups around the following themes.

Home Office Biometrics programme and governance review

The Home Office Biometrics (HOB) programme Ethics Working Group was asked to continue to advise on the HOB programme and its Data Protection Impact Assessments. In addition, the group was asked to provide advice on the Home Office biometrics governance review, paying special attention to data sharing and oversight arrangement.

Use of Live Facial Recognition

The Facial Recognition Working Group was asked to build on its work in its interim report on ethical issues arising from police use of live facial recognition (LFR) technology and provide advice on:
* specific projects considering the use of LFR;
* LFR collaborations between police forces and private entities; and
* use of publicly available images.

Use of large and complex datasets

The BFEG was asked to form a new working group to advise projects considering the adoption and/or use of artificial intelligence such as machine learning applications, and to review projects to ensure that stakeholders understand how and why decisions or conclusions were reached.

Development of the Home Office data ethics framework.

The BFEG was asked to establish a new working group to provide support to ethical consideration of the use of data throughout the development, consideration, and evaluation of new policy or projects. The group was commissioned to provide advice on:

- a Home Office data ethics framework with reference to the other working groups and to the BFEG ethics principles (April 2018);
- the principles that the BFEG developed to guide police trials of facial recognition (February 2019); and
- the Government Data Ethics Framework (June 2018).

Overview of activities

Appointment of new Chair

In September 2019 Christopher Hughes, OBE concluded his tenure with the Biometrics and Forensics Ethics Group (BFEG) after ten years. The Home Office Chief Scientific Officer, John Aston, and the Director of Data and Identity Policy, Christophe Prince, thanked Mr Hughes for his dedication and hard work, for promoting the work of the BFEG, and for his support of colleagues and the Department.

A recruitment campaign was undertaken for a new Chair and in September 2019, the BFEG was pleased to welcome Professor Mark Watson-Gandy as the new Chair of the BFEG.

Professor Mark Watson-Gandy is a practising barrister, author and company chairman. Mark is experienced in advising the Government, having been a former junior counsel to the Crown and has considerable experience of chairing committees. The author of several legal textbooks, Mark is also a special lecturer at Cass Business School, a visiting professor at the University of Westminster and a member of Court at the University of Essex.

Appointment of new members

In February 2019 the remit of the BFEG was expanded to include an independent review of the use of large datasets by the Data and Identity Directorate and other stakeholders within the Home Office.

In order to provide the range of expertise required to advise Ministers on the newly expanded remit a recruitment campaign was undertaken to appoint four new members.

In September 2019 the following members were welcomed to the BFEG:

- Dr Nóra Ni Loideain – Director of the Information Law and Policy Centre, Institute of Advanced Legal Studies, University of London;
- Professor Richard Guest – Professor of Biometric Systems Engineering and Head of the School of Engineering and Digital Arts, University of Kent;
- Professor Charles Raab – University of Edinburgh and Turing Fellow, Alan Turing Institute; and
- Dr Julian Huppert – Director and Fellow at the Intellectual Forum, Jesus College Cambridge.

Resignation of member

In January 2020 Professor Dame Sue Black stood down from the BFEG as a result of work commitments. Professor Dame Black had been a member of the BFEG since December 2017 and provided valuable input and commitment throughout. A recruitment campaign would be run in winter 2020/21.

Meetings

Full committee meetings
The BFEG held four full committee meetings in the period covered by this annual report. The minutes of these meetings are publicly available on the BFEG gov.uk website.

Speakers

The BFEG heard from several external speakers between April 2019 and April 2020 to maintain a broad and up-to-date understanding of the ethical issues in forensics, biometrics and the use of data-driven technologies. Details of the presentations can be found in the relevant minutes and a summary and link are provided here. Individuals or organisations with a relevant topic for discussion at a BFEG meeting would be welcome to contact the BFEG secretariat at: BFEG@homeoffice.gov.uk.

Ada Lovelace Institute and Royal Statistical Society (RSS)
At the September 2019 meeting the BFEG heard from a representative from the Ada Lovelace Institute and the RSS on the work of the Ada Lovelace Institute, and specifically the proposed Citizens' Biometric Council, that would bring together members of the public to deliberate on the use of facial recognition and other biometrics technologies, alongside an independent legal review of the governance of biometric data. The group also heard about the work of the RSS in developing statistical guides for advocates and evidence standards for forensic science.

The Alan Turing Institute
At the March 2019 meeting the BFEG heard from a member of the Alan Turing Institute's Data Ethics Group about their advisory report to West Midlands Police Analytics, co-authored with the Independent Digital Ethics Panel for Policing (IDEPP). The report discussed ethical implications of a proposed National Analytics Solution (NAS). The NAS involved the use of data sources and analytical techniques within a national law enforcement context to prevent harm, reduce criminality, and protect the vulnerable.

Forensic Capability Network (FCN)
At the March 2020 meeting the BFEG heard from a representative from the Forensic Capability Network (FCN), a new organisation providing coordination of police forensic services across England and Wales. The group was informed about the proposed FCN research and ethics framework for traditional and digital forensics.

Working group meetings

In 2019/20 the sub-groups of the BFEG also met regularly to progress their individual areas of work. The Home Office Biometrics Programme Working Group, the Facial Recognition Working Group, and the Complex Datasets Working Group each met on four occasions and the Data Ethics Framework Group met on one occasion. The activities of the working groups were reported to the BFEG at the quarterly meetings and reflected in the minutes of those meetings.

Ministerial meetings

The new Chair of BFEG met with Baroness Williams of Trafford, the lead Minister overseeing the work of the BFEG in January 2020. The meeting focused on:
- how the BFEG could best provide independent challenge and guidance regarding the ethical considerations for use of data in the Home Office; and
- mechanisms to increase awareness and utilisation of the group, both within the Home Office and by public sector partners, such as police forces.

Stakeholder engagements

The BFEG routinely provided advice and guidance to the Forensic Information Databases Strategy Board (FIND SB), and the Home Office Biometrics (HOB) programme. The BFEG also provided advice as required for other relevant departments in the Home Office.

Forensic Information Databases Strategy Board
The FIND SB provides governance and oversight over the operation of the National DNA Database (NDNAD) and the National Fingerprint Database. In the 2019/20 reporting period the BFEG was asked to advise on ethical issues arising in connection with the Forensic Information Database Service business on the following topics:

Identification of bodies following burial at sea
Since 2010 the police had been dealing with several unidentified bodies that had been washed ashore. As it was unknown whether the bodies were from individuals who had opted to be buried at sea, a full forensic post-mortem examination would be performed, and cases were treated as potential murder enquiries until proven otherwise. This was both costly and resource intensive. The BFEG was asked to consider a proposal to amend the existing licensing conditions to require a person requesting to be buried at sea to consent to a DNA sample being taken post-mortem. The resulting DNA profiles would be loaded on to the Missing Persons' DNA Database (MPDD) and could be compared to samples taken from bodies washed ashore.

The BFEG recommended that a leaflet be provided to individuals who wished to be buried at sea explaining the benefits of providing their DNA profile, such as saving police time and money and preventing inconvenience and distress.

The burials at sea project moved to the National Crime Agency Missing Persons' unit. The recommendation from the BFEG had been taken as an action that would be required before the project was launched.

Expanding the number of loci on the NDNAD
In 2020 the NDNAD held DNA profile information from up to 16 different areas of DNA (loci) allowing all of the information generated using the DNA-17 profiling chemistry to be stored on the NDNAD. Following the implementation by some forensic service providers (FSPs) of newer DNA profiling chemistries that looked at over 20 areas of DNA (20+ loci DNA profiling chemistries) the views of the BFEG were sought on a proposal to expand the number of DNA loci retained on the NDNAD. This would allow the additional profile information generated from 20+ loci profiling chemistries to be held on the NDNAD.

The BFEG agreed with the proposal as this could enhance the match process for both confirmation and elimination purposes.

Near match DNA report
In a criminal investigation a law enforcement authority may submit a DNA profile for comparison against the records held on the NDNAD. A full DNA match would result when the 16 pairs of numbers (and sex marker) representing an individual's DNA profile were an exact match against a sample on the database and the resulting match would be reported to the investigating authority.
The BFEG was asked to consider a proposal for near match results to be routinely reported. A trial of an operational service was proposed in which confirmed near match results would be reported to Law Enforcement Authorities (LEAs), with the support of Greater Manchester Police. This would allow for the investigation of near matches.

This proposal was at an early stage and the BFEG expected to be provided with additional criteria and process information in 2020/21 and would provide feedback on a detailed proposal before the trial would commence.

Genealogical databases for law enforcement
The BFEG was asked by FIND SB to consider whether the use of genealogical databases for law enforcement purposes would be possible or acceptable in the UK. A report was produced for the board by BFEG members, Denise Syndercombe Court and Mark Jobling. The report introduced genetic genealogy and explained how the technique had been used in the investigation of criminal cases in the USA. It also outlined the challenges to the use of genetic genealogy approaches and an assessment of the feasibility, and necessity, of using such methods in the UK. The report concluded that the UK DNA database, was very efficient and conventional methods with appropriately applied familial searches would identify the bulk of perpetrators. Following the provision of the report to the FIND SB an updated report was expected be published on the BFEG website later in 2020. The recommendations of this report are summarised in the recommendations table.

Collection of elimination samples at Sexual Assault Referral Centres (SARCs)
The BFEG was asked to consider a proposal to obtain DNA elimination samples for inclusion on the Contamination Elimination Database (CED) from practitioners, complainants, and other relevant individuals at SARCs. The aim of collecting elimination samples was to ensure that any DNA profiles generated during a sexual assault examination that were the result of a contamination event were not retained on the NDNAD. The BFEG was informed that around 1,000 DNA profiles had been removed from the NDNAD after they were identified as contamination profiles from police officers and staff.

The BFEG made the following recommendations in response to this proposal.
1. Elimination samples should be collected by a healthcare professional and not a police officer.
2. Information provided to patients and attendees being asked to provide their DNA samples for elimination purposes should be clear, informative and explain the benefits of providing the DNA samples.
3. Manufacturers of consumables for forensic DNA analysis should be encouraged to provide their employees' DNA samples to the Contamination Elimination Database (CED) to ensure that their profiles do not appear on the NDNAD.

Biometrics Commissioner

The Biometrics Commissioner highlighted to the BFEG the effect of the increased use of voluntary attendance (VA) by police resulting in a decrease in biometrics being taken. The Commissioner expected this to have an impact on opportunities for speculative database searching as a result of a reduction in the size of biometrics databases and this should be taken into account when considering biometrics policy.

The Biometrics Commissioner informed the BFEG that changes to police bail made by the Policing and Crime Act 2017 were causing problems for police forces. Following these changes large numbers of suspects were 'released under investigation' (RUI) rather than on bail. It was mentioned that not all police IT systems had been updated to reflect this method of release, which could result in the automatic triggers for biometric deletion not being activated. The BFEG was advised that some biometrics could be held for longer than was necessary and/or lawful. The Home Office was planning to undertake a review of the RUI system, and the BFEG's advice could be sought for this review.

Forensic Science Regulator
Massively Parallel Sequencing
The Forensic Science Regulator asked the BFEG to consider the ethical issues in the use of Massively Parallel Sequencing (MPS) for forensic casework. MPS allows the simultaneous analysis of hundreds of genetic markers and, together with providing information on the size of the markers, it can also determine the underlying DNA sequence. As a result, MPS offered a solution to interpreting mixtures and obtaining usable profiles from degraded DNA.

Other potential applications of MPS included using panels of multiple genetic markers for estimation of ancestry, phenotype, and age. A presentation on the potential forensic uses of MPS by representatives from Cellmark Forensic Services was heard at the March 2020 meeting. This presentation covered short tandem repeat (STR) analysis, and the potential use of genetic markers to predict phenotype and ancestral origin.

The BFEG identified a number of concerns regarding the prediction of phenotype and ancestry from forensic samples and recommended the following ethical considerations before implementing this technique:

- make clear how the data from phenotypic and ancestral markers were used to give predictions on phenotype and geographical area of origin;
- present ancestral and phenotypic data as probabilities to allow uncertainty to be evaluated;
- place an onus on the manufacturers of the phenotypic and ancestry DNA marker products to continue to improve the range of markers used; and
- make clear how judgements would be made about when to use MPS and who would make this decision.

Policy

In addition to the commissioned work the BFEG also provided advice to policy colleagues on an ad hoc basis.

Custody images leaflet

In response to the High Court ruling on the retention of images of individuals who had not been convicted (*R. M. C.* and *F. J.* v. *Commissioner of Police for the Metropolis and Secretary of State for the Home Department* [2012] EWHC 1681 [Admin]), the Government commissioned a review of the current framework for the acquisition, retention and deletion of custody images as well as their operational uses and governance arrangements (the Custody Image Review). The review was published in 2017 and the Home Office recommended to police chiefs that people not convicted of an offence should be given the right to request that their custody image be deleted from all police databases, with a general presumption that it must be removed.

The BFEG recommended that policy produce a leaflet for arrestees that explained the process of retaining custody images. A similar leaflet that the BFEG previously recommended to explain retention of DNA samples had already been produced and it was agreed that these should be kept as two separate leaflets. The BFEG would provide feedback on the draft of the custody images leaflet.

Other engagements

The Centre for Data Ethics and Innovation (CDEI)

At the December 2019 meeting the BFEG heard from representatives from the CDEI on their work in developing a draft framework for the ethical development of police data analytics tools. The members provided comment on the scope of the work and highlighted the need for ethical oversight, support, and resources for the effective use of data analytics tools by policing.

National Crime Agency

At the June 2019 meeting the BFEG heard from a representative from the National Crime Agency (NCA) on the early developments of voice analytics. The BFEG was asked to consider what effective oversight of voice analytics would be required to ensure any application would be ethical and acceptable. The BFEG recommended research pertaining to public opinion on voice capture be undertaken.

Home Office Police Digital Service

At the June 2019 meeting the BFEG heard from a representative from the Home Office Police Digital Service (PDS) on its retrospective facial recognition trial to assist in searching for missing people. The BFEG was informed that around 360 people went missing each day and this was a priority area of investigation for policing.

The PDS team had been focusing on scenarios where missing persons were searched for in video footage taken retrospectively from locations where a missing person was suspected to have visited. Video footage would be manually reviewed to locate the missing person. The PDS proposed using retrospective facial recognition technology to suggest matches for the person of interest in the footage. The matches would be reviewed by the investigating officer who would decide what course of action to take. By incorporating facial recognition technology in this process, it proposed that a review of the footage and identification of the missing person could be carried out more quickly. To test the process the PDS team was using video footage produced using actors to represent missing persons.

The BFEG was supportive of the trial. However, it recommended that this trial, and other similar trials, include more ethnic diversity of participants/actors to test the performance and accuracy of the technology on ethnic minority groups.

Identity security Policy

The BFEG's views were sought by the Identity Security Team within the Home Office to advise on a passport application that it had received. An application for a British passport had been rejected on the grounds that the DNA profile used as proof of paternity had not met policy requirements as it had been taken prenatally. The Identity Security Team asked the BFEG to consider if it was ethical to use DNA profiles from foetal DNA samples for nationality claims.

The BFEG recommended that prenatal tests should not be used for nationality claims, since there would always be the requirement to retest the child after birth to confirm that the child applying was the same as the foetus tested.

Budget and expenditure

The Biometrics and Forensics Ethics Group's (BFEG's) members are unremunerated for their work but received reasonable travel and overnight expenses. Other costs were accrued from the production of reports and hosting meetings. BFEG expenditure for April 2019 to April 2020 is shown in Table 1 below.

Expense	Cost
Recruitment	£ 222.40
Design of *2018/19 Annual Report*	£1,368.00
Members' expenses	£3,128.44
External venue hire	£ 271.92
Food	£ 537.80
Total	£5,528.56

Table 1: BFEG expenditure April 2019 to April 2020

Communications

Freedom of Information Act requests

The Biometrics and Forensics Ethics Group (BFEG) received 14 requests for information under the Freedom of Information Act.

Website activity

Details of the work of the BFEG can be found on its gov.uk website. This website was viewed 3,738 times (2,773 unique views) between March 2019 and April 2020.

Progress on commissioned work in 19/20

Home Office Biometrics programme and governance review

During 19/20 the group advised on a range of Data Protection Impact Assessments (DPIAs) for the Home Office Biometrics (HOB) programme and provided suggestions for improvements to the Home Office DPIA template.

As a continuation of this work the HOB forward plan referenced the Biometrics and Forensics Ethics Group's engagement in the review of HOB projects through to 2021, including consultation earlier in project lifecycles. In addition, the group would continue to advise on projects from Innovation, and from Open Space and may be asked to advise on projects from Borders, Immigration and Citizenship System (BICS) and the Law Enforcement Database Service (LEDS).

Use of Live Facial Recognition

In 2019/20 the Facial Recognition Working Group focused on gathering evidence on the ethical issues arising from the collaborative use of live facial recognition (LFR), where data or images were shared between public and private sectors.

In support of this work the group sought evidence from a range of sources. The evidence gathering day in December 2019 was informative, taking views from the Surveillance Camera and Biometrics Commissioners and a civil liberty organisation. Views from manufacturers and public and private sector users of LFR technology would be sought through a public call for evidence. A further evidence gathering event supporting the working group's research had been postponed from April until June as a result of the Covid-19 pandemic and would be reported in the next Annual Report.

Use of large and complex datasets

The Complex Datasets Working Group was established to consider ethical issues in the use of complex datasets by Home Office teams to implement systems using artificial intelligence or machine learning. The BFEG was asked to consider two use cases from Data Services and Analytics (DSA). These cases and their associated DPIAs were been reviewed and the group would draft a report for the DSA team highlighting areas for ethical consideration and the establishment of best practice.

Development of the Home Office data ethics framework

A working group was established to provide advice on the development of a Home Office data ethics framework. The BFEG sought to differentiate a Home Office framework from data ethics frameworks published by other groups by identifying the specific Home Office users and possible use cases. This was initially addressed through worked examples at the BFEG away day and more recently by the Complex Dataset Working Group. The view of the Data Ethics Working Group was that practical, user-specific guidance on data ethics would add more value than an overarching framework as other frameworks could be utilised by the Home Office for high-level guidance.

The Data Ethics Working Group was supportive of the draft data ethics process proposed for Digital, Data and Technology (DDaT) which would utilise the data ethics framework from the Department for Digital, Culture, Media and Sport (DCMS), if satisfactorily updated. In this model

the working group could function as an advisory group providing ethical guidance and support for projects where ethical queries were not resolved using the DCMS framework.

The BFEG was working with Home Office policy to develop a process to address specific data ethics queries. Where ethical queries were broad or related to legal or data protection issues, they would be triaged by a policy team and referred to the relevant data ethics frameworks, the Home Office legal advisors, or Data Protection Practitioners, where appropriate. Where cases required specific ethical advice, they would be referred to the BFEG secretariat for consideration of review by the BFEG.

Summary of advice and recommendations

No.	Proposal	Advice/Recommendation	Progress
1	**Burials at sea** Addition to existing licensing conditions to require consent to collect a post-mortem DNA sample from individuals who wished to be buried at sea.	A leaflet should be provided to individuals who wish to be buried at sea explaining the benefits of providing their DNA profile to allow identification of remains found washed ashore.	This project had moved to the National Crime Agency Missing Persons' Unit and the advice from the BFEG was taken as a required action. The project was on hold and expected to resume later in 2020/21 depending on resources.
2	**Expanding the number of loci on the National DNA Database (NDNAD)** The Biometrics and Forensics Ethic Group's views were sought on retention on the NDNAD of all the Short Tandem Repeat (STR) markers (loci) in a DNA profile generated from all 20+ loci DNA profiling chemistries.	The BFEG agreed with the proposal. The NDNAD should be extended to capture the additional STR markers that could enhance the match process for both confirmation and elimination purposes.	The extension would be part of the Home Office Biometrics programme roll out.
3	**Near match DNA report** Near match DNA results to be routinely reported to Law Enforcement Authorities (LEAs) for the investigation of near matches.	The BFEG requested additional criteria and process information before providing feedback on a trial of this approach.	FINDS would develop the proposal and process and provide an update to the BFEG in 2020/21.

No.	Proposal	Advice/Recommendation	Progress
4	**Genealogical databases for law enforcement** The BFEG was asked by the Forensic Information Databases Strategy Board (FIND SB) to consider whether the use of genealogical databases would be possible or acceptable in the UK.	The BFEG identified a number of ethical, legal and safeguarding considerations. • Genetic genealogy should only be used if it can be shown that the established methods were no longer adequate or effective. • Processes would be needed to maintain the security of data, including sensitive medical and personal data that may be misinterpreted if revealed. • Genealogists must have the necessary skills and knowledge, ideally with accreditation and affiliation to a professional body, to ensure quality, conduct, confidentiality and privacy. • The genetic analysis would need to be carried out in an accredited analytical environment that meets chain of custody, security, process and confidentiality requirements. • A legal framework that would permit the collection and use of genetic data accompanied by relevant legal safeguards would need to be established.	A report would be published in September 2020 on the BFEG website.
5	**Elimination DNA samples from Sexual Assault Referral Centres** Collection of elimination DNA samples from all attendees at a forensic medical examination for sexual assault, including the complainant and anyone coming into contact with the complainant.	1. Elimination samples should be collected by a healthcare professional and not a police officer. 2. Information provided to patients and attendees being asked to provide their DNA samples for elimination purposes should be clear, informative and explain the benefits of providing the DNA samples; 3. DNA consumables manufacturers should be encouraged to provide their employees' DNA samples to the Contamination Elimination Database (CED) to ensure their profiles did not appear on the NDNAD.	Samples from victims of crime were no longer permitted to be loaded to the CED. A separate exercise was undertaken to encourage employees of consumable manufacturers to provide samples for the CED, which had a limited uptake.

No.	Proposal	Advice/Recommendation	Progress
6	**Massively Parallel Sequencing (MPS)** The Forensic Science Regulator asked the BFEG to consider the ethical issues in the use of MPS for forensic casework.	The BFEG recommended the following ethical considerations before implementing this technique, 1. Make clear how the data from phenotypic and ancestral markers were used to give predictions on phenotype and biogeographical origin. 2. Present ancestral and phenotypic data as probabilities to allow uncertainty to be evaluated. 3. Place an onus on the manufacturers of the phenotypic and ancestral DNA marker products to continue to improve the range of markers used. 4. Make clear how judgements would be made about when to use MPS and who would make the decision.	
7	**Custody images** The Home Office was keen to ensure that people taken into custody were appropriately informed of their rights in relation to the retention and deletion of data, including images.	The BFEG recommended that policy produce a leaflet for arrestees that explained the process of retaining custody images.	The BFEG would provide feedback on the draft of the custody images leaflet once produced.
8	**New biometrics voice analytics** The BFEG was asked to consider what effective oversight of voice analytics was required to ensure that any application would be ethical and acceptable.	The BFEG recommended research pertaining to public opinion on voice capture be undertaken.	
9	**Retrospective facial recognition trials**	The BFEG recommended that trials of retrospective facial recognition technology incorporate ethnic minority participants, to test the performance and accuracy of the technology on ethnic minority groups.	
10	**Foetal DNA profile for nationality claims** The BFEG was asked to consider if it would be ethical to permit DNA profiles from samples taken prenatally to be used for nationality claims.	The BFEG recommended that prenatal tests should not be used for nationality claims, since there would always be the requirement to retest the child after birth to confirm that the child applying was the same as the foetus tested.	Policy unchanged as a result of advice provided.

Appendix 1: Update on 2018/19 recommendations

Recommendation	Progress made	2019/20 Update
Recommendation 1: That the Metropolitan Police Service (MPS) encourages a greater level of public scrutiny for its trial deployments of Live Facial Recognition (LFR).	There were no further trial deployments of LFR by the MPS.	The MPS had published information on its use of LFR on its force website and had deployed LFR operationally twice in February 2020.
Recommendation 2: Pending the development of a legislative framework, police trials of LFR should comply with the usual standards of experimental trials, including rigorous and ethical scientific design.		The use of LFR by the police had been tested in the courts in the case of *Bridges* v. *the Chief Constable of South Wales Police.*
Recommendation 3: The scope of Data Protection Impact Assessments (DPIAs) introduced alongside the General Data Protection Regulation (GDPR) should be sufficiently broad and should address human rights and the societal impact of Home Office actions, in addition to matters of data protection.	The Home Office Biometrics Ethics Working Group (HOB E WG) reviewed the Home Office DPIA template.	The HOB E WG provided feedback to the Home Office on improvements that should be made to the Home Office DPIA.
Recommendation 4: Data on the use and success of familial searching using the UK National DNA Database (NDNAD) system should be obtained and analysed prior to consideration of any alternative methods of identifying relatives in criminal forensic investigations, such as the use of genetic genealogy.	These data were obtained from the Forensic Information Databases Service.	The BFEG's report on the use of genetic genealogy techniques would be published on the BFEG website in September 2020.

Appendix 2: Glossary

Artificial intelligence (AI)	In computer science, the term artificial intelligence (AI) refers to any human-like intelligence exhibited by a computer, robot, or other machine. AI is the ability of a machine to perform a task usually done by humans such as recognising objects, understanding and responding to language, making decisions, and solving problems.
Biometrics Commissioner	The Biometrics Commissioner is independently appointed to provide oversight of the regime established by the Protection of Freedoms Act 2012 to govern the retention and use by the police in England and Wales of DNA samples, DNA profiles and fingerprints. The Biometrics Commissioner also has a UK-wide oversight function as regards their retention and use by the police on national security grounds.
Biometric identifiers	Information about an individual's physical characteristics such as fingerprints or eye colour, which are discriminating and measurable.
Biometric recognition	Biometric recognition is the automated recognition of individuals based on their biological and behavioural characteristics, for example, facial image, DNA, voice and gait.
Contamination Elimination DNA Database (CED)	The CED is a centrally held database of DNA profiles taken from individuals who have a role where there is a risk that they may inadvertently contaminate a DNA sample taken from a crime scene with their own DNA. This includes DNA consumable manufacturing staff, forensic laboratory staff, crime scene examiners and police officers.
Custody images review (CIR)	Review by the Home Office to consider proportionality of the use and retention of images on a national database.
Data Protection Impact Assessment (DPIA)	A tool to identify and minimise the data protection risks associated with a project.
Deoxyribonucleic acid (DNA)	The chemical in the cells of an organism that carries that organism's heritable material used in the development, functioning and reproduction of all known living organisms. DNA is a nucleic acid and consists of two strands coiled around each other to form a DNA double helix and packaged into chromosomes.
DNA-17	DNA-17 is a particular type of DNA profiling test that looks at 16 areas of an individual's DNA plus a sex marker [*see also STR DNA profile*]. There are multiple, specific profiling chemistries within DNA-17, which have differences in design that can result in slight differences in the resulting profiles. Other profiling chemistries exist that look at different numbers of areas of DNA and/or different areas, but only the information contained within the DNA-17 set are currently retained on the National DNA Database.
Elimination DNA sample	A DNA sample taken from an individual and used to create a DNA profile in order to identify possible DNA contamination. [*See also Contamination Elimination DNA Database*].

Facial recognition system	An application capable of identifying or verifying a person from a digital image or a live video source by comparing it to selected facial features from a known source image.
Familial searching	Involves searching a DNA profile from an unknown individual against the National DNA Database for profiles that may have come from a close relative. As half a person's DNA is inherited from the mother and half from the father, relatives such as parents, children, and siblings, will share a predictable amount of DNA.
Forensic Information Databases Service (FINDS)	The Home Office unit responsible for administering the National DNA Database, National Fingerprint Database and Footwear Database.
Forensic Information Databases Strategy Board (FIND SB)	The FIND SB provides governance and oversight over the National DNA Database and the National Fingerprint Database. It has a number of statutory functions including issuing guidance on the destruction of profile records and producing an annual report.
Forensic Science Regulator (FSR)	The FSR ensures that the provision of forensic services across the criminal justice system is subject to an appropriate regime of scientific quality standards. The FSR works with the Home Office.
Genetic genealogy	Genetic genealogy uses powerful DNA analysis, distinct from short tandem repeat (STR) DNA profiling, to identify individuals who may be related by searching the genetic genealogy database (GED) to find a match with other individuals who share common sections of DNA. The likely relationship between individuals is predicted from the amount of DNA in common. A short list of individuals with common DNA is then used by genetic genealogists to construct family trees and attempt to identify a common ancestor.
Home Office Biometrics Programme	The HOB (HOB) Programme has been running since 2014, delivering services supporting fingerprints, facial images and DNA (the main biometric modalities currently extensively used in the UK public sector), developing capabilities across the Home Office, law enforcement and, where appropriate, more widely across government.
Live facial recognition (LFR)	LFR is the automated one-to-many 'matching' of near real-time video images of individuals with a curated 'watchlist' of facial images.
Machine learning	Machine learning is a branch of artificial intelligence (AI) focused on building applications that learn from data. Machine learning algorithms improve their accuracy with experience without being explicitly programmed to do so.
Massively Parallel Sequencing (MPS)	MPS or Next Generation Sequencing is a fast way to analyse DNA that works by processing many sections of DNA at the same time. In forensic DNA analysis, MPS can differentiate between two DNA profiles that appear the same after STR analysis[*see STR DNA profile*] by looking for differences in the sequence of the bases (A,T,C,G). Other MPS applications include phenotyping [*see phenotype*], estimation of age, and prediction of ancestry.

Missing Persons' DNA Database (MPDD)	The MPDD is a database containing DNA profile records of missing persons, relatives of missing persons (where a reference DNA profile is not available for the missing person), unidentified bodies and some crime stain DNA profile records that may be linked to missing persons or unidentified bodies (for example, a no-body murder case).
National DNA Database (NDNAD)	Established in 1995, the NDNAD is an electronic, centralised database holding the short tandem repeat (STR) DNA profiles taken from both individuals and crime scenes. The database can be searched to provide the police with a match to an individual or a match linking an individual to a crime scene and *vice versa*.
Near match report	A near match report is created when two DNA profiles are identical except for a specific number of values. The NDNAD defines a near match as two DNA profiles where all alleles are identical except one. One source of this difference is where the profiles were generated using two different profiling chemistries [*see also DNA-17*].
Phenotype	Phenotype is a term used in genetics to describe observable, physical characteristics that are influenced by genes. For example, eye or hair colour.
Sexual Assault Referral Centre (SARC)	SARCs are specialist medical and forensic services for anyone who has been raped or sexually assaulted.
Short tandem repeat (STR)	DNA is composed of four types of bases known as A, T, C and G. STRs are short sections of DNA that contain repeating sequences of bases (such as AATGAATGAATG). The number of times the sequence of DNA is repeated (in this example three times) varies between individuals so it can be used to tell people apart. [*See also STR DNA profile*].
STR DNA profile	A DNA profile is created by counting the number times a section of DNA is repeated at specific areas in a persons' DNA [*see Short tandem repeat*]. Pairs of numbers will be generated as a person has two strands of DNA (if the number of repeats was five on both strands the profile would be 5,5, if it was five on one strand and six on the other it would be 5,6). The number of areas of DNA looked at depends on the profiling chemistry used [*see DNA-17*]. The presence of the sex chromosomes, X and Y is also tested for. The numerical representation allows DNA profiles to be uploaded to a database and compared with other DNA profiles. (For further information the Royal Society has published a primer on DNA analysis)

Surveillance Camera Commissioner	The role of the Surveillance Camera Commissioner is to encourage compliance with the surveillance camera code of practice. The office of the commissioner was created under the Protection of Freedoms Act 2012 to further regulate CCTV.
Voice analytics	Voice analytics software is used to analyse speech. It can be used to translate speech to text. It can also be used to look at certain features such as pitch, stress, tempo and rhythm to predict emotion. Speaker recognition software uses algorithms to verify and identify speakers from unique voice characteristics.
Voluntary attendance	Suspect interviews conducted at a police station, where the suspect is not under arrest. The interview is legally the same as one conducted with a suspect under arrest. The difference is that the suspect agrees to attend the police station to be interviewed.

Appendix 3: Chair and Member profiles

Chair

Christopher Hughes, OBE (Chair – September 2019)

Chris devotes his professional time to a range of part-time public and judicial appointments. In his judicial capacity he sits in the Health Education and Social Care Chamber dealing with the rights of individuals detained in psychiatric hospitals, and in the General Regulatory Chamber resolving disputes about access to information held by public bodies (Freedom of Information), environmental issues, as well as other cases.

Among his public appointments he has served as Chair of a statutory regulator and as Chair of a forum advising Ministers on chemical regulation. He serves on the Audit Committee of the Open University and is an alternate Chair of the Board of Appeal of the European Chemicals Agency. He has been a member of health and local authorities and served on a regulatory board of the Law Society. He was for many years the Chief Legal Adviser to the British Medical Association and prior to that a lawyer in local government service. He holds degrees from Cambridge, London and the Open University and is a chartered biologist.

Mark Watson-Gandy (Chair from September 2019)

Professor Mark Watson-Gandy is a practicing barrister at Three Stone Chambers and is a former Junior Counsel to the Crown. He is one of the Ministry of Justice pro bono "Legal Services Are Great" Champions who promote the UK's legal services offering overseas.

He is a Visiting Professor at the University of Westminster and at the Université de Lorraine in France and is a member of the Court of the University of Essex. He has written extensively on business law with his books including "Watson-Gandy on Accountants" "Corporate Insolvency Practice", "Personal Insolvency Practice" and most recently, "Simple Contract Law".

Mark is non-executive chair of a number of companies including Kids MBA (whose course, teaching core business skills to 12-15-year-old children, is presently provided, through its partnership with ABE UK, in 30 countries) and the Pure Cremation Group (from start up to largest national provider of direct cremation funerals). Until September 2020, he was chair of Mental Health First Aid England, a spin out from the Department of Health NIMHE charged with raising the nation's mental health literacy. As at today, 1 in 68 of this country's adult population has undertaken Mental Health First Aid training.

Members

Dr Adil Akram

Adil is a consultant psychiatrist, based mainly at South West London and St George's Mental Health NHS Trust from 2009 onwards. He is also an honorary senior lecturer at St George's, University of London. He has published on antipsychotics, perinatal psychiatry, parenting with mental illness and the social care needs of women with mental illness. He has qualifications in healthcare education and mental health research. He has a longstanding interest in genetics, medical ethics and medical law from his time studying medicine at King's College, University of Cambridge. He has significant experience of dealing with complex ethical dilemmas and risk assessments.

Adil also works for the Ministry of Justice as a judicial officer and medical member of the first-tier tribunal service, hearing detained patient appeals under the Mental Health Act. He has detailed knowledge and experience of legislation relevant to mental health. His other roles and contributions to public service have included working with the General Medical Council to help to write and develop tests of competency, being a governor of his local NHS Trust and volunteering as a psychiatrist at the London 2012 Olympic Games.

Professor Louise Amoore

Louise is a Professor of Human Geography at Durham University. Her research expertise is focused on the geographies of biometric and security technologies, with a particular interest in how contemporary forms of data, analytics and risk management are changing the techniques of biometric data collection and analysis. Louise is currently a Leverhulme Major Research Fellow investigating how the foundation of law, ethics and accountability is challenged by new methods of machine learning and automated recognition.

Professor Dame Sue Black (member – January 2020)

Sue is the Pro-Vice Chancellor for engagement at Lancaster University. She leads on developing the university's culture of engagement, working at local, regional, national and international levels to shape the university's engagement strategy. She was previously director of the Leverhulme Research Centre for Forensic Science, School of Science and Engineering, University of Dundee. She is a forensic anthropologist with research interests including the pattern of features on the back of the hand as a unique identifier, interpreting dismemberment, the prediction of body movements in water, and age estimation using medical imaging and gait analysis. Sue has previously provided advice to the UN, the House of Commons, and the Scottish Government.

Professor Liz Campbell

Liz is the inaugural Francine McNiff Chair in Criminal Jurisprudence at Monash Law, Australia, having previously been professor of criminal law at Durham University. She is also adjunct Professor at Queensland University of Technology School of Justice.

Liz is a global expert in corporate crime, organised crime, corruption, and biometric evidence. Her research is socio-legal in considering the law in context, and often involves a comparative dimension. Liz's research has a significant impact outside academia. Her research has been cited by the Irish Supreme Court and relied upon in arguments before the UK Supreme Court. Her work has also been cited in reports of law reform commissions.

Liz sits on a number of editorial boards and is a member of the UK's Arts and Humanities Research Council Peer Review College. Liz previously chaired Durham Constabulary's Ethics Committee and served on the NHS Research Ethics Committee (Scotland).

Professor Simon Caney

Simon is a Professor in Political Theory at the University of Warwick. He has worked on a wide range of topics including global poverty, equality, climate change, our obligations to future generations, the social discount rate, liberal neutrality, political perfectionism, multiculturalism, national self-determination, secession, sovereignty, human rights, resistance, humanitarian intervention, war, non-ideal political theory, realism in international relations, and democratic theory. He has engaged with policy makers at the World Bank, the Trades Union Congress, Oxfam America, and the UN, and is a member of the Nuffield Council for Bioethics.

Professor Richard Guest

Professor Richard Guest, Professor of Biometric Systems Engineering and Head of the School of Engineering and Digital Arts, University of Kent. His research work is in the area of biometric technologies, examining aspects of systems deployment and algorithm development, usability, standardisation, sample quality and conformance. His work has also examined the use of human identification/verification mechanisms within automated processes. He is also the Chair of the Training and Education Committee of the European Association of Biometrics (EAB) and a Fellow of the British Computer Society.

He has had significant involvement with biometrics standards development as UK Principal Expert to ISO/IEC JTC1 SC37. He is currently the Project Coordinator for the AMBER EU Marie Skłodowska-Curie ITN in Mobile Biometrics and is Kent PI on the EPSRC Hummingbird Project. He is also a member of the Kent academic team for the PriMa EU Marie Skłodowska-Curie ITN.

Professor Nina Hallowell

Nina is a Professor of Social and Ethical Aspects of Genomics at the Ethox Centre, Nuffield Department of Population Health, University of Oxford, where she is involved in a programme of research on ethical issues arising from the use of big data. She has over 20 years of experience of undertaking research on the social and ethical implications of the introduction of genetic and genomic technologies in medicine and has published widely in this field. She has qualifications in social sciences and medical law and ethics. She taught ethics at the University of Edinburgh and has been a member of a number of research ethics committees in Edinburgh, Cambridge and Newcastle.

Dr Julian Huppert

Dr Julian Huppert is an academic and politician. His research looked at the structure and function of DNA beyond the double helix, and he then served as Member of Parliament for Cambridge between 2010 and 2015. During this time, he served on the Home Affairs Select Committee for five years and was the ISPA Internet Hero of the Year 2013. He is now Director of the Intellectual Forum, a new interdisciplinary centre at Jesus College, Cambridge.

He is also a Director of the Joseph Rowntree Reform Trust Ltd, Deputy Chair of the NHS Cambridgeshire and Peterborough CCG, and a Visiting Professor at King's College, London. He was also the first Chair of the Independent Review Panel for DeepMind Health.

Professor Mark Jobling

Mark is a professor of genetics at the University of Leicester, specialising in human and medical genetics, human evolution, forensics, genetic genealogy, ancestry testing and genetics in historical studies. He is a senior editor of the *Annals of Human Genetics*, co-director of the Alec Jeffreys Forensic Genomics Unit and was the Research Excellence Framework academic lead for biological sciences in 2014.

Isabel Nisbet MPhil BPhil MA

Isabel is a member of the National Statistician's Data Ethics Group and of the Board of Qualifications Wales (the regulator of examinations and qualifications in Wales). She serves on the Board of Governors of two higher education institutions (the University of Hertfordshire and the University College of Osteopathy). She is also a member of the British and Irish Ombudsman Association and from 2004 to 2011 she was an independent member of the Council of St George's Medical School.

Isabel has previously held a variety of senior posts in the civil service, and then moved on to work in the regulation of medicine and education. She has held chief executive and director positions at several statutory regulatory bodies (including Ofqual [Office of Qualifications and Examinations Regulation] and the General Medical Council), giving her extensive experience of dealing with complex and sensitive human rights, fairness and public confidence issues.

Isabel is also an Affiliated Lecturer in the Faculty of Education at the University of Cambridge and is co-author of *Is Assessment Fair?* (SAGE publications).

Dr Nóra Ní Loideáin

Dr Ní Loideáin is Director and Lecturer in Law of the Information Law and Policy Centre at the Institute of Advanced Legal Studies, University of London. She is also a Visiting Lecturer in Law at King's College London, a Senior Research Fellow at the University of Johannesburg's Faculty of Humanities, and an Associate Fellow of the University of Cambridge Leverhulme Centre for the Future of Intelligence (LCFI).

Nóra's research interests focus on governance, human rights law, and technology and her forthcoming publications include her PhD from the University of Cambridge on state surveillance and European human rights law. This is the focus of her forthcoming monograph – *EU Data Privacy Law and Serious Crime* (Oxford University Press). She is also co-author of the

forthcoming textbook: Lynskey & Ní Loideáin, *Data Protection Law and Policy* (Oxford University Press).

Nóra is an editor of the leading peer-review journal *International Data Privacy Law* (Oxford University Press) and was appointed to the Board of Trustees of the British and Irish Legal Information Institute (BAILII) in 2018. Prior to her academic career, she was a Legal and Policy Officer for the Office of the Director of Public Prosecutions of Ireland and clerked for the Irish Supreme Court.

Professor Charles Raab

Charles Raab is Professorial Fellow of the University of Edinburgh, and formerly Professor of Government; Co-Director, Centre for Research into Information, Surveillance and Privacy (CRISP); Fellow of the Alan Turing Institute (ATI) and Co-Chair, ATI Data Ethics Group; member, Europol Data Protection Experts' Network. He has held visiting positions at institutions in the UK, Germany, the Netherlands, New Zealand and Canada. He has conducted research on privacy, data protection, surveillance, regulation, 'smart' environments, identification, security, democracy, identity, and data ethics. These include projects under the EU 6th, 7th, and Horizon 2020 Framework Programmes (PRIME, IRISS, SIAM, PRISMS, CANDID), the ESRC, and the National Science Foundation (USA).

In addition to publications including *The Governance of Privacy* (2003; 2006), *A Report on the Surveillance Society* (2006), and *Policing the European Union* (1995) as well as many journal articles and book chapters, Charles has written reports and provided advice to the European Commission, many UK and Scottish government departments (including, currently, the Scottish Government Digital Identity Scotland Programme and the Digital Directorate/National Digital Ethics Expert Group), Police Scotland, the New Zealand Law Commission, the EU Agency for Fundamental Rights (FRA), and research organisations in the UK and the Netherlands. He has provided evidence to UK parliamentary committees (for example, the Intelligence and Security Committee, 2014). Charles was specialist adviser, House of Lords (HL) Constitution Committee for inquiry, *Surveillance: Citizens and the State*, HL Paper 18, Session 2008–2009. He is a Fellow of the Academy of Social Sciences and a Fellow of the Royal Society of Arts.

Professor Tom Sorell

Tom Sorell is a Professor of Politics and Philosophy in PAIS and the Department of Philosophy, and head of the Interdisciplinary Ethics Research Group in PAIS. He was an RCUK Global Uncertainties Leadership Fellow (2013–2016), working on ethics in counter-terrorism and the fight against organised crime. Before that he led the Warwick work on SURVEILLE a counter-terrorism, human rights and surveillance project. He was (CO-l) of the (ESRC)-funded Assuming Online Identities project (2014–2017), and more recently of the EPSRC-funded DAPM project (on mass market fraud) and headed the Warwick contribution to the FP7 SIIP project on speech identification technology. He leads the Warwick work on PERICLES a Horizon 2020 project on anti-radicalisation and was CO-l on the H2020 Media4sec project on policing and social media. He is Vice-Chairman of the Home Office Biometrics and Forensics Ethics Group. A member of the Data Ethics Committee of the West Midlands Police Commissioner, he is also Chair of the General Ethics Committee of West Midlands Police.

He has published recent peer-reviewed articles on preparatory offences, problems in the conceptualisation of organised crime, digilantism, victimisation in romance scamming fraud, section 15 of the Sexual Offences Act (2003) definitions of serious crime, stalking as an extreme privacy violation, big data ethics and policing, and the use of electronic monitoring for offenders. He is co-editor (with John Guelke and Kat Hadjimatheou) of *Security Ethics* (Routledge, 2018).

Professor Denise Syndercombe Court

Denise is a professor of forensic science at King's College London. Her experience includes scientific research, forensic evidence examination and DNA interpretation, and the civil and criminal justice process, including court presentation as an expert witness. She is a specialist in

complex DNA profiling interpretation, forensic genetics and blood pattern analysis. Denise is the secretary-general of the British Academy of Forensic Sciences and has an active interest in promoting science to a wider audience via television, radio and external lectures.

Professor Jennifer Temkin, CBE

Jennifer is professor of law at City, University of London and emeritus professor of law at Sussex University. She is a Bencher of the Middle Temple and a Fellow of the Academy of Social Sciences. Her specialist area is criminal justice, particularly in relation to sexual offences. She has published widely in this field and her books include *Rape and the Legal Process* (2002) and *Sexual Assault and the Justice Gap* (2008) with Barbara Krahé. She has been a frequent contributor to discussion in the media. She has also engaged in training programmes for Crown prosecutors, judges, barristers and doctors. In connection with her work, she has served on the following committees:

- Old Bailey Scrutiny Committee on Draft Criminal Code, 1985–1986;
- Home Office Advisory Group on Video-Recorded Evidence in Criminal Trials (The Pigot Committee), 1988–1989;
- National Children's Home Committee of Enquiry into Children and Young People Who Abuse Other Children, 1990–1992;
- SCOSAC (Standing Committee on Sexually Abused Children), 1993–1996, Patron (with Dame Margaret Drabble);
- Justice Committee on Sexual Offences Law Reform, 1998;
- External Reference Group, Home Office Sex Offences Review, 1999–2000;
- Scientific Expert, Council of Europe's Committee of Experts on the Treatment of Sex Offenders, 2003–2005;
- Expert Group on Rape and Sexual Assault, Victims of Violence and Abuse Prevention Programme, Department of Health and National Institute for Mental Health in England, 2005–2007;
- Disability Forum, Disability Protection Project, Handicap International, 2010, Expert Advisor;
- Board of Diploma in the Forensic and Clinical Aspects of Sexual Assault (DFCASA), Society of Apothecaries of London, 2010–2012.

At City, she now teaches a course entitled 'Forensic Science and the Legal Process'. She chaired the BFEG's Working Group on Ethical Principles.

Dr Peter Waggett

Peter is the director of research at IBM, making him responsible for all aspects of research conducted in the UK, and represents the UK in IBM's wider research agenda. He holds multiple patents relating to biometrics and imaging systems and is editor of a number of biometric standards. Peter has a PhD in image processing and was the biometrics lead responsible for specifying, evaluating and testing the UK's visa waiver system.