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Article Title: 'Noble Cause Casuistry' in Forensic Genetics.

Article Category:

PERSPECTIVE

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Conflict of Interest

The authors declare no conflict of interest.

Abstract

In the forensic genetics community, too often one can find what we have called 'noble cause casuistry': scientists believing that, 'since we are catching criminals, any ethical shortfalls in our work are negated by good outcomes'. Such casuistry is also characterised by the extrapolation of 'success' in individual case work to assumptions of reliability and usefulness for all forensic genetic applications, in all

contexts. The increasing and deepening interaction of forensic (epi)genetics technologies with broader surveillance logics, is also rarely problematised within the community, with a notable reticence to address fundamental and complex questions about the role of forensic genetics in society. Furthermore, despite some initial progress, forensic genetics largely remains content to be guided by 'thin' empiricist ethics, foregrounding notions that 'maths does not lie,' with little acknowledgement of the serious limitations of this approach. Outside of laboratory settings, social and cultural effects of forensic genetics technology alter regardless of the 'maths'. As such, the field needs to adopt an ethos that centralises and deepens their ethical *bona fides*, approaching ethics as 'lived practice', with community accountability similar to other public-serving professions and disciplines. This could commence with a commitment to professionalism, with a robust ethos grounded in both integrity and social justice.

1. INTRODUCTION

1.1 Noble-Cause Casuistry

Forensic genetics has played a key role in advances in criminal detection and prosecution and victim identification, cementing a view of forensic genetics as a powerful 'force for good' in the public imagination. This has been mirrored by the perception among the forensic genetics community that they are contributing to a safer and more just society. This doctrine of beneficence has expedited the development of ever more informative and sensitive technologies. Yet interrogations of the ethics of these advances in forensic genetics have often taken a backseat, both in research and application. Too frequently we encounter instead two manifestations of casuistry: firstly, reasoning that because 'conventional' forensic DNA profiling has been endorsed as ethical via legislative measures, all forensic genetic research and techniques are equally ethical – because the aim remains the same: 'catching criminals'. The second is revealed when exceptional case work is used to make the argument for the acceptability (even necessity) of wider adoption – in the vein of: 'this technique, while ethically questionable, helped detect this criminal, ergo it should be used in other cases.' Echoes of the long recognised 'noble cause corruption' in policing (Caldero *et al.*, 2018) can be heard; forensic geneticists dismissing ethical concerns, even justifying questionable practice because, even if unethical, such techniques can secure good outcomes (convictions, identifications etc.).

1.2. Ethics in Forensic Genetics

The broad-ranging and inherently fraught ethical questions raised by using (epi)genetic data, mean that the forensic genetics community's mix of ethical protectionism (ethics is kept in-house and requires no external 'interference') and reductionism (certain issues fall beyond the boundaries of our concern) combine to form an empiricist ethics: as long as (laboratory-based) forensic genetics technologies have a (however experimental) scientific basis as well as the potential to contribute to investigations, we do not need to attend to wider assumptions about, and impacts of, their use 'in the wild'. When publications authored by the forensic genetics community engage with ethics and public perspectives, they are then often instrumental: ethical and public discourses are applied in service to the enabling of new and emerging technologies (see, e.g., D'Amato *et al*., 2023; Schneider *et al*., 2019; Teodorović *et al*., 2017; Zieger & Utz, 2015). And while three consecutive meetings of the key professional body of the community, the International Society for Forensic Genetics (ISFG), held between 2015 and 2019, featured very well attended ethics workshops, the 2022 iteration in Washington DC did not. The communicated rationale (in an email reply by the US-based organiser to one of the authors) was that because ethics have been incorporated into all aspects of forensic genetics, a dedicated workshop is no longer necessary. Despite this claim, recent high-profile, large-scale forensic genetics grant applications have shown a lack of engagement with both research ethics and wider understandings of the role of forensic science in technologies of social control. While efforts are made to address questions vis-a-vis the relationship of forensic science with policing and judiciary, including the seven principles of the Sydney Declaration (Roux *et al*., 2022) and various issue-focused guidance (D'Amato *et al*., 2020, 2023; Scudder *et al*., 2018), these are aimed primarily at strengthening the field against contestations in legal contexts. Noticeably, fundamental questions go unasked on, for example, the societal role of forensic genetics; the commercialisation of research and personal data as well as forensic service provision; and the close relationship of forensic science with the policing of crime, borders, and civil society more widely (e.g., surveillance).

The forensic genetics community tends then to adopt a 'thin' understanding of ethics: a focus on bureaucratic and legal rules; concern with data protection and confidentiality vis-a-vis materials and data; and technical approaches to bias and efficiency (see, e.g., the work of DNA-focused committees in ISFG and the European Network of Forensic Science Institutes, ENFSI) (Wienroth *et al*., 2021). This

thin ethical agency is passive and ignores justice, fairness, integrity, dignity, equity, equality, and diversity, as well as other ethical values that mark out pluralist-democratic societies. Thin ethics is not only insufficient, it also enables scientists to disengage from ethics, encouraging a perception of forensic genetics technologies and analyses as mere tool, process, method. However, technology is always social, cultural, moral, contextual (Timmermans & Berg, 2003; Toom *et al*., 2016). The key to the societal significance of forensic genetics is the interface of robust academic science and its impact on humans and communities via legal and disaster response systems: There must be a disciplinary commitment to an ethos that reaches beyond academic science and laboratories.

2. ONE STEP FORWARD, TWO STEPS BACK?

In a positive move, the forensic genetics community has lately taken steps towards greater ethical agency. For example, forensic genetics journals have instituted ethical guidelines on data collection and reporting (Carracedo *et al*., 2010; Parson & Roewer, 2010), with later additions (D'Amato *et al*., 2020; Gusmão *et al*., 2017). Arguably, this is accompanied by a rhetorical broadening away from a sole focus on ethics as "burdens" (Kayser, 2015, page 45) to some geneticists openly considering ethical aspects as inherent to their work (Samuel & Prainsack, 2019). And yet, ethical compliance reporting of forensic genetics research in journal publications remains stubbornly low (Bonsu *et al*., 2022), and despite a focus on the source of biomaterial and the consent of 'donors', debate around the use of samples from marginalised minority groups remains alive (see, e.g., the Uighur in China and the Roma in Europe: Forzano *et al*., 2021; Lipphardt *et al*., 2021; Moreau, 2019). Sourcing materials and data, and curating reference databases are a central matter of research ethics, which will remain contentious as long as the forensic genetics community remains equivocal about the protection of research participants, a concern already clearly voiced for forensic science:

> "Protecting human research participants is paramount in all scientific fields. In biomedical research, extensive policies and regulations protect the privacy of human subjects. Centralized protected databases exist for researchers to access anonymized data. These safeguards are not as extensive or regulated for academic research in the forensic sciences." (Allen *et al*., 2023: 1)

Previously, we have discussed the vital integration of wider societal self-awareness into research ethics in what we term 'ethics as lived practice' (Wienroth *et al.* 2021). Despite recognition that the ethical provenance and use of genetic material is crucial for the reliability and legitimacy of the resulting technologies and analyses, engagement with ethics in the forensic genetics community mostly reduces ethical agency to attempts to ensure informed consent and secure the approval of communities. Whether or not either is possible, the draft report by the ISFG's Forensic Databases Advisory Board (D'Amato *et al*., 2023), suggests it remains preferable to have more data, not less, because a (potential) increase in the effectiveness of reference data could help marginalised communities in the criminal justice system. Such a laissez-faire approach to (personal) data and population genetics contravenes research ethics, and again reveals noble-cause casuistry: justifying marginalising communities by divorcing lab-based research from applications 'in real life'.

This ISFG report also stands as another example of the prioritisation of 'effectiveness' over – or perhaps as the decisive issue in – the ethics of forensic genetics (McCartney & Amankwaa, 2022), again demonstrating indifference to the social and cultural nature of (forensic) science and policing. Had the authors noted widely discussed reports on institutional racism in policing even in democracies (e.g., Baroness Casey of Blackstock, 2023; GBD 2019 Police Violence US Subnational Collaborators, 2021) and widely published concerns about data collection methods, curation, and reporting in genetics (e.g., Bartram *et al*., 2021; Ossorio & Duster, 2005; Skinner, 2013), their report would have avoided intimations of casuistry and reached more informed and responsible recommendations.

3. ARGUING THE UNIVERSAL FROM THE EXCEPTIONAL?

New technologies in forensic (epi)genetics and genomics promise to offer *inter alia*,

- Information on appearance and on biogeographic ancestry, fuelling marginalisation of communities (as recently acknowledged by the Edmonton police force in Canada)[1];

[1] https://edmontonjournal.com/news/local-news/coffee-with-the-edmonton-police-chief

- Large-scale family trees whose use encourages deceptive tactics when collecting genetic samples from relatives, likely impacting on public confidence (see, e.g., the Holmes case)[2];
- Inferences of health and "lifestyle", the latter a term that may, scientifically alimented, facilitate assumptions and prejudices similar to contentious concepts such as "race".

Even foregoing discussion concerning the interaction of forensic (epi)genetics technologies with biometric surveillance, environmental DNA analysis, and cross-database referencing (McCartney *et al*., 2023), such 'advances' are rarely contemplated contextually or holistically. Here, too, we observe noble cause casuistry: the community refer to the utility of such techniques when used in individual case work, assuming, or at least inferring success in all similar cases, ignoring the fact that, one, data and information will be interpreted by non-scientists within institutions with their own cultures, biases, and logics, and two, the reliability and utility, even the legitimacy of specific forensic technologies are strictly context-bound (see also Wienroth 2020).

Calls for legislative and operational reforms to enable the use of such advanced techniques should always be accompanied by a strong evidence base for their reliability, but to be legitimate, also require justification for their necessity, proportionality, and proof that they are non-discriminatory. Instead, exceptional case work is employed to argue for more forensic firepower with few(er) legal and practical restrictions, justified often by reference to 'efficiency' or 'effectiveness,' and backed by assumed public demand. Here again we see 'thin' ethics and noble-cause casuistry at play: high-profile case work 'success' is coupled with reliability rates produced under laboratory conditions and sold to publics as potential game-changers in criminal detection. Realistic discussion of the limitations of technology and whether it might meaningfully contribute to policing is avoided (McCartney & Amankwaa 2022). Ethical considerations are portrayed as obstacles to progress, where progress is understood as maximising the utility of DNA processing and databases.

Law reform proposals almost universally aim at 'authorising' provisions: permitting new techniques and technologies rather than outlining the limits of their uses (New Zealand may be the exception that proves the rule), with broad and ambiguous powers enabled (observe legislation in, e.g., USA, UK, Switzerland,

[2] https://www.nbcnews.com/news/us-news/they-lied-us-mom-says-police-deceived-her-get-her-n1140696

Germany). A holistic, and realistic appraisal of forensic genetic analyses is rarely found in official documentation, with language that belies both a 'police/prosecution' bias and exaggerated expectations of what can be achieved. Benefits are weakly evidenced and, in most cases, do not withstand scrutiny (see, e.g. for DNA databases, McCartney and Amankwaa 2022). The scientific basis for proposals is often contentious, controversial, and largely unproven outside of laboratory, with significant ethical issues unexamined and unresolved. Advances are instead predicated on a mathematical model of probabilities and likelihoods, perhaps best interpreted as a form of automated ethics – ethics grounded in the notion that the 'maths does not lie,' with little acknowledgement of the fact that, outside a laboratory, social and cultural effects of technology alter 'success' regardless of the 'maths'. Adopting an ethos that centralises research ethics at the same time as adopting applied ethics as lived practice, with the community accountable like other public-facing professions and disciplines, would ensure the ethical advancement of forensic genetics. This can only commence with a definitive commitment to professionalism, including effective (responsible, responsive, and consistent) self-regulation, with comprehensive and multi-dimensional ethical guidance, standards, and oversight.

4. SELF-REGULATION, PROFESSIONALISM, AND ETHICS

Many professions have adopted Codes of Ethics because of their direct engagement with humans. In the UK this includes, e.g., nail technicians (e.g. Habia's Code of Practice for Nail Services 2007)[3], the army (e.g. Values and Standards 2008)[4], social workers (e.g. British Association of Social Workers Code of Ethics 2012)[5], and medical professionals (e.g. General Medical Council Good Medical Practice 2013)[6]. Recently, police forces globally have come under sustained scrutiny concerning their adherence (or lack thereof) to professional standards. The UK's College of Policing suggests that a Code of Ethics for policing should set out "exemplary standards of behaviour for everyone who works in policing … [operate as] everyday decision-making framework […] to encourage personal responsibility and the exercise of professional judgement …" However, "simply having a Code of Ethics is not enough to reduce unprofessional behaviour – it needs to be talked about … [help raise] self-awareness, ensuring

[3] https://www.ardsandnorthdown.gov.uk/images/assets/Code_of_Practice_for_Nail_Services.pdf
[4] https://www.army.mod.uk/who-we-are/our-people/a-soldiers-values-and-standards/
[5] https://www.basw.co.uk/resources/basw-code-ethics-social-work-0
[6] https://www.gmc-uk.org/ethical-guidance/ethical-guidance-for-doctors/good-medical-practice

that everyone in policing feels able to always do the right thing and is confident to challenge colleagues irrespective of their rank, role or position" (both quotations from the College of Policing).[7] There are plentiful examples of Codes of Ethics and guidance[8] on how they are best constructed and 'embedded' within a professional culture. Centrally, a code states the rights, duties, and responsibilities of the profession and the professional to each other and to society, and as such acts like the social contract between citizen and state: principles and rules of conduct guide practical and oversight decision-making, and frame interaction with others, including those outside the profession. Despite urgent ethical issues in forensic genetics, we have not seen an equivalent effort on behalf of the forensic genetics community to formulate a Code of Ethics.

4.1 Integrity as the key to ethical professionalism

In 2011, following the 20th Australian and New Zealand Forensic Science Society (ANZFSS) Symposium, James Robertson suggested that forensic science in Australia was not yet a profession. He linked his assessment to the lack of, among others, sufficiently developed self-governance mechanisms and a mandatory ethics code. While forensic science bodies elsewhere might be a bit further along towards professionalisation, such as in the United Kingdom (with reference to the Forensic Science Regulator), professionalisation might only be possible from an international level (Robertson, 2011). More recently, Sheila Willis in turn argues that effective and legitimate self-regulation for forensic science requires a shared sense of professionalism, with ethical agency at its heart (Willis, 2023). Both refer to a variety of stakeholders in forensic science as they see professionalisation as a means to ensure continuously and consistently good practice and good standing of all its members. Of course, forensic science is made up of a diversity of stakeholders, ranging from academic researchers and corporate developers, via laboratory technicians, private investigators (e.g., genetic genealogists, commercial consultants), and larger commercial service providers, to end users of forensic technologies and expertise (e.g., police, disaster management). Professionalisation here is linked to the development and deployment of scientific insights in and for society, as such it pertains to the diverse community's self-perception of science-based contributors to public goods.

[7] https://www.college.police.uk/ethics/code-of-ethics
[8] https://www.dcu.ie/ethics/code-ethics-design-implementation

Professionalism refers to the capacity to carry out a work role in accordance with commonly accepted general principles of the profession, e.g., as codified by regulatory and professional bodies. Professional integrity can be described as a process of continuous reflexive sense-making (Cox *et al*., 2003) and manifests in expressing and following a professionally shared position – as a community – rather than simply adjusting and conforming to external demands (Becker, 1998). Integrity incorporates a balance between institutional loyalty and moral autonomy, being associated with humility (Solomon, 1999, p.40). It involves a pervasive sense of social context and the courage to stand up for others as well as oneself (integrity is inextricably social) (Solomon, 1993, p.169, 174). What, then, can be said about the professionalism of the forensic genetics community: Is there shared professional integrity and does it embed the necessary plurality of (applied) ethical principles (see also, e.g., McCartney & Amankwaa, 2022; Roux *et al*., 2022; Wienroth *et al*., 2022; Willis, 2023)? Without a strong internalised ethical code, the community may too easily succumb to external demands without the courage or wherewithal to push back and resist when professional (including scientific) integrity is challenged by technological hubris and political short-sightedness.

Part of becoming a profession is the capacity for a shared understanding of the direction of travel, with an ethos that places the community's *raison d'etre* in a wider societal context. A clarity of vision and mission, accompanied by professional guidance, practices, and oversight, supports capacity-building towards, both, resisting political pressures (as seen in Victoria, Australia, and Switzerland) and accommodating increased external scrutiny (see, e.g., in Scotland, Canada, New Zealand [New Zealand Law Commission 2020]). It also enables anticipatory capacity, starting with a consciousness of wider operational and societal impacts of daily decisions in both research and in forensic casework.

4.2 Responsible research, innovation, and implementation

The precondition that all advances in forensic genetics are fortified by responsible, democratic research and innovation by an ethical, professional community of practice, is made imperative by the fact that ultimately, decision-making about how and when to use forensic technologies lies with policing, prosecutorial, and juridical authorities. Such authorities will defer to 'selected' individuals or groups from the wider scientific community, and publicly available documentation will rarely detail guiding policies nor how decisions were reached (indeed these are sometimes deliberately kept secret). Even in

countries with oversight and operational limitations, transparency and consultative decision-making remain rare. There is often little by way of regulatory infrastructure to ensure the ethical, legal, and socially compatible use of technologies, and even where there is oversight, it is not guaranteed to remain (e.g., in England & Wales, the recently combined office of the Biometrics and Surveillance Camera Commissioner lies deliberately vacant ahead of planned closure).

Responsible innovation must be democratic (Taebi *et al*., 2014), and include engagement with diverse publics, e.g., via citizen juries[9] and interpretive modes of reflection such as art science and science theatre; recognising the value of citizen science for forensics (Granja, 2023). Yet forensic genetics technologies are ordinarily developed without such engagement and scrutiny: see the example of Germany where debate on phenotyping and biogeographic ancestry testing centred upon two violent crimes rather than honest, holistic, and multi-perspectival engagement with the reliability, utility, and legitimacy of these technologies (Lipphardt 2018, Weitz & Buchanan 2017, Wienroth & Amelung *forthcoming*). In most countries it remains difficult to discover what forensic genetics technologies are in use, and while countries may have local motivations for changing their laws governing issues such as DNA seizure, processing, retention, and curation, these have global implications: e.g., German and Swiss documents setting out potential reforms made reference to UK and Dutch powers but omitted important caveats and limitations, with the Swiss ignoring that their proposals went significantly further than either the UK or Netherlands. Should other jurisdictions wish to adopt FDP, they can now point to the Swiss as an example of adoption with few safeguards and little oversight.

5. A FUTURE FOR FUTURE FORENSIC GENETICS?

Scholarship from the social sciences and humanities has levelled criticism at the increasing yet unreflected role of genetic analyses in forensic and surveillance contexts (Amelung, 2021; Bartram *et al*., 2021; Hopman & M'charek, 2020; Machado *et al*., 2020; M'charek, 2020). Such criticisms have been discredited or downplayed by the forensic community – countered with 'folk/faux' ethics and portrayed as emanating from 'essentialists' with 'grievances' – taking an adversarial approach to the study of social and ethical aspects of forensic genetics. Multi- and interdisciplinary scholarship on

[9] https://www.dundee.ac.uk/projects/citizens-jury

forensic genetics is either ignored or cast as in need of refuting. But such an adversarial stance merely fuels controversy and contestation. Accepting that critique is legitimate and constructive, even if provocative, could prompt the forensic genetics community to address both extant and future issues, rather than dismissing concerns and doubling down on overly promissory narratives. The community could, instead, affirm their ethical *bona fides* and commitment to professionalism and responsible research and innovation, undertaking research that directly engages with and answers socio-ethical challenges.[10] So in place of wagon forts, the community could build bridges (preferably capable of weathering storms) to other disciplines, working collaboratively to develop reliable, legitimate, and acceptable forensic applications utilising ethical data sets. This would not 'hamper', but facilitate progress. Movement in this direction is perceptible, but progressing at a glacial pace, and can be tempered, even counteracted, by the instrumentalisation of public engagement and the re-(mis-)direction of debate. Research funders increasingly expect projects that are interdisciplinary, so a forensic genetics project without socio-legal and ethical expertise on a team, or at least in a full advisory capacity, is not only shirking its ethical and societal democratic responsibilities, but potentially also depressing success rates for forensic funding.[11]

Visible, articulate(d) ethical deliberation and decision-making that extend throughout the life cycle of the conduct of science is not navel gazing, but impactful in both practical and professional terms. Current legal and regulatory requirements are insufficient to ensure high ethical standards, as is the adoption of the ethics of biomedicine which are too easily equated with a narrow understanding of privacy (data protection) and autonomy (consent), and overridden with reference to the beneficence of forensic work, noble cause casuistry at work again. It is vital that an interdisciplinary ethical foundation is laid for a community that is itself inherently multidisciplinary (drawing from, e.g., population and medical genetics, too) and that has to manage competing commitments, obligations, and priorities.

Conclusion

[10] Notably, the UK forensic genetics community has been considerably more open to ethical debate than others, perhaps partially explained by experience with handling prior public debates, and local research culture.

[11] There has been some effort to address socio-ethical aspects in the design and conduct of forensic genetics research - including via a recent UK Research & Innovation Forensic Science Sandpit led by the Economic and Social Research Council in June/July 2023.

In this perspective, we identify the thin ethics of forensic genetics, buttressed by a noble cause casuistry. Efforts from within the forensic genetics community demonstrate that the field is mature enough to aim for a professional and coherent understanding of itself. It should now articulate a bespoke strong ethos: a shared spirit drawing on habits, values, norms, and relationships that inform practice, based upon integrity, trustworthiness, and effectiveness (Wienroth *et al.*, 2022). A strong ethos will support the development of and adherence to professional ethics in both research and application, cementing the building of a trust*worthy* community and epistemic culture spanning a web of local, regional, and international organisations in more complex and contentious domains.

Arguably, the advancement of forensic genetics requires the maturation of an overarching sense of purpose and societal standing, augmenting efforts to guarantee ethical practice and scientific rigour, built on a synergy of scientific and social justice commitments. Thus, forensic genetics must take seriously the application of ethical principles. 'Ethics' cannot be 'completed', neither in self-reflection, grant applications, research, or case work. It must be inherent to decision-making and practices throughout the life cycle of forensic genetics technologies and data. The future of the community requires ethics as intrinsic and visible, as 'lived practice' of empowered scientists, thus helping community members build anticipatory capacity. Forensic genetics is highly valuable and valued but comes with enormous responsibility. If the forensic genetics community is truly to contribute to security and justice, it should be yet more ambitious and make good on the rich promise of helping to shape society.

Funding Information

No funding to declare.

Acknowledgments

We are grateful for many conversations with colleagues in the forensic genetics community, the forensic science community more widely, and in the field of Social Studies of Forensic Science. These conversations have inspired us to write this Perspective.

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