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LEGAL CLASHES AND UNCERTAINTIES IN THE
DIGITAL AGE, WITH A PARTICULAR FOCUS ON THE
PUBLIC SECTOR – RESEARCHING ACROSS
BOUNDARIES

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A written commentary submitted in partial fulfilment of the
requirements of the University of Northumbria at
Newcastle for the degree of Doctor of Philosophy by
Published Work

27 October 2020

Declaration

I declare that no outputs submitted for this degree have been submitted for a research degree of any other institution. I also confirm that this work fully acknowledges opinions, ideas and contributions from the work of others.

I declare that the Word Count of this Commentary is 12,267 words (excluding title page, contents pages, acknowledgements, list of publications, bibliography and referencing)

Name: Marion Oswald

Date: 27 October 2020

Signed:

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Acknowledgements

I would like to express my considerable thanks to my supervision team, Professor Chris Newman and Professor Carole McCartney for their advice and encouragement, and to Professor Chris Ashford for his ongoing support. I owe a considerable debt to all the academics and authors cited within the Work for helping me to develop as a researcher, and in particular to my joint authors for their knowledge, enthusiasm and team-work. Finally, I am grateful to my husband David for being such a patient and wise sounding board for many years.

List of Publications (the Work)

1	Peer-reviewed Chapter	Marion Oswald, 'Seek and ye shall not necessarily find' in Kieron O'Hara, M-H. Carolyn Nguyen and Peter Haynes (eds), <i>Digital Enlightenment Yearbook 2014</i> (IOS Press 2014) 99-115.
2	Peer-reviewed Report	Alexander Babuta and Marion Oswald, 'Data Analytics and Algorithmic Bias in Policing' (2019) <i>RUSI Briefing Paper</i> .
3		Alexander Babuta, Marion Oswald and Christine Rinik, 'Algorithms, Predictive Policing and Criminal Justice Decision-Making' (2018) <i>RUSI Whitehall Report</i> .
4	Peer-reviewed Article	Marion Oswald, 'Technologies in the twilight zone: early lie detectors, machine learning and reformist legal realism' (2020) <i>International Review of Law, Computers & Technology</i> , 34:2, 214-231.
5		Marion Oswald, 'Algorithmic-assisted decision-making in the public sector: framing the issues using administrative law rules governing discretionary power' (2018) <i>Phil. Trans. R. Soc. A</i> , 376:2128.
6		Marion Oswald, Jamie Grace, Sheena Urwin & Geoffrey C. Barnes, 'Algorithmic risk assessment policing models: lessons from the Durham HART model and 'Experimental' proportionality' (2018) <i>Information & Communications Technology Law</i> , 27:2, 223-250.
7		Marion Oswald, 'Jordan's dilemma: Can large parties still be intimate? Redefining public, private and the misuse of the digital person' (2017) <i>Information & Communications Technology Law</i> , 26:1, 6-31.
8		Marion Oswald, Jamie Grace, 'Intelligence, policing and the use of algorithmic analysis: a freedom of information-based study' (2016) <i>Journal of Information Rights, Policy & Practice</i> , 1:1.
9		Marion Oswald, Helen James and Emma Nottingham, 'The not-so-secret life of five year olds: legal and ethical issues relating to disclosure of information and the depiction of children on broadcast and social media' (2016) <i>Journal of Media Law</i> , 8:2, 198-228.
10		Jamie Grace and Marion Oswald, "Being on our radar does not necessarily mean being under our microscope' The Regulation and Retention of Police Intelligence' (2016) <i>European Journal of Current Legal Issues</i> , 22:1.
11		Marion Oswald, 'Share and share alike? An examination of trust, anonymisation and data sharing with particular reference to an exploratory research project investigating attitudes to sharing personal data with the public sector' (2014) <i>Script-ed</i> , 11:3.
12		Marion Oswald, 'Mandatory reporting of child abuse - necessary medicine for 'nervous Nellies' or a remedy too far?' (2013) <i>International Data Privacy Law</i> , 3:4, 269-277.
13		Marion Oswald, 'Freedom of information in cyberspace: What now for copyright?' (2012) <i>International Review of Law, Computers & Technology</i> , 26:2-3, 245-255.
14		Marion Oswald, 'Facebook group implies consent to disclosure' (2012) <i>International Data Privacy Law</i> , 3:1, 51-60.

Abstract

The last decade has seen digital technologies become ubiquitous and integrated into everyday life. The Work spans eight years of this period and addresses several legal challenges, clashes and uncertainties that have arisen as a result, particularly in respect of the use of digital technologies by public sector bodies. In this thesis commentary, the Work is categorised by reference to three sub-themes: i) digital processing of information, legal conflicts and harms; ii) questions around data sharing and trust; iii) AI and algorithmic analysis in policing and the legal and policy framework. The commentary discusses how the Work, as an integrated whole, represents an independent and original contribution to Cyberlaw and has championed and proven the value of an approach that is 'interdisciplinary' both within the legal field and outside of it. Digital technologies do not exist in a vacuum. Research across legal and other boundaries, as demonstrated by the Work, is necessary to address the impact on interlocking legal, operational and policy systems, and therefore to support convincing recommendations for change. Mixed-methodologies underpin the Work, combining doctrinal and law-in-context/law-in-action approaches with empirical research, historical and comparative methods, freedom of information request methods and/or participatory research, in order to deepen understanding of the issues identified and explored from different perspectives. These methodologies, combined with interdisciplinary working, could be described as an 'in-house' approach to legal research, defined by practical knowledge and understanding of an operational context, awareness of relevant legal frameworks, translation of theoretical concepts, and the independence of thought necessary for pragmatic conclusions and recommendations. The Work has informed further academic investigation, both by the author and others, and led to policy and operational developments. Various new avenues of research are suggested by Work as we continue to see misuses of the digital person, the siloing of knowledge by commercial bodies and the side-lining of the law in favour of *en vogue* self-regulatory and 'ethical' approaches for the oversight of algorithm-assisted public sector decision-making.

1. Introduction

Technological change has been the dominant underlying influence throughout my working life, an influence that is reflected in the publications (the Work) discussed in this Commentary. In 1992, when I began my legal career as an Articled Clerk (the old name for a trainee solicitor), we were still living in an age of physical information. I had no computer on my desk. Instead, paper files dominated and I dictated my letters and documents onto a cassette via a hand-held Dictaphone. These were typed by the secretaries using electronic typewriters or basic computers, printed, amended by hand and returned. The lawyers did not take much notice of the computers.

A year or so later, we all had computers. Even for the traditional solicitors' profession, email started to become the communication method of choice. In the wider internet sphere, this period corresponded with coming online of eBay, Myspace, Facebook and Amazon.com. In 1997, Steve Jobs re-joined Apple Inc., signalling that company's long term product strategy which would significantly influence the MP3 and digital device market. Also in 1997, IBM's supercomputer 'Deep Blue' beat world chess champion Garry Kasparov – genuine artificial intelligence at work or just brute force? In 1998, as Google filed for incorporation in California, I followed Jobs to Apple becoming the company's first UK in-house legal counsel. In the same year, 3G was launched, paving the way for faster data-transmission and internet access, and thus the growth of the mobile phone as the ubiquitous communication device. I was a late adopter of the mobile phone, despite my employment by technology companies, but by 2003, I was the proud owner of a Blackberry device with my emails following me wherever I went. My subsequent employment within Government coincided with this time of change, when public bodies were having to come to terms with the changing nature of information and communications, and the implications for use, disclosure and analysis by the public sector. Since then, we have witnessed a mobile revolution (a median of 76% of adults across 18 advanced economies were reported to have smartphones in 2018),¹ coinciding with 'Web 2.0', a term used to describe websites that encourage user participation, such as social media and self-publishing sites and functionality including user commentary, 'likes' and 'tagging'.

The last decade - the time period spanned by the Work - has seen the steady rise of mobile connectivity, home broadband, streaming and digital services and social media use, with resultant concerns around digital tracking, data privacy, the 'right to be forgotten', surveillance (2013 marked the Snowden revelations concerning NSA surveillance), digital harms, online abuse and misinformation. [1, 7, 9, 11, 13, 14] 'Artificial Intelligence' (AI) became the new buzzword, although this term is a considerable misnomer disguising as it does the very human nature of the methods and calculations behind the technology (and the suspicion that much of it is old (statistical) wine in new bottles). That being said, this period has seen considerable advancements in natural language processing and speech technology, facial recognition and algorithmic recommender and classification systems, underpinned by supervised and unsupervised machine learning methods, and the analysis and combination of digital information. Led by the commercial sector,² these technologies are now so integrated into our daily digital lives (in the form of search engines, online shopping recommendations, social media interactions, job candidate assessment, surveillance and security applications, 'smart' devices, 'driver-assist' tools and so on) that they have become almost invisible, sometimes leading to well publicised personal data abuses.³ The prospect that combining datasets will create hitherto unknown intelligence or knowledge, or create certainty where uncertainty previously existed, is an understandably attractive one: 'A network of devices that can accurately give your location at any time of day, your eating habits, your energy consumption, your bank details, and your biometric data points has great potential when held by either corporations or governments.'⁴

¹ Laura Silver, 'Smartphone Ownership Is Growing Rapidly Around the World, but Not Always Equally' (Pew Research Center, Feb 5, 2019) <https://www.pewresearch.org/global/2019/02/05/smartphone-ownership-is-growing-rapidly-around-the-world-but-not-always-equally/> accessed 4 October 2020.

² Committee on Standards in Public Life, *Artificial Intelligence and Public Standards: A Review by the Committee on Standards in Public Life* (February 2020).

³ One of the most infamous being the Cambridge Analytica scandal in 2018.

⁴ Jon Crowcroft, 'How to Tell When a Digital Technology Is *Not* Ready for You' (2020) *Patterns*, 1(1).

Where private sector developers lead, the public sector tends to follow, albeit more cautiously. Within policing and national security, facial recognition, automated audio-visual analysis and speech-to-text transcription are established tools, and there is considerable interest in methods that triage or filter data for examination, or which derive insights from large, disparate datasets and identify connections that would otherwise go unnoticed by human operators.⁵ However, alongside live facial recognition, it is perhaps the application of behavioural analytics to 'predict' risky or suspicious behaviour, or for the State to categorise a person, that raise the most concern from a legal and ethical perspective. [2, 3, 4, 5, 6]

Take the EU funded iBorderCtrl (Intelligent Portable Control System) project⁶ as an example; this project combines automated biometric scanning, facial recognition, document assessment, radar and acoustic sensors (for detecting hidden humans in vehicles), an algorithmic risk assessment tool combining various inputs to produce 'actionable risk scores' and finally (and most controversially) an 'Automated Deception Detection System', the AI equivalent of a polygraph and described as quantifying 'the probability of deceit in interviews by analysing interviewees' non-verbal micro-gestures'.⁷ This project encapsulates the challenges of the new digital environment. Digital data can be collected and combined, and new information (or outputs) created which may be considered 'useful' by border control officers, an example of Brownsword 'technological management' with the aim of improving the effectiveness of the law and preventing wrongdoing.⁸ But the process necessitates vastly increased personal data processing, the (semi)automation of decision-making processes, the categorisation of individuals as risky by a hidden algorithm, and the creation of AI based on an arguably invalid scientific basis (i.e. that there are reliable bodily indicators of deception).⁹ Is it sufficient mitigation that a human remains 'in the loop'? This is just one of the questions that parts of the Work have sought to explore. [2, 3, 4, 5, 6]

This Commentary begins with an overview of the Work, dividing the pieces into three overarching themes: digital processing of information, legal conflicts and harms; data sharing and trust; and AI and algorithmic analysis in policing and the legal and policy framework. It then assesses the Work's contribution to knowledge, significant academic influences and highlights key citations of the Work in and outside academia. Sections 3 and 4 discuss methodological approaches and types of interdisciplinarity and how these are reflected in the Work. Finally, the Commentary reviews the progression of the research areas in 2020 and potential future avenues for further investigation, concluding with an overall evaluation of the Work's contribution to the field.

1.1 Overview of the Work

The Work not only reflects the digital developments of the last decade, but also my personal development as a legal researcher from a practice background who moved into academia in 2009. While the character of the publications has changed and expanded over the period, the Work has remained grounded in a high level of practical application. The Work has not however focused on the needs of the legal profession or 'focused exclusively on traditional legal materials and the techniques required to interpret them.'¹⁰ Instead, the Work is influenced by my 11 years' experience as an in-house counsel employed by technologies companies and the Government (following private practice and immediately prior to academia), a non-traditional legal career route that has received comparatively little attention in the legal education literature. Guntz highlights that employed in-house lawyers assume significant non-legal managerial responsibilities, tending to be 'generalist' lawyers delivering services across a broad spectrum of legal issues and with an ability to understand the in-house client's needs.¹¹ Therefore, the operation of law in context, and the

⁵ Alexander Babuta, Marion Oswald and Ardi Janjeva, 'Artificial Intelligence and UK National Security: Policy Considerations' (2020) *RUSI Occasional Paper*.

⁶ <https://www.iborderctrl.eu/> accessed 4 October 2020.

⁷ <https://www.iborderctrl.eu/Technical-Framework> accessed 4 October 2020.

⁸ Roger Brownsword, *Law, Technology and Society: Re-Imagining the Regulatory Environment* (Routledge 2019) 7.

⁹ Javier Sánchez-Monedero & Lina Dencik, 'The politics of deceptive borders: 'biomarkers of deceit' and the case of iBorderCtrl' (2020) *Information, Communication & Society*.

¹⁰ Fiona Cownie and Anthony Bradney, 'Socio-legal studies: A challenge to the doctrinal approach' in Dawn Watkins and Mandy Burton (eds) *Research Methods in Law, Second Edition* (Routledge 2018).

¹¹ Sally Gunz, 'Testing Educational Assumptions in the Context of the Non-Traditional Legal Career as a Corporate Lawyer' (1990) 24 *Law Tchr* 266, 271.

interaction of the law with perhaps competing business, policy or ethical issues,¹² becomes just as important as a 'black letter' understanding of the law itself. The Work has followed suit in part with a developing focus on law in context and interdisciplinary work (to be explored in more detail in sections 3 and 4 below). Pieces that are more doctrinal in nature [such as **12**, **13**, **14**] have furthermore attempted to avoid the criticism that 'doctrinal researchers do no more than 'work the rules' in isolation from practice or the theory underlying the rules, and without due consideration for how the rules might be improved or reformed.'¹³

Under the overarching theme of 'legal clashes and uncertainties in the digital age', it is possible to identify the following sub-themes within the Work representing the overlapping impacts of the digital environment as set out above: i) digital processing of information, legal conflicts and harms; ii) questions around data sharing and trust; iii) AI and algorithmic analysis in policing and the legal and policy framework.

1.1.1 Digital processing of information, legal conflicts and harms

Pieces **1**, **7**, **9**, **13** and **14** fall within this sub-theme. **13** and **14** were my first peer reviewed publications after leaving in-house practice for academia. These pieces reflect my interest in the interplay of laws relating to information – in particular, data protection, freedom of information and intellectual property. They analyse the freedom of information statutory regime (and related case-law) and a specific case-law decision¹⁴ respectively. Despite this limited focus, both pieces identify conflicts and potential issues within the application of existing law. Publication **14** challenged a tribunal decision that took the view that social media use implied a waiver of privacy in other contexts, a decision that was subsequently overturned substantially on grounds suggested in the article.¹⁵ Publication **13**, written six years after the implementation of the Freedom of Information Act,¹⁶ considered the question of whether irreconcilable differences existed between freedom of information and copyright law due to the likelihood of online publication, and anticipated future Strasbourg interpretations of Article 10 ECHR as incorporating a right of access to information.

At the end of 2014, at the invitation of the Society for Computers & Law, I made the following prediction for the year 2015:

'Two of the main players - 'data-hungry' corporations and privacy technologists - will develop new technologies in an attempt to frustrate the other. Both will argue that they have the 'innocent' end-user's best interests in mind. New tracking technology will defeat existing countermeasures. End-users will be encouraged to fight back with privacy-enhancing technologies, but apathy will, in the main, prevail. The law will cling to the concept of consent as the way of regulating personal data use, and to justify the imposition of one-sided terms and conditions by social media providers.'¹⁷

Publications **1** and **7** are related pieces, exploring the above-mentioned digital environment, with **7** developing the idea of 'privacy vigilantism', first coined in **1**, as a potential means of tackling digital harms. This piece reviewed the landmark 'right to be forgotten' decision in *Google Spain*.¹⁸ It questioned whether the decision would make any significant difference to privacy and dignitary harms created or facilitated by new technologies, not only committed by corporations or Government but also by the individual 'surveillant on the street'. My conclusion that 'Harmful data processing needs to be addressed head-on, which may mean dealing with problems in more than one place in the information lifecycle' remains applicable today,

¹² Sally Gunz & Hugh Gunz, 'Ethical Decision Making and the Employed Lawyer' (2008) *Journal of Business Ethics* 81(4), 927-944.

¹³ Terry Hutchinson, 'Doctrinal Research: Researching the Jury' in Dawn Watkins and Mandy Burton (eds) *Research Methods in Law, Second Edition* (Routledge 2018).

¹⁴ *Morley v Information Commissioner and Surrey Heath Borough Council* [2012] EA/2011/0173.

¹⁵ *Surrey Heath Borough Council v IC and Morley* [2014] UKUT 0330 (AAC).

¹⁶ 2000, c. 36.

¹⁷ Society for Computers and Law, 'Predictions: Final Treats' (10 December 2014) <https://www.scl.org/blog/3261-predictions-final-treats> accessed 4 October 2020.

¹⁸ *Google Spain v AEPD and Mario Costeja Gonzalez* (C-131/12), 13 May 2014.

as we see the UK Government struggling with the implementation of its Online Harms proposals.¹⁹ Publication 7 developed the discussion of privacy in the online 'party', critiquing case-law interpretations of the reasonable expectation of privacy and methods of 'privacy vigilantism'. It built on approaches from other scholars and proposed a new model of 'misuse of the digital person', designed not to prevent the observation of 'public' information about an individual, but instead to protect the fundamentals of a person from undesirable digital intrusion.

Publication 9 was the first UK academic article to critique the depiction of young children in television 'Science Entertainment' based on FOI-based and empirical research and the application of privacy, medical and child-law principles. It developed the theory of 'Generation Tagged' - young children whose images and identity appear on digital media as a result of the action of others. As at the date of writing, it is the 'most-read' article in the Journal of Media Law.²⁰



Have 'Generation Tagged' lost their privacy?²¹

Although its focus is intrusion into children's privacy created by certain forms of broadcast programming, its context is the 'always on' digital age which exacerbates and expands the reach of those intrusions. This publication too proposed specific measures to tackle misuse. It argued that the legal framework had failed to keep track with the changing nature of broadcast programming. Digital on-demand services make broadcasts less ephemeral, and parallel social media interactions become part of the online record, with even old information more easily accessible due to digital search tools.

1.1.2 Data sharing and trust

My prediction for the year 2014 focused on the importance of effective use of information for the protection of the vulnerable:

'The Serious Case Reviews into the deaths of Keanu Williams and Daniel Pelka, CEOP's assessment 'The Foundations of Abuse' and the Children's Commissioner's inquiry into child sexual exploitation in gangs all criticised the robustness of data sharing between public bodies. 'Instances of concern tended to be viewed in isolation with a lack of attention to patterns developing' (Williams SCR). So why, when hardly a day goes by without the trumpeting of the potential of Big Data, data intelligence, profiling and so on, do these issues persist? A crisis of confidence around data protection? Over-reliance on consent? Privacy concerns around problem-profiling? Little understanding about the value of intelligence? Fears that anonymised data will be easily re-identified? Incompatible IT systems? Lack of trust between agencies? Cautious lawyers? I predict

¹⁹ BBC News, 'Online Harms bill: Warning over 'unacceptable' delay' (29 June 2020) <https://www.bbc.co.uk/news/technology-53222665>. accessed 4 October 2020.

²⁰ <https://www.tandfonline.com/toc/rjml20/current> accessed 4 October 2020.

²¹ Publication 9 and the research behind it was immortalised in Lego™ in the University of Winchester Images of Research exhibition 2017 <https://www.flickr.com/photos/149999106@N05/32344166566/in/album-72157677123864351/> accessed 4 October 2020.

(and hope) that the outcome of the Law Commission's consultation into data sharing between public bodies will challenge us all to get to grip with these issues once and for all.²²

Publications **10**, **11** and **12** expand on these concerns under the theme of data sharing (and **10** and **11** have a close connection with the third theme relating to AI and algorithmic analysis). In everyday language, we often use the word 'share' to mean giving something to someone (perhaps temporarily) or letting someone 'have a go.' We insist righteously that our children share their toys with others, although as adults, if we share, we want safeguards; we want the Government to guarantee our savings; we want to know that someone will not copy our idea; we want to know that someone takes responsibility for any damage to our property. And in respect of personal data, the potential for damage is so much more difficult to quantify compared to, say, the sharing of physical property: 'there are many tangible benefits to be gained by allowing intrusions into one's life, but there is also the intangible worry. We simply find it hard, as humans, to balance the tangible benefits and the intangible costs.'²³ Our decision may come down to first, what benefits we believe we will gain by sharing our data, and secondly, whether we trust the organisation that acquires our data.²⁴

Publication **12** was written in the context of the calls for mandatory reporting of child abuse to be introduced in light of the above scandals. It took a comparative and historical approach to the question of whether mandatory reporting was a necessary remedy to the societal horror of child abuse, learning in particular from the 50 years' experience of such laws in the United States, and English law negligence and human rights actions. Publication **11** widened the focus on data sharing by way of an exploratory empirical study to ask whether the necessity of public services results in a readiness by individuals to share personal data and sacrifice a measure of privacy. Both the literature review and the empirical study suggested the more tangible and/or immediate the benefit, the stronger the correlation with comfort in data sharing, leading to the conclusion that trust in data sharing initiatives might be improved by a local, institution-led approach (a lesson that remains pertinent to the ongoing Covid-19 pandemic response).

Publication **10** focused upon police databases of 'intelligence' considering the Supreme Court decision in *Catt*,²⁵ a decision that was subsequently overturned in part by the European Court of Human Rights.²⁶ The piece discussed the tensions that arise between privacy and human rights, and police efficacy and operational pressures, in the context of intelligence gathering, sharing and analysis. This piece represents my first formal foray into the world of law enforcement data analysis, an area that now represents a significant part of my research, and the first joint work with a researcher who has become a valued collaborator. We concluded, *inter alia*, that not enough attention had yet been paid, in the regulation of intelligence, to existing and potential electronic data analysis techniques. This is an important area to which I return in the remaining publications.

Underlying the above pieces is a concern about trust and trustworthiness,²⁷ between those organisations sharing public sector data, between individuals and public sector organisations using information, and in respect of the governing law itself. Trust has become a key theme in current dialogue concerning the deployment of digital technologies,²⁸ including proposals for 'data trusts'²⁹ which have obtained some

²² Society for Computers and Law, 'Predictions 2014: Batch2' (6 December 2013) <https://www.scl.org/blog/2971-predictions-2014-batch-2>. accessed 4 October 2020.

²³ Kieron O'Hara and Nigel Shadbolt, *The Spy in the coffee machine: the end of privacy as we know it* (1st edition, Oneworld 2008) 5.

²⁴ Marion Oswald, 'Share and share alike - attitudes towards data sharing in the UK public sector' (2014) *Privacy and Data Protection* 14(3), 15.

²⁵ *R (Catt) v Commissioner of Police of the Metropolis & Anor and another* [2015] UKSC 9.

²⁶ *Catt v UK* App. No. 43514/15 (ECHR, 24 January 2019).

²⁷ O'Hara defines trust and trustworthiness as two sides of the same coin: trustworthiness is the virtue of reliably meeting one's commitments, while trust is the belief of another that the trustee is trustworthy – Kieron O'Hara, 'A general definition of trust' (2012) Southampton, GB. University of Southampton <https://eprints.soton.ac.uk/341800/> accessed 4 October 2020.

²⁸ See for instance: David Anderson, 'A Question of Trust: Report of the Investigatory Powers Review' (June 2015); Centre for Data Ethics and Innovation, 'Addressing trust in public sector data use' (20 July 2020).

²⁹ Wendy Hall and Jerome Pesenti, *Growing the Artificial Intelligence Industry in the UK* (London: Department for Digital, Culture, Media and Sport and Department for Business, Energy and Industrial Strategy, 2017).

traction despite being incapable - it appears - of being legal trusts.³⁰ This aspect is discussed further in section 2.

1.1.3 AI and algorithmic analysis in policing and the legal and policy framework

This third theme focuses upon advanced algorithms used by the police to derive insights, inform operational decision-making or make predictions. The use of machine learning algorithms by the police has grown in importance over recent years, as the police explore how new technologies might facilitate more efficient and effective working in an age of austerity. Publications **2, 3, 4, 6 and 8** revolve around this theme, and aim to address three main areas: a) identifying the legal, policy and operational issues arising from existing or potential use of AI and algorithmic analysis within policing; b) considering the implications of the focus on algorithmic 'prediction'; and c) questioning if and how 'human' legal principles such as reasonableness and natural justice can govern this kind of augmented decision making.

The use of 'Austerity AI'³¹ in order to make individual predictions in connection with the preventative and public protection mission of the police has created a divide between those who promote the benefits and opportunities of data science within policing and those who stress the risks and issues. The Work has attempted to bridge that divide. Furthermore (and this reflects my experience as an in-house counsel), the Work has attempted to address the realities of the operational front line, where decisions made can have significant legal and societal implications but theoretical and doctrinal debates command little attention unless translated to address operational and strategic imperatives.

Publication **8** was the first publication within the Work to focus upon this line of research, seeking to establish the extent to which algorithmic analysis of intelligence is currently used in UK policing and making a number of recommendations regarding the legality, accountability and transparency of 'algorithmic' police intelligence analysis. Surprisingly, there is not a clear picture of the extent to which machine learning is deployed within UK policing and our freedom of information-based research aimed to contribute to addressing this gap. Publication **6** built on this analysis; with the cooperation of Durham Constabulary, it was the first UK academic publication to critique an operational algorithmic tool within a UK police force to inform the ongoing legal and ethical debate around data analytics in policing. It has been extensively cited and quoted to inform the public debate in this area. Based on the research, the article proposed a decision-making framework called 'Algocare' (which has since been adopted by the National Police Chiefs' Council (see section 2)). It also argued for a new model of 'experimental proportionality', designed to permit the use of unproven data technologies in the public sector in order that benefits and harms can be fully explored, yet giving the public confidence that such use would be controlled and time-limited and the proportionality subject to a further (non-presumptive) review on a stipulated future date. In doing so, I would argue that we are using our 'imagination' as encouraged by Brownsword to rework traditional principles to apply to the situations and issues that new technologies present.³²

This overall research theme develops in publications **2, 3 and 5**. Publication **5** takes an original approach to reformulating longstanding administrative law principles to new algorithm-assisted public sector environments. It argues that the principles of administrative law are concerned with human decisions involved in the exercise of state power and discretion, thus offering a promising avenue for the regulation of the growing number of algorithm-assisted decisions within the public sector. Publications **2 and 3** were based upon participatory research exploring the legal, regulatory and ethical challenges presented by the use of machine learning within policing. Publication **2** was commissioned by the Centre for Data Ethics and Innovation as part of its ongoing review of data bias, with one of the publication's original contributions being a project lifecycle approach to assessing the risk of bias.³³

³⁰ Christine Rinik, 'Data trusts: more data than trust? The perspective of the data subject in the face of a growing problem' (2020) *International Review of Law, Computers & Technology* 34(3), 342-363.

³¹ Marion Oswald and Alexander Babuta, 'Machine Learning Predictive Algorithms and the Policing of Future Crimes: Governance and Oversight' (October 31, 2019) in John L.M. McDaniel and Ken Pease OBE (eds) *Policing and Artificial Intelligence* (Routledge, Forthcoming 2021). Available at SSRN: <https://ssrn.com/abstract=3479081>.

³² Roger Brownsword, *Law 3.0* (Routledge 2021), 16.

³³ This project concluded with a final report published in 2020: Alexander Babuta and Marion Oswald, 'Data Analytics

Finally publication 4 uses an historical perspective to examine the deployment of the polygraph within the criminal justice and considers the analogies and parallels to today's use of machine learning. It argues that a reforming legal realist approach can be identified in both contexts and proposes a number of regulatory solutions informed by the early lie detector experience.

2. Contribution to knowledge

2.1 Cyberlaw and the law of the horse

The Work sits within the area of academic studies commonly called Cyberlaw or Information [Technology] Law. In 1996, US Judge Easterbrook famously and derogatorily equated this area of law to the law of the horse:

'Lots of cases deal with sales of horses; others deal with people kicked by horses; still more deal with the licensing and racing of horses, or with the care veterinarians give to horses, or with prizes at horse shows. Any effort to collect these strands into a course on 'The Law of the Horse' is doomed to be shallow and to miss unifying principles.'³⁴

Therefore, I am at risk, as Easterbrook put it, of 'multidisciplinary dilettantism'.

In response to Easterbrook, Lessig countered that Cyberlaw can 'illuminate the entire law' as it involves considering how law and cyberspace connect; 'it is a feature of cyberspace that interferes with the particular end' (privacy, protecting kids from porn and so on)³⁵ – different from the horse which cannot generally interfere with important societal aims! We therefore must ask whether we change cyberspace or the law/societal goal itself. Murray questions whether Lessig in fact successfully rebutted Easterbrook or whether he simply pled 'special circumstances'; mainstream lawyers continue to see cyber as a case-study for their subject, not a freestanding topic of study.³⁶ Marsden is more bullish: the 2020s will be 'the decade of cyberlaw' as it is 'vital to understanding regulation of platforms, of artificial intelligence and robotics, of blockchains, of automated vehicles, and of disinformation in our democracies.'³⁷ Cyberlaw 'was a horse that was destined to bolt' according to Brownsword; Easterbrook was wrong because he 'not only failed to anticipate the regulatory thinking of much of the incoming law of cyberspace but he failed to anticipate that the law might engage with cybertechnologies as both regulatory targets (technologies to be regulated) and regulatory tools (technologies to be used by regulators).'³⁸

So what, within the field of Cyberlaw, is the Work attempting to do? Within publication 7, 20 years after Easterbrook's law of the horse, I argued the following:

'Digital technologies operating in real world settings link to online search, investigation and identification technologies in order to return information to those real world settings (an example being the deployment of facial recognition technologies within shops, not only for crime-prevention but to enable the retailer to identify age, gender and race, with the potential for digital photographs taken in the real world to be compared to those online.) The process is so interlinked that it could almost be said that there is **no longer any point in trying to distinguish the real and the cyber.**'

and Algorithms in Policing in England and Wales: Towards A New Policy Framework' (2020) *RUSI Occasional Paper* <https://rusi.org/publication/occasional-papers/data-analytics-and-algorithms-policing-england-and-wales-towards-new>.

³⁴ Frank H. Easterbrook, 'Cyberspace and the Law of the Horse' 1996 University of Chicago Legal Forum 207 (1996).

³⁵ Lawrence Lessig, 'The Law of the Horse: What Cyberlaw Might Teach' (1999) 113 *Harvard Law Review* 501-549.

³⁶ Andrew Murray, 'Looking back at the Law of the Horse: Why Cyberlaw and the Rule of Law are Important' (2013) *ScriptEd* 10(3).

³⁷ Christopher T. Marsden, 'The Regulated End of Internet Law, and the Return to Computer and Information Law?' in Kevin Werbach (ed) *After the Digital Tornado* (Cambridge University Press 2020) 36.

³⁸ n32, 46-47.

Cyber is no longer a separate ‘thing’ that can be studied in isolation, in the way a horse can. The digital and the cyber are now firmly embedded within our society and ways of living and working, with resultant consequences for how the law operates or should operate. Therefore, while strongly disputing the charge of dilettantism, I would defend the need to develop **interdisciplinary awareness** and be able to think **across legal and other boundaries** within Cyberlaw studies. I encourage students to think of Cyberlaw as a system of interlocking jigsaw pieces with consideration of digital technologies at their heart, including, but not limited to, laws that target specific technologies or digital harms (Fig. 1). It is impossible (for me at least) to be an expert in all pieces of the jigsaw. This does not however result in dilettantism or superficiality. To borrow from Donald Rumsfeld,³⁹ it is important if we wish to gain some level of understanding to be aware of ‘known unknowns’ - these are the issues that I know are relevant to the issue at hand but that I do not know, but can find out. (The ‘unknown unknowns’ are more difficult but can be addressed by interdisciplinary working – see section 4 below). The strength of a good in-house counsel is – in my view – an awareness of known unknowns and an ability to address them. This is equally applicable to the academic arena where an awareness of what is within ‘scope’ of the research, and what is relevant but outside scope of the specific project or the researcher’s expertise, is crucial. I would therefore categorise myself as a generalist in the field of Cyberlaw who attempts to use relevant and connected legal frameworks to illuminate the impact of digital technologies.

Those from a practice background often struggle against an external or internal view that they are not enough of an ‘academic’ or do not conform to the requirements of the disciplinary field. However, I support Bash and Ashar’s contention that work by those with a clinical background ‘(1) is grounded in observation of lived reality and awareness of the operation of interlocking systems (2) incorporates an innate criticality borne of the activism and advocacy of clinicians, and (3) meaningfully and productively generates and deploys theoretical insights in the wider world.’⁴⁰

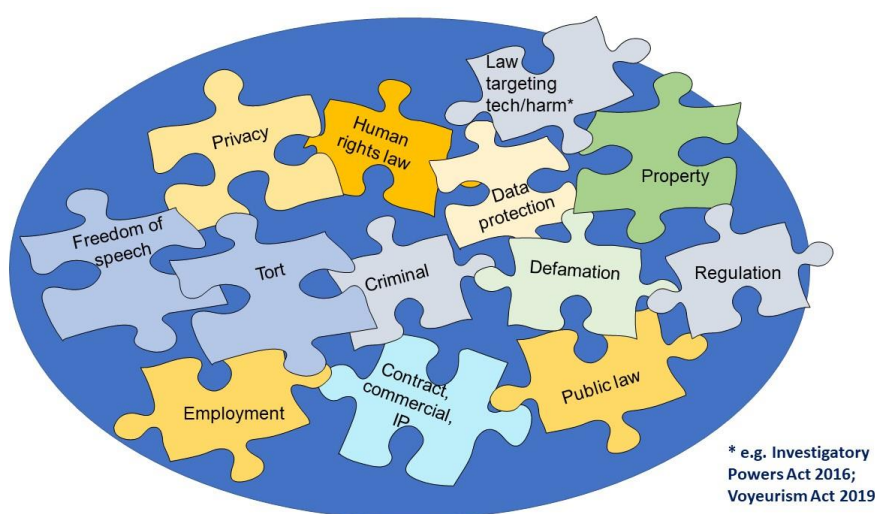


Fig. 1: Some of the pieces of the Cyberlaw jigsaw

2.2 Significant academic influences

The Work discusses and builds upon the work of many scholars in the field, both within law and other disciplines such as computer science. I gratefully acknowledge the ideas of all these scholars in developing and expanding my knowledge, understanding and thinking, including those in particular identified below.

³⁹ US Department of Defense News Briefing (February 12, 2002)

<https://archive.defense.gov/Transcripts/Transcript.aspx?TranscriptID=2636> accessed 4 October 2020.

⁴⁰ Wendy A. Bach and Sameer M. Ashar, ‘Critical Theory and Clinical Stance’ (2019) *Clinical Law Review*, 26(81), 81-97, 82.

Eric Barendt's critique of the reasonable expectation of privacy test⁴¹ was an influential underpinning of the research in publications **7** and **9**, including the conclusion that the legal and ethical framework had failed to keep track with the changing nature of broadcast programming as part of the online record. This research also led (in a further publication documenting related workshop proceedings) to a recommendation that young children should have a privacy right independent of their parents and the need for a duty of care on internet intermediaries to consider children's best interests in their operations,⁴² pre-dating the UK Government's proposal of a duty of care for online harms and the reference to best interests of the child in the ICO's 2020 Age Appropriate Design Code.⁴³

In thinking about 21st digital culture, I was also influenced by Neil Postman's 1985 book 'Amusing ourselves to death'⁴⁴ in which (in the context of TV news) Postman argued that we should worry about Huxley's *Brave New World* rather than Orwell's *Nineteen Eighty-Four*. The 'trivial pursuit' information environment risked amusing us into indifference and a kind of 'culture-death.' Postman's warnings seemed equally relevant when I considered the surveillant on the street; the 'YouTube Families' phenomenon; younger and younger children featuring on mainstream broadcasts, with public comment via social media using the inevitable hashtag. As Cohen argues, surveillant assemblages of informational capitalism 'beckon with seductive appeal'⁴⁵ and therefore it is not enough to expect individuals to be objective defenders of their own - or other's - best interests when it comes to the cumulative effect of digital intrusions and surveillance.

In the context of digital processing and data sharing, the limitations of the public/private dichotomy highlighted by Helen Nissenbaum⁴⁶ informed my concerns about the reasonable expectation of privacy test. My criticism of the *Morley* decision in publication **14** could be said to reflect Nissenbaum's 'contextual integrity' approach to privacy based on applicable norms.⁴⁷ Nissenbaum's approach, however, is ultimately based upon an individualistic approach to privacy protection. Individuals must assert and defend the 'appropriate' treatment of personal data in circumstances 'where entrenched norms and what appear to be promising new norms for personal information find themselves in conflict.'⁴⁸ It is not an approach that can, of itself, determine acceptable and unacceptable data processing with any certainty; Rule comments:

'Nearly anyone can readily picture his or her favored use of personal information as "consistent" with the "contexts" ascribed to it. The problem is, there are bound to be as many interpretations of what constitutes the relevant context, and the standard of consistency, as there are positions on the ideological spectrum of participants.'⁴⁹

Methods deployed by the 'privacy vigilante', including obfuscation technologies promoted by Nissenbaum, are in my view symptoms of rights-based approaches which push too much responsibility onto the individual to defend her rights and to understand and express her preferences. As Kieron O'Hara (whose work on conceptions of privacy and trust and technology has been a significant influence) argues, these

⁴¹ Eric Barendt, 'Problems with the 'reasonable expectation of privacy' test' (2016) *Journal of Media Law*, 8(2), 129-137.

⁴² Marion Oswald, Helen James, Emma Nottingham, Rachel Hendry and Sophie Woodman, 'Have 'Generation Tagged' Lost Their Privacy? A report on the consultation workshop to discuss the legislative, regulatory and ethical framework surrounding the depiction of young children on digital, online and broadcast media' (2017) <https://winchester.elsevierpure.com/en/publications/have-generation-tagged-lost-their-privacy-a-report-on-the-consult-3>.

⁴³ Information Commissioner's Office, 'Age appropriate design: a code of practice for online services' (2020) <https://ico.org.uk/for-organisations/guide-to-data-protection/key-data-protection-themes/age-appropriate-design-a-code-of-practice-for-online-services/1-best-interests-of-the-child/> accessed 4 October 2020.

⁴⁴ Neil Postman, *Amusing Ourselves to Death: Public Discourse in the Age of Show Business* (Penguin 1985).

⁴⁵ Julie E. Cohen, 'What Privacy Is For' *Harvard Law Review* (2013) 126, 1904-1933, 1916.

⁴⁶ Helen Nissenbaum, *Privacy in Context* (Stanford University Press 2010) 117.

⁴⁷ Ibid.

⁴⁸ James B. Rule, 'Contextual Integrity and its Discontents: A Critique of Helen Nissenbaum's Normative Arguments' (2019) *Policy & Internet*, 11, 260-279, 271.

⁴⁹ Ibid, 274.

neoliberal antagonistic approaches are not conducive to the development of trust.⁵⁰ Furthermore, the individualistic nature of data protection law limits its effectiveness in tackling systematic unfairness or harms and ensuring organisational accountability, and in these considerations, I acknowledge the doctrinal work of Lilian Edwards⁵¹ and Orla Lynskey⁵² in particular.

This concern has also informed my research and publications around algorithmic decision-making and the way that information technologies can shape how we perceive the world⁵³ and alter human decision-making agency. As I laid out in publication **5**, the implementation of algorithm-informed decision-making creates a significant risk of ignoring or changing the question that the public sector decision-maker has to answer; indeed, all the administrative law grounds set out in this article (the duty to give reasons, relevant and irrelevant considerations, and fettering discretion) were prescient of the issues raised in respect of Ofqual's 2020 A-level moderation algorithm. I give significant credit to the research of Mireille Hildebrandt in expanding my thinking in this area. Hildebrandt works on the cusp of law and computer science, philosophy of law and philosophy of technology, and as a lawyer from a practitioner background, I acknowledge that I find engagement with her work a challenge but a welcome one. I have been influenced by Hildebrandt's concept of the 'incomputable self'⁵⁴ and her concerns around data-driven agency: 'where observations are limited to digital data and actions are informed by the computational processing of such data.'⁵⁵ My aim has been to focus on a high level of practicality in reflecting upon these concepts and translating them into the context of algorithm-assisted State decision-making.

Publications **2, 3, 4, 5, 6 and 8** sit within the bodies of literature addressing legality and the use of emerging technology by the State (specifically policing) and the clashes that occur through the interaction between legal and technological norms. In one sense, my work has followed Lessig's concept of the judge as translator when it comes to law and technology:

'We must always adopt readings of the Constitution that preserve its original values. When dealing with cyberspace, judges are to be translators: Different technologies are the different languages, and the aim is to find a reading of the Constitution that preserves its meaning from one world's technology to another.'⁵⁶

The Work has been concerned with the application of 'old' law to new technologies and their deployment by the State, and the translation of underlying principles to new contexts. It has built on Andrew Le Sueur's work on robot government⁵⁷ and Karen Yeung's research into algorithmic regulation,⁵⁸ and has developed alongside Michael Veale and Reuben Binns' work on algorithmic accountability.⁵⁹ The Work is both reactive to operational computer science and algorithmic developments, implications and assumptions (in policing, the research of Richard Berk and Geoff Barnes⁶⁰ on algorithmic prediction has influenced the practice of operational policing), and in parallel aims to increase understanding of the implications of the law for such developments, their design and use.

⁵⁰ Kieron O'Hara, 'Data Trusts: Ethics, Architecture and Governance for Trustworthy Data Stewardship' (2019) *Web Science Institute White Papers*, Southampton, University of Southampton, 9.

⁵¹ Lilian Edwards, 'With Great Power Comes Great Responsibility?': The Rise of Platform Liability' in Lilian Edwards (ed) *Law, Policy and the Internet* (Hart Publishing 2019).

⁵² Orla Lynskey, 'Criminal justice profiling and EU data protection law: precarious protection from predictive policing' (2019) *International Journal of Law in Context* 15(2), 162-176.

⁵³ n45, 1913.

⁵⁴ Mireille Hildebrandt, 'Privacy As Protection of the Incomputable Self: From Agnostic to Agonistic Machine Learning' (2019) *Theoretical Inquiries of Law* 20(1), 83-121.

⁵⁵ Mireille Hildebrandt and Kieron O'Hara (eds) *Life and the Law in the Era of Data-Driven Agency* (Edward Elgar 2020) 1-2.

⁵⁶ Lawrence Lessig, *Code: Version 2.0* (Basic Books 2006) 165-166.

⁵⁷ Andrew Le Sueur, 'Robot government: automated decision-making and its implications for Parliament' in A Horne and A Le Sueur (eds) *Parliament: Legislation and Accountability* (Hart Publishing 2016).

⁵⁸ Karen Yeung, 'Algorithmic Regulation: A Critical Interrogation' (2018) *Regulation & Governance* 4, 505-523.

⁵⁹ Michael Veale and Max Van Kleek and Reuben Binns, 'Fairness and Accountability Design Needs for Algorithmic Support in High-Stakes Public Sector Decision-Making' (April 21, 2018). Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI'18).

⁶⁰ Richard A. Berk, Susan B. Sorenson and Geoffrey Barnes, 'Forecasting Domestic Violence: A Machine Learning Approach to Help Inform Arraignment Decisions' (2016) *Journal of Empirical Legal Studies* 31(1), 94-115.

Finally - and perhaps my most important academic influence - are my joint authors,⁶¹ with whom I have developed doctrinal and socio-legal understanding and theories, operational insight and interdisciplinary research. These collaborative projects, which have been interdisciplinary both within the legal 'discipline' and outside it, have led me 'to a more informed and more balanced judgment and...a deeper understanding than someone who is only interested in the 'law as such'', thus providing confidence to 'make an informed policy recommendation because interdisciplinary research provides her [me] with a more comprehensive view of a particular topic.'⁶²

2.3 Citations of the Work and impacts outside of academia

This section highlights key citations of the Work within academic commentary and the most significant impact of the Work outside academia.

Publication **6** was the first academic article in the UK to analyse the legal and societal issues raised by an operational algorithmic tool in the policing environment (the Harm Assessment Risk Tool deployed by Durham Constabulary). It was written from an interdisciplinary perspective alongside the force's head of criminal justice (Urwin) and machine learning tool designer (Barnes) and proposed a new decision-making model called 'Algocare' to highlight key questions and issues that police forces should review when considering an algorithmic tool. At the date of writing, **6** has been cited by 45 academic publications⁶³ including by Yeung for a Council of Europe study,⁶⁴ by Spiegelhalter in the Harvard Data Science Review,⁶⁵ by Lynskey in her review of criminal justice profiling and data protection law,⁶⁶ and in a review on Government Use of Artificial Intelligence in New Zealand.⁶⁷ Its findings have been a reference point for further academic research including by Charlesworth.⁶⁸

Publication **5** has been cited in over 20 articles including by Yeung,⁶⁹ Cobbe,⁷⁰ Veale,⁷¹ Binns⁷² and Hildebrandt.⁷³ It was cited in a House of Lords Library briefing in preparation for a debate on the implications of decision-making and prediction by algorithm in the public sector.⁷⁴ The article was quoted by Lord St John of Bletso in the Parliamentary debate on Algorithms and Public Sector Decision-making: 'In deciding upon the relevance of algorithmic output to a decision by a public sector body, the decision-maker

⁶¹ Jamie Grace, Alexander Babuta, Sheena Urwin, Geoff Barnes, Helen Ryan and Emma Nottingham.

⁶² Mathias M. Siems, 'The Taxonomy of Interdisciplinary Legal Research: Finding The Way Out of The Desert' (2009) *Journal of Commonwealth Law and Legal Education* 7(1), 5-17, 12.

⁶³ https://scholar.google.com/scholar?cites=3070524780853611068&as_sdt=2005&scioldt=0,5&hl=en

⁶⁴ Karen Yeung, 'A Study of the Implications of Advanced Digital Technologies (Including AI Systems) for the Concept of Responsibility Within a Human Rights Framework' (November 9, 2018). MSI-AUT (2018) 05.

⁶⁵ David Spiegelhalter, 'Should We Trust Algorithms?' (2020) *Harvard Data Science Review* 2(1).

⁶⁶ Orla Lynskey, 'Criminal justice profiling and EU data protection law: Precarious protection from predictive policing' (2019) *International Journal of Law in Context* 15(2), 162-176.

⁶⁷ Colin Gavaghan et al., 'Government Use of Artificial Intelligence in New Zealand: Final Report on Phase 1 of the New Zealand Law Foundation's Artificial Intelligence and Law in New Zealand Project' (New Zealand Law Foundation, Wellington 2019).

⁶⁸ Teresa Scantamburlo, Andrew Charlesworth and Nello Cristianini, 'Machine Decisions and Human Consequences' in K. Yeung & M. Lodge (Eds) *Algorithmic Regulation* (Oxford University Press 2019).

⁶⁹ Karen Yeung, 'Why Worry about Decision-Making by Machine?' in K. Yeung & M. Lodge (Eds) *Algorithmic Regulation* (Oxford University Press 2019), 27.

⁷⁰ Jennifer Cobbe, 'Administrative law and the machines of government: Judicial review of automated public-sector decision-making' (2019) *Legal Studies* 39(4), 636-655.

⁷¹ Michael Veale and Irina Brass, 'Administration by Algorithm? Public Management Meets Public Sector Machine Learning' (2019) in K. Yeung & M. Lodge (Eds) *Algorithmic Regulation* (Oxford University Press 2019).

⁷² Reuben Binns, 'Human Judgement in Algorithmic Loops; Individual Justice and Automated Decision-Making' (September 11, 2019). Available at SSRN: <https://ssrn.com/abstract=3452030> accessed 4 October 2020.

⁷³ Mireille Hildebrandt, 'Code Driven Law. Scaling the Past and Freezing the Future' in Simon Deakin and Christopher Markou (eds) *Critical Perspectives on Law and Artificial Intelligence* (Hart Publishers 2020 Forthcoming), Available at SSRN: <https://ssrn.com/abstract=3522079> accessed 4 October 2020.

⁷⁴ James Tobin, 'Predictive and Decision-making Algorithms in Public Policy' *House of Lords Library Research Briefing* (3 February 2020).

should have the discretion to assess unthought of relevant factors and whether the decision is one for which the algorithm was designed.¹⁷⁵

Publication **8** has also been cited internationally, by New Zealand scholars in an exploration of transparency in algorithmic decision-making,⁷⁶ and by the United Nations in a 2019 report into AI in the delivery of public services.⁷⁷ Publication **9** has contributed to further debate around digital child rights and parental consent,⁷⁸ with the research being further developed by my fellow author, Emma Nottingham, in her research into sharenting and the rights of micro-celebrities.⁷⁹ Publication **13** was cited by Oster in his book 'Media Freedom as a Fundamental Right'.⁸⁰ Publication **14** was cited by Selvadurai in a discussion of online privacy protection proposed by new Australian laws.⁸¹ Publication **4** has been cited by sociologists Paul, Fischer and Voigt in their review of the 'anachronistic progress' of the polygraph in the juridical field in Germany.⁸²

Outside academia, the 'Algocare' framework proposed in **6** was adopted by the National Police Chiefs' Council (Business Change Council) and recommended for local force use; the framework supports written submissions to the West Midlands Police & Crime Commissioner and West Midlands Police data ethics committee (which I was invited to chair due to my experience in this field). The research has enabled and influenced campaigns and thinking by campaigning groups and think-tanks. Publication **6** was cited by privacy campaigning organisation Big Brother Watch in its blog and campaign against the use of Mosaic data by Durham Constabulary,⁸³ and by Liberty in its influential report on predictive policing.⁸⁴ Publication **2** was cited by Amnesty International in its 2020 report on predictive policing in the Netherlands.⁸⁵ The Centre for Public Impact has used publication **6** to inform its supporting policing case study for its report 'How to make AI work in government and for people'.⁸⁶

Furthermore, the Work has informed policy development and political debate. My evidence informed by publication **8** was cited on page 14 of the Commons Science & Technology Committee report into algorithms in decision-making 23 May 2018.⁸⁷ Evidence informed by publication **6** was cited on page 42 of the Lords AI Committee's 2018 report.⁸⁸ The All-Party Parliamentary Group report on data analytics cited

⁷⁵ House of Lords, 'Algorithms: Public Sector Decision-Making – Question for Short Debate' 12 February 2020.

⁷⁶ John Zerilli et al., 'Transparency in Algorithmic and Human Decision-Making: Is There a Double Standard?' (2019) *Philos. Technol.* 32, 661–683.

⁷⁷ United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and Google, 'Artificial Intelligence in the Delivery of Public Services' (Oct 2019).

⁷⁸ Mark J Taylor, Edward S Dove, Graeme Laurie and David Townend, 'When can the Child Speak for Herself? The Limits of Parental Consent in Data Protection Law for Health Research' (2018) *Medical Law Review* 26(3), 369–391.

⁷⁹ Emma Nottingham, 'Children's rights to privacy in the age of 'generation tagged': sharenting, digital kidnapping and the child micro-celebrity' in Jane Murray, Beth Blue Swadener and Kylie Smith (eds) *The Routledge International Handbook of Young Children's Rights* (Routledge 2020).

⁸⁰ Jan Oster, *Media Freedom as a Fundamental Right* (Cambridge University Press 2015).

⁸¹ Niloufer Selvadurai, 'Protecting online information privacy in a converged digital environment – the merits of the new Australian privacy principles' (2013) *Information & Communications Technology Law* 22(3), 299–314.

⁸² Bettina Paul; Larissa Fischer and Torsten H. Voigt, 'Anachronistic Progress? User Notions of Lie Detection in the Juridical Field' (2020) *Engaging Science, Technology, and Society* August 2020, 328–346.

⁸³ Big Brother Watch, 'A Closer Look at Experian Big Data and Artificial Intelligence in Durham Police' (April 6, 2018) <https://bigbrotherwatch.org.uk/2018/04/a-closer-look-at-experian-big-data-and-artificial-intelligence-in-durham-police/> accessed 4 October 2020.

⁸⁴ Hannah Couchman, 'Policing by Machine' *Liberty* (January 2019).

⁸⁵ Amnesty International, 'We Sense Trouble: Automated Discrimination and Mass Surveillance in Predictive Policing in the Netherlands' (2020) EU 35/2971/2020.

⁸⁶ Danny Buerkli and Margot Gagliani, 'How to make AI work for government and for people' (2018) Centre for Public Impact.

⁸⁷ House of Commons Science and Technology Committee, 'Algorithms in Decision-Making' (Fourth Report of Session 2017-19, 15 May 2018) HC 351.

⁸⁸ House of Lords Select Committee on Artificial Intelligence, 'AI in the UK: ready, willing and able?' (Report of Session 2017-19, 2018) HL Paper 100.

publications **3 and 6** and my associated written evidence extensively on pages 35-40.⁸⁹ In launching the Committee on Standards in Public Life's review of AI and Public Standards, the Chair, Lord Evans, stated that publication **3** 'was part of the reason I thought there was an issue here, on the ethical framework that we should apply to application of this in a law enforcement context.'⁹⁰ Publications **5 and 6** informed the work of the Parliamentary Office of Science and Technology in developing its report on interpretable machine learning.⁹¹

The Work informed my invited oral evidence and related written evidence to the Law Society commission on algorithms in the justice system⁹² and the resultant Law Society Report on algorithm use in the criminal justice system cited publications **6 and 8** at 7.1, 7.3.1 and 7.3.6.⁹³ The 2019 report on data-driven policing from the influential Police Foundation takes up three of the recommendations from publication **3**.⁹⁴ Publication **6** and the Algotcare framework were cited extensively in 'Better use of data and advanced statistics / machine learning in delivering benefits to the fuel poor' prepared by Deloitte LLP for the Department for Business, Energy and Industrial Strategy.⁹⁵

The results of the research published in **11** were cited by the Law Commission in its scoping report 'Data Sharing between Public Bodies' in July 2014.⁹⁶ It was also cited by O'Hara, Shadbolt and Hall in their paper 'A Pragmatic Approach to the Right to be Forgotten.'⁹⁷ My proposal for a new model of 'misuse of the digital person' as discussed in publication **7** was included in a proposal by science commentator Anjana Ahuja for a radio documentary, which was approved for production by the BBC. I was interviewed for the documentary on 5 July 2016 and it was broadcast on 11 September 2016.⁹⁸

⁸⁹ All Party Parliamentary Group on Data Analytics, 'Trust, Transparency and Tech: Building Ethical Data Policies for the Public Good' (May 2019).

⁹⁰ Edward Malnick, 'Former MI5 chief warns police and intelligence officers could blame AI for controversial or racist decisions' *The Telegraph* (23 March 2019) <https://www.telegraph.co.uk/politics/2019/03/23/former-mi5-chief-warns-police-intelligence-officers-could-blame/> accessed 4 October 2020.

⁹¹ The Parliamentary Office of Science and Technology, 'Interpretable machine learning' POSTNOTE Number 633, October 2020, footnotes 25 and 69.

⁹² The Law Society, Technology and the Law Policy Commission - Algorithms in the Justice System <https://www.lawsociety.org.uk/policy-campaigns/articles/public-policy-technology-and-law-commission/> accessed 4 October 2020.

⁹³ The Law Society of England and Wales, 'Algorithms in the Criminal Justice System' (4 June 2019).

⁹⁴ Ian Kearns and Rick Muir, 'Data-Driven Policing and Public Value' *The Police Foundation* (March 2019) 38, footnote 125.

⁹⁵ Deloitte LLP, 'Better use of data and advanced statistics / machine learning in delivering benefits to the fuel poor' May 5th 2020.

⁹⁶ Law Commission, 'Data Sharing between Public Bodies: A Scoping Report' (2014, LAW COM No 351) HC 505.

⁹⁷ Kieron O'Hara, Nigel Shadbolt and Wendy Hall, 'A Pragmatic Approach to the Right to be Forgotten' (2016) Global Commission on Internet Governance Paper No. 26.

⁹⁸ 'The Online Identity Crisis' BBC Radio 4 <https://www.bbc.co.uk/programmes/b07tqvvp> accessed 4 October 2020.

Finally, of a number of media and press publications to discuss the Work (including the Mail,⁹⁹ the Law Society Gazette¹⁰⁰ and Engineering & Technology¹⁰¹), the one of which I am most proud is Private Eye which reported on publication **6** in 2018.¹⁰²

⁹⁹ Mail Online, 'Call to regulate police use of Minority Report-style crime prediction software' (21 September 2018) <https://www.dailymail.co.uk/wires/pa/article-6191409/Call-regulate-police-use-Minority-Report-style-crime-prediction-software.html> accessed 4 October 2020.

¹⁰⁰ Michael Cross, 'Call for regulation of police decision algorithms' *Law Society Gazette* (17 September 2018) <https://www.lawgazette.co.uk/news/call-for-regulation-of-police-decision-algorithms-/5067630.article> accessed 4 October 2020.

¹⁰¹ Hilary Lamb, 'Regulate AI in policing as 'matter of urgency', warns report' *Engineering and Technology* (September 21, 2018) <https://eandt.theiet.org/content/articles/2018/09/regulate-ai-in-policing-as-matter-of-urgency-warns-report/> accessed 4 October 2020.

¹⁰² Private Eye issue 1469 (4 May – 17 May 2018).

3. Methodologies

In this section, I have taken methodology to mean the research approach - 'how to find relevant information, how to organize it, and how to interpret the results' or 'the steps taken by the researcher to travel from the problem statement to the conclusion.'¹⁰³ Looking back at my transition from practice to academia, I acknowledge that, as well as having a 'healthy skepticism...about theory generation,'¹⁰⁴ the same could be said of methodology. I was used to drafting, advising and interpreting but had less time to consider concepts, ideas and purposes of law, or to analyse how I was 'doing' law.

The Work has provided the opportunity to consider the ways in which my research has been conducted. My approach is grounded in experience of what could be described as the 'standard' doctrinal legal methodology as deployed by practising lawyers and judges: 'the search for a 'system' of general, logically consistent principles, built up from the study of particular instances' using 'logical deductions derived from a *priori* propositions, and the principles of inductive generalisation and analogous reasoning.'¹⁰⁵ It has not however taken a positivist approach in the sense of concentrating solely on a 'closed' system of the law as it 'is' and which is assumed to be objective. As an academic with a practice background, I recognise Bach and Ashar's description of an 'embedded clinical stance' within my scholarship.¹⁰⁶ Within the Work, there are also aspects of what they describe as 'critical theory' in the process that I have undertaken: 'Observe from a particular position the operation of a set of laws and systems, describe the subject as it is perceived from that vantage point (sometimes deploying and sometimes generating or revising theory), and then deploy these insights to bolster and justify the demand — see, describe, generate/deploy, demand.'¹⁰⁷ I am concerned not only with what the law 'says' but how it is interpreted, viewed and (sometimes) abused by those advising upon, subject to and enforcing the law, and what policy and other extra-legal factors affect the effectiveness of the law. Socio-legal perspectives can of course improve doctrine.¹⁰⁸ I am a strong believer in the normative value of law in providing a guide and reasons for behaviour, although I am under no illusions that law - absent good faith interpretation and robust oversight and regulation - will be sufficient to guarantee correct action or a moral outcome. This aspect has been an important element of the pieces exploring AI and policing in particular.

The pieces therefore consistently deploy a mixed-methods approach, combining doctrinal and law-in-context/law-in-action approaches with empirical research, historical and comparative methods, freedom of information request methods and/or participatory research with multidisciplinary collaboration, thus deepening the perspectives and issues identified and explored. Using Minow's categorisation, I have: gathered 'more than one line of cases, across doctrinal fields, and show[n] why they belong together or expose doctrinal discrepancies' (for instance **10**); pursued 'policy analysis' and proposed alternative schemes or methods (for instance **2** and **3**); undertaken an empirical investigation into a proposition to investigate its validity (for instance **11**), engaged in critical projects to expose tensions within a body of law, and attempted to link them to larger social difficulties (for instance **9** and **12**), engaged in historical inquiry in order to contextualise the selected era using history and illuminate differences, choices or continuities when compared with contemporary practice (**4**), and developed a theory that tries to explain how areas of law fit together and contributes to a practical problem (for instance **4**, **6** and **7**).¹⁰⁹ The benefits and challenges of interdisciplinary research are discussed in section 4. I will therefore focus in the remainder of this section on my empirical and historical research and the challenges of these approaches.

¹⁰³ Fons Coomans and Fred Gunfeld and Menno T Kamminga, 'Methods of Human Rights Research: A Primer' (2010) 32 *Hum Rts Q* 179, 183-184.

¹⁰⁴ n40, 82.

¹⁰⁵ Shane Kilcommins, 'Doctrinal Legal Method (Black-Letterism): Assumptions, Commitments and Shortcomings' in Laura Cahillane and Jennifer Schweppe (eds) *Legal Research Methods: Principles and Practicalities* (Clarus 2016), 9.

¹⁰⁶ n40, 83.

¹⁰⁷ n40, 86.

¹⁰⁸ Darren O'Donovan, 'Socio-Legal Methodology: Conceptual Underpinnings, Justifications and Practical Pitfalls' in Laura Cahillane and Jennifer Schweppe (eds) *Legal Research Methods: Principles and Practicalities* (Clarus 2016), 114.

¹⁰⁹ Martha Minow, 'Archetypal Legal Scholarship – A Field Guide' in AALS Workshop for New Law Teachers (AALS, 2006), 34-5.

Empirical research can help us to 'be better at seeing and describing'.¹¹⁰ The following approaches have been deployed in the Work: participatory research interviews and grounded theory analysis (2 and 3), empirical research based on freedom of information responses (8) and qualitative and quantitative analysis of a questionnaire exploring attitudes to data sharing (11). I also undertook an informal analysis of the content of Twitter messages as described in 9. The underlying reason for deploying these empirical elements was to 'foster connection and holism in solving research problems'.¹¹¹ The participatory research approach allowed us to gain from the experience of stakeholders in the assessment of the real-world context, actors and institutions, diagnosis of the issues and consideration of policy requirements.¹¹² I am aware however that building research relationships through practice or from engagement in the work of others¹¹³ can raise questions from a research perspective about neutrality, detachment and bias in terms of being too close to those involved in the system.¹¹⁴ However, it would seem impossible for a researcher to have no knowledge of the context or literature in which she is working. Concerns regarding neutrality were mitigated to a certain extent by purposive selection of interviewees to ensure a cross-section of standpoints, use of a 'snowball' sampling strategy where initial interviewees proposed subsequent interview participants for interview, and by achieving 'data saturation' such that later interviews did not produce data that led to any new themes.¹¹⁵

A freedom of information-based approach allowed us to obtain information about an issue (the extent of the use of algorithmic analysis by police forces) that was not well known or publicly available. Savage and Hyde identify the following advantages: 'Whilst we could have approached the authorities and attempted to negotiate voluntary access to such data, such negotiations would be lengthy and unlikely to produce uniform answers to the research questions posed in the study. Freedom of information requests can be dispatched to multiple local authorities at the same time, allowing information held by public authorities to be obtained cheaply and in a uniform fashion. This data can then be usefully compared, allowing trends to be discerned'.¹¹⁶ Freedom of information requests not only enable us to obtain information; the 'round-robin' requests sent to all police force permit differences and inconsistencies to be identified, particularly valuable for research concerned with the consistent and fair use of state power and activities that raise rule of law concerns.

Publication 11 is perhaps the most ambitious piece of empirical research, aiming as it does to explore the influence of social factors – specifically trust - on understanding and acceptance of legal concepts and legal supports such as data anonymisation, and models of data collection based on public interest rather than consent. It might be said that this piece is not very legal. I would argue however that an exploration of attitudes to data 'sharing' can inform the effectiveness (or otherwise) of legal, regulatory and policy measures designed to engender trust in public sector activities, providing a more robust underpinning for the conclusions. The empirical element also assists in the generalisation of the results for a non-legal audience.¹¹⁷ I freely confess that at the start of the project, I had probably underestimated the time and effort required for even this modest empirical data collection, and the work needed to ensure that the data was analysed in a statistically appropriate manner. The National Health Service research ethics application alone involved the submission of answers to over seventy questions. However, the empirical results (although exploratory) gave me some confidence in the answer to the research question, and how the findings could contribute to the handling of public sector data sharing initiatives in the future. One of these findings was that the more tangible the public service, the more trust is shown in it. Thus, I could argue that data sharing initiatives, even if 'legal' on the face of it, might benefit from a bottom-up institution led approach.

¹¹⁰ n104, 96.

¹¹¹ n108, 128.

¹¹² Fiona de Londras, 'Participatory Research: Some Provocations for Doctoral Students in Law' in Laura Cahillane and Jennifer Schweppe (eds) *Legal Research Methods: Principles and Practicalities* (Clarus 2016), 150.

¹¹³ I chair the West Midlands PCC and West Midlands Police data ethics committee.

¹¹⁴ n40, 97.

¹¹⁵ Lisa M Given, *100 Questions (and Answers) About Qualitative Research* (Thousand Oaks, CA: SAGE Publications, 2015), 135.

¹¹⁶ Ashley Savage and Richard Hyde, 'Local Authority Handling of Freedom of Information Requests: Lessons from a Research Project' (2013) *European Journal of Current Legal Issues*, 19(2).

¹¹⁷ Michael Doherty, 'Getting Down and Dirty: The Case for Empirical Legal Research' in Laura Cahillane and Jennifer Schweppe (eds) *Legal Research Methods: Principles and Practicalities* (Clarus 2016), 133.

Finally in this section, I comment briefly on the historical research in publications 4 and 12. Both pieces took an external approach to legal history – described by Cahillane as ‘almost a historical version of the socio-legal approach’¹¹⁸ - together with a comparative element focused on identifying and proposing best practice and lessons to be learned. It was important therefore to be cognisant of the differences in legal systems, and the limitations of my own knowledge of those systems, when drawing conclusions. I attempted to avoid the danger of using history simply to explain the present or viewing history as linear progress.¹¹⁹ The use of history can however ‘illustrate ... how legal precepts – rules, principles, conceptions and standards – have met concrete situations of fact in organising human society in the past and enabling or helping us to judge how we may deal with such situations with some assurance in the present.’¹²⁰ I also used elements of what has been described as ‘legal archaeology’¹²¹ within my approach in publication 4, including the consideration of case facts in their historical context, and wider historical and social settings. This approach enabled me to draw analogies between the historical use of the polygraph and modern day machine learning, with historical material, and comparison with current activities, supporting my conclusion that a utilitarian ‘reforming legal realist’ attitude can be detected in the arguments of both the early proponents of the polygraphs and current AI enthusiasts.

4. Interdisciplinarity within the Work

Balkin describes interdisciplinary scholars as ‘romantic rebels’, questioning authority by ‘transgressing disciplinary boundaries...in the service of a greater truth.’¹²² Although it would be rather satisfying to categorise the Work in this way, it would be going too far! The Work remains grounded in the law, while aiming to avoid ‘an unhealthy preoccupation with technicalities’.¹²³ I noted above that much of the Work is interdisciplinary both within the legal discipline and outside it. In this section, I review selected definitions of ‘interdisciplinarity’ within legal research and reflect on which, if any, of these forms of interdisciplinarity are present within the Work.

Siems argues that there is no uniform definition of ‘multi-’, ‘inter-’, ‘trans-’ and ‘cross-disciplinarity’, nor as to the degree of synthesis required for interdisciplinarity,¹²⁴ although this has not prevented scholars from proposing such definitions or categorisations. Siems himself suggests a taxonomy (Fig. 2) based on the type of question addressed (legal or otherwise) and the subordinate or integrated way of involving the other discipline(s).

	<i>Approaches that keep disciplines separate</i>	<i>Approaches that integrate ‘scientific’ methods into legal thinking</i>
Legal questions	Basic interdisciplinary research	Advanced interdisciplinary research type 2
Non-legal questions	Advanced interdisciplinary research type 1	Advanced interdisciplinary research type 3

Fig. 2: Taxonomy of interdisciplinary legal research (Siems, 2009)

Siems argues that the advantage of the first type of advanced interdisciplinary legal research is that it can provide a relatively comprehensive view of a particular topic. It avoids the trap of focusing on only one piece of the jigsaw and disregarding other important interconnected issues.¹²⁵ The second and third type of interdisciplinary research involve the introduction of ‘scientific’ methods, for instance empirical research.

¹¹⁸ Laura Cahillane, ‘The Use of History in Law: Avoiding the Pitfalls’ in Laura Cahillane and Jennifer Schweppe (eds) *Legal Research Methods: Principles and Practicalities* (Clarus 2016), 61.

¹¹⁹ *Ibid*, 63-64.

¹²⁰ R. Pound quoted in Laura Cahillane, ‘The Use of History in Law: Avoiding the Pitfalls’ in Laura Cahillane and Jennifer Schweppe (eds) *Legal Research Methods: Principles and Practicalities* (Clarus 2016), 69.

¹²¹ Brian A W Simpson, *Leading Cases in the Common Law* (Oxford 1995).

¹²² J. Balkin, ‘Interdisciplinarity as colonization’ (1996) *Washington and Lee Law Review* 53, 949–70.

¹²³ n62, 6.

¹²⁴ n62, 6.

¹²⁵ Mathias Siems, ‘Legal originality’ (2008) *Oxford Journal of Legal Studies* 28, 147–164, 163.

Yet Siems warns that law is not science in the sense of constructing models in order to test hypotheses.¹²⁶ It may be that ‘the legal world and its relationship with extra-legal factors is too complex to be reduced to numbers.’¹²⁷ This is because ‘an applicable legal norm on anything but the most banal question is likely to be complex, nuanced, contested. [...] Law is not a datum; it is in constant evolution, developing in ways that are sometimes startling and endlessly inventive.’¹²⁸ Publications **2, 3, 8** and **11** include aspects of Siems’ advanced interdisciplinary research types, in exploration of non-legal as well as legal issues, collaboration with researchers outside the legal discipline and the use of methods (empirical analysis of freedom of information and survey responses, and participatory research with results analysed following an inductive grounded theory approach) not common in legal research.

Doctrinal research has however been paralleled to discovery in sciences: ‘Doctrinal research, at its best, involves rigorous analysis and creative synthesis, the making of connections between seemingly disparate doctrinal research strands, and the challenge of extracting general principles from an inchoate mass of primary materials’, a blend of deduction and induction and analogy.¹²⁹ This is especially so since doctrinal research reflects a positivist approach where the law is seen as neutral and objective. Regarding the law as ‘data’, however, overlooks the importance of context and that interpreting and applying the law is highly subjective¹³⁰ (explaining why lawyers spend so much time arguing!).

Taekema and Burg point out that as doctrinal analysis ‘is usually restricted to one legal order at a specific moment in its historical development, it does not yield generalisable results, let alone general theories.’¹³¹ They propose an integrated approach - ‘interdisciplinary doctrinal research’ - and argue that ‘there is no such thing as purely monodisciplinary doctrinal analysis.’ They posit that legal doctrinal research ‘cannot be other than interdisciplinary in nature.’ Critical evaluation and reform proposals ‘require at least some critical distance regarding the legal order’, consideration of the society in which the law exists and the behaviour that it regulates, and the inclusion of insights from other disciplines.¹³²

They distinguish between five different ways of interdisciplinary research and their purposes as laid out in Fig. 3.

<i>Type of interdisciplinary research</i>	<i>Purpose</i>
1. <i>Heuristics</i>	The second discipline is used to stimulate creativity and to obtain new ideas
2. <i>Auxiliary discipline</i>	The second discipline provides data and input, for example sociological insights about effectiveness or economic insights about efficiency
3. <i>Interdisciplinary comparative research</i>	Two parallel but separate projects – for example, a legal and an ethical one – on the same issue, with parallel questions and methods and a comparison at the end
4. <i>Dialectical cooperation</i>	Two separate disciplinary projects interact throughout the research process, enabling researchers to continuously adjust and refine their research
5. <i>Integrated research</i>	The most challenging and the ultimate aim of Taekema and Burg’s ‘interdisciplinary doctrinal research’ in order to construct, evaluate and reform legal doctrine

Fig. 3. *Types and purposes of interdisciplinary research, Taekema and Burg (2015)*

Within the Work, examples of the first and second ways of interdisciplinary research can be seen, for instance with developments in criminology and data science both providing the basis for the case study

¹²⁶ n62, 9.

¹²⁷ n62, 11.

¹²⁸ C. McCrudden, ‘Legal research and social sciences’ (2006) *Law Quarterly Review* 122, 632–50.

¹²⁹ Council of Australian law Deans, CALD Statement on the Nature of Research (May and October 2005), 3.

¹³⁰ N. J. Duncan and T. Hutchinson, ‘Defining and describing what we do: Doctrinal legal research’ (2012) *Deakin Law Review* 17(1) 83-119, 116.

¹³¹ Sanne Taekema and Wibren van der Burg, ‘Introduction: The Incorporation Problem in Interdisciplinary Legal Research’ (2015) *Erasmus Law Review* 2, 55-64.

¹³² *Ibid.*

critiqued in publication 6, and providing insight and contribution to the output. Integrated research was attempted in publications 2 and 3 although I would not classify these publications as 'interdisciplinary doctrinal'. The aim of these pieces of research was wider than doctrinal analysis and in particular to the inform the structure and application of the law by developing an understanding of the challenges and issues faced by those at the 'coal face.'

Roux disagrees with the view that legal research is an inherently interdisciplinary discipline.¹³³ Doctrinal research, Roux argues, 'characteristically draws on other disciplines to improve the rational coherence and social efficacy of law. Provided doctrinal researchers respect the conventionally accepted reasoning techniques of the legal tradition in which they are working, there is no reason why such research should be regarded as interdisciplinary.' It is open to the doctrinal researcher to use knowledge from another discipline, but with 'primary fidelity' to the purposes of the legal tradition; in other words, doctrinal researchers are 'expert cannibalisers' of knowledge from other disciplines. In some respects, I would recognise myself in this cannibalistic description. I would however frame the process in a more positive manner in terms of the need to work across legal and disciplinary boundaries in order to identify and incorporate relevant information and tackle those 'known unknowns'.

Legal research in the wider sense, says Roux, can be regarded as a multidisciplinary field 'in which doctrinal research is but one of many mono-disciplinary and interdisciplinary forms of research being pursued.' It is questionable therefore whether legal research can be thought of as a discipline, in the sense of having a limited and defined set of methodological standards and audiences. The Work includes jointly written pieces (9 and 10) where the authors, although all from a legal background, approach the research from different areas of expertise and different experiences (academic or practice), thus making links between often disparate and siloed academic 'subjects' and research strands to propose a more coherent approach to legal principle.

Schrama's definition of interdisciplinary legal research is a considerably more straightforward one: 'legal research which incorporates insights from non-legal disciplines.'¹³⁴ It concerns the external effectiveness of the law and thus the law in action, evaluating the difference between 'the legal reality and the real reality' with the method determined by the nature of the research question.¹³⁵ Schrama argues that 'at least two different goals may be discerned: to give context to a legal problem or to test a specific legal approach as to its external effectiveness.'¹³⁶ She further suggests two main routes: 'unilateral' where a legal research question is investigated by a legal researcher but using data from another discipline; and 'multilateral' where the project, from the start, involves at least two researchers from different disciplines.¹³⁷ Again, the Work has involved both these approaches. A key challenge is how to assess the non-legal data in order to judge the implications about the legal reality: Schrama asks, 'when does an external argument result in a necessity to change the law?...The external argument will have to be transformed into an internal argument and then to be weighed against the other arguments.'¹³⁸ The Work has also used an interdisciplinary approach to assess whether the law is understood or being applied effectively by those subject to it.

I identify with many of the problems of interdisciplinary legal research laid out in the literature, in particular the accusation of 'picking and choosing' and thus incorrectly understanding the other discipline, the challenge of how to integrate empirical results within the legal discipline, lack of knowledge of quantitative/qualitative methods (which I have tried to address by personal training and the use of research assistance with such expertise) and difficulties in translating legal concepts.¹³⁹ As Buchanan and Headrick point out, interdisciplinary work between lawyers and computer/data scientists comes with a risk of talking at cross-purposes, with words and concepts having different meanings in each discipline (as I discuss in

¹³³ Theunis Robert Roux, 'The Incorporation Problem in Interdisciplinary Legal Research: Some Conceptual Issues and a Practical Illustration' (2015) *Erasmus Law Review* 2, 39-42.

¹³⁴ Wendy Schrama, 'How to carry out interdisciplinary legal research: Some experiences with an interdisciplinary research method' (2011) *Utrecht Law Review* 7(1) 147-162, 147.

¹³⁵ *Ibid*, 149.

¹³⁶ n134, 161.

¹³⁷ n134, 151-152.

¹³⁸ n134, 160.

¹³⁹ n134, 160.

publication 5): ‘computer scientists...have operated with a conception of law as a collection of facts and “correct” legal principles; they have assumed that the computer can be most helpful to the lawyer if it can retrieve the right answers quickly. But the lawyer rarely looks for, or even expects, clear answers. More often than not, he searches his data base...in order to construct legally acceptable arguments in the pursuit of one or more objectives.’¹⁴⁰

Furthermore, it is certainly the case that, despite the promotion of interdisciplinary work within funding calls and ‘impact’ assessments, University and academic research structures, in particular the separation of disciplines into silos, can act against successful interdisciplinary integration. Ultimately, however, I would agree with van Klink and Taekema that we should adopt a pragmatic view on the differences between law and other academic fields, as the advantages of mixing can outweigh a formalistic strict separation.¹⁴¹ There can be no one-size-fits-all approach to interdisciplinary research. Projects and activities will require differing levels of disciplinary integration (from knowledge sourcing to jointly combining approaches) but, crucially in order to have the best chance of success, with common aims. The approach that I have adopted - interdisciplinarity combined with the methodologies discussed in section 3 - are no doubt familiar to many legal researchers with a practice background and could be described as an ‘in-house’ approach to legal research. This approach is defined by practical knowledge of an operational context built up through deep interaction with that context, awareness of relevant legal frameworks (including the ‘known unknowns’), translation of theoretical concepts for such operational contexts, and the independence necessary to produce robust conclusions and recommendations from such comprehensive understanding, which then feed back into the operational context. It is a research approach that I would suggest is worthy of further consideration and development within academia.

5. Progression of the research

The research has continued in 2020 culminating in the following publications. The themes explored in 2 and 3 have been further developed in a final project report in which the full findings of the participatory research process informed extensive practical recommendations directed at police forces, regulators and software developers.¹⁴² The report advised *inter alia* that algorithmic outputs should be treated as a form of intelligence associated with a level of confidence, thus driving human users to assess the validity and relevance of the information.¹⁴³ This conclusion has been of direct relevance to a national policing project that has been reviewed by the West Midlands Police data ethics committee, resulting in a change to the tool’s operation and design.

Continuing the theme of the public sector use of AI, a forthcoming book chapter uses a doctrinal approach to draw attention – in the context of predictive tools being deployed to support the police’s public protection functions - to the difficulties of reliance upon a common law legal basis, an issue also highlighted by the *Bridges* decision in the context of live facial recognition.¹⁴⁴ We conclude that the roles and responsibilities of the police of England and Wales may need to be explicitly defined in the form of statutory functions, as is the case with the police services of Scotland and Northern Ireland, not just in respect of police use of algorithms, but to provide reassurances regarding the legitimacy of the ‘public protection’ and preventative functions of the police.¹⁴⁵ In addition, the participatory research methodology and interdisciplinary

¹⁴⁰ Bruce G. Buchanan and Thomas E. Headrick, ‘Some Speculation about Artificial Intelligence and Legal Reasoning’ (1970) *Stanford Law Review* 23(1) 40-62, 40.

¹⁴¹ Bart van Klink and Sanne Taekema, ‘A Dynamic Model of Interdisciplinarity: Limits and Possibilities of Interdisciplinary Research into Law’ (2008) Tilburg University Legal Studies Working Paper No. 010/2008, Tilburg Working Paper Series on Jurisprudence and Legal History No. 08-02. Available at SSRN: <https://ssrn.com/abstract=1142847> accessed 4 October 2020.

¹⁴² Alexander Babuta and Marion Oswald, ‘Data Analytics and Algorithms in Policing in England and Wales: Towards A New Policy Framework’ (2020) *RUSI Occasional Paper*.

¹⁴³ *Ibid*, viii.

¹⁴⁴ *R (on the application of Bridges) v Chief Constable of South Wales Police* [2020] EWCA Civ 1058.

¹⁴⁵ Marion Oswald and Alexander Babuta, ‘Machine learning predictive algorithms and the policing of future crimes: governance and oversight’ in Dr John L.M. McDaniel and Prof Ken Pease OBE (eds) *Policing and Artificial Intelligence* (2021 Routledge, Forthcoming). Available on SSRN at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3479081

approach used successfully in **2** and **3** was deployed again in the research for and production of a peer-reviewed report on AI and national security commissioned by GCHQ.¹⁴⁶

The concept of 'experimental proportionality', first posited in **6**, is revisited in an analysis piece forthcoming in *Public Law* in the context of the English Covid-19 contact tracing app.¹⁴⁷ In the uncertainty of the coronavirus pandemic, it is difficult to determine the impact on rights and benefits for society of the data driven solutions deployed or proposed (an issue that was also raised in **11**). We argue that, combined with a robust and rolling oversight function, a model of 'experimental' proportionality review could assist in upholding a fair balance between the rights of the individual and the interests of the community in situations of uncertainty and crisis. This piece contributes to the increasingly important body of work that promotes administrative law principles as providing a systematic (and less individualistic compared to data protection law) constraint on the use of algorithmic decision-making by public bodies, as I discuss in **5**. Daly, for instance, argues that the Ofqual grading algorithm 'could lead to systemic unfairness in the sense that the algorithm "creates a real risk of a more than minimal number" of irrational decisions (*R (BF (Eritrea)) v Secretary of State for the Home Department* [2019] EWCA Civ 872, [2020] 4 WLR 38, [63] (Underhill LJ)).¹⁴⁸

My 'interdisciplinary' work within law has also continued, with the development of a new collaboration with Kotsoglou. Together we commented upon the High Court decision in *Bridges*, critiquing the court's conclusion that live facial recognition was 'no more intrusive than the use of CCTV on the streets' and arguing that insufficient attention was paid to particular decision-making contexts in which facial recognition could be deployed.¹⁴⁹ In this respect, it was somewhat satisfying to note the Court of Appeal's conclusion that 'The fundamental deficiencies, as we see it, in the legal framework currently in place relate to two areas of concern. The first is what was called the "who question" at the hearing before us. The second is the "where question". In relation to both of those questions too much discretion is currently left to individual police officers.'¹⁵⁰ Again in collaboration with Kotsoglou, I have built on the research and conclusions in **4** to explore the increasing use of the polygraph in the current English penal system, including Bills before Parliament providing for the use of the polygraph in the monitoring of terrorism and domestic violence offenders. This project has used in part a freedom of information methodology which has highlighted a concerning lack of consistency in both practice and procedure in respect of the use of the polygraph by police forces, including the uncovering of a non-statutory imposition of the polygraph test in connection with bail and a community sentence programme.¹⁵¹

A few thoughts to conclude this section on further avenues of research suggested by the Work. First, responsibilities and liabilities of internet intermediaries, or platforms as they are now more commonly called. As Edwards argues, 'The dawning horror at [the] covert manipulation of everything from buying choices to democratic decision making may have finally killed off once and for all the notion of platforms as innocent intermediaries.'¹⁵² Despite this, Mac Sithigh's view is that the fragmented approach to the law on intermediaries has continued and that new approaches are emerging,¹⁵³ bringing with them 'a number of

¹⁴⁶ Alexander Babuta, Marion Oswald, Ardi Janjeva, 'Artificial intelligence and UK national security: policy considerations' (2020) *RUSI Occasional Paper*.

¹⁴⁷ Marion Oswald and Jamie Grace, 'The COVID-19 Contact Tracing App In England and 'Experimental Proportionality'' (June 24, 2020). Forthcoming, *Public Law*. Available at SSRN: <https://ssrn.com/abstract=3632870>.

¹⁴⁸ Paul Daly, 'Algorithms, Administrative Law and Administrative Justice' *Administrative Law Matters blog*, August 26, 2020 <https://www.administrativelawmatters.com/blog/2020/08/26/algorithms-administrative-law-and-administrative-justice/> accessed 4 October 2020.

¹⁴⁹ Kyriakos N. Kotsoglou and Marion Oswald, 'The long arm of the algorithm? Automated Facial Recognition as evidence and trigger for police intervention' (2020) *Forensic Science International: Synergy* 2, 86-89.

¹⁵⁰ *R (on the application of Bridges) v Chief Constable of South Wales Police* [2020] EWCA Civ 1058, 91.

¹⁵¹ Marion Oswald and Kyriakos Kotsoglou, 'Not 'very English' - On the Use of the Polygraph by the Penal System in England and Wales' (September 3, 2020). Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3686069.

¹⁵² n51, 259.

¹⁵³ Daithí Mac Síthigh, 'The road to responsibilities: new attitudes towards Internet intermediaries' (2020) *Information & Communications Technology Law* 29:1, 1-21, 2-3.

design and implementation dilemmas' including finding the right balance between judicial resolution of disputes and a regulatory approach.¹⁵⁴

In 1, I argued that 'harmful data processing needs to be addressed head-on, and this may mean dealing with problems in more than one place in the information lifecycle.' (1 at page 112). I continue to stand by this view. With such continuing 'horrors' as the mainstreaming of deepfake porn,¹⁵⁵ the alleged profiling of Black Americans on Facebook by the Trump campaign,¹⁵⁶ and the 'surveillant on the street' (as coined in 1) now a reality thanks to DIY facial recognition systems,¹⁵⁷ it could be time to revisit the 2017 'misuse of the digital person' model proposed in 7. Rather than attempting to hide information already in the public domain, this model focuses upon 'how an individual might be protected from inappropriate intrusion based on the exploitation of this information to de-anonymise, make links or generate presumptions.' The model would apply to digital information that represented the fundamentals of a person (Fig. 4), permitting only certain actions in respect of that information. I suggested that 'discernible digital information that falls within the fundamentals of a person (for instance, a blog in which a person expresses their views and talks about their life) can [in this model] be viewed, read, searched, stored, linked to and reported upon, but not further used (unless an exception applied) to generate new information or intelligence about an individual that falls within the fundamentals of a person' (7 at page 23).

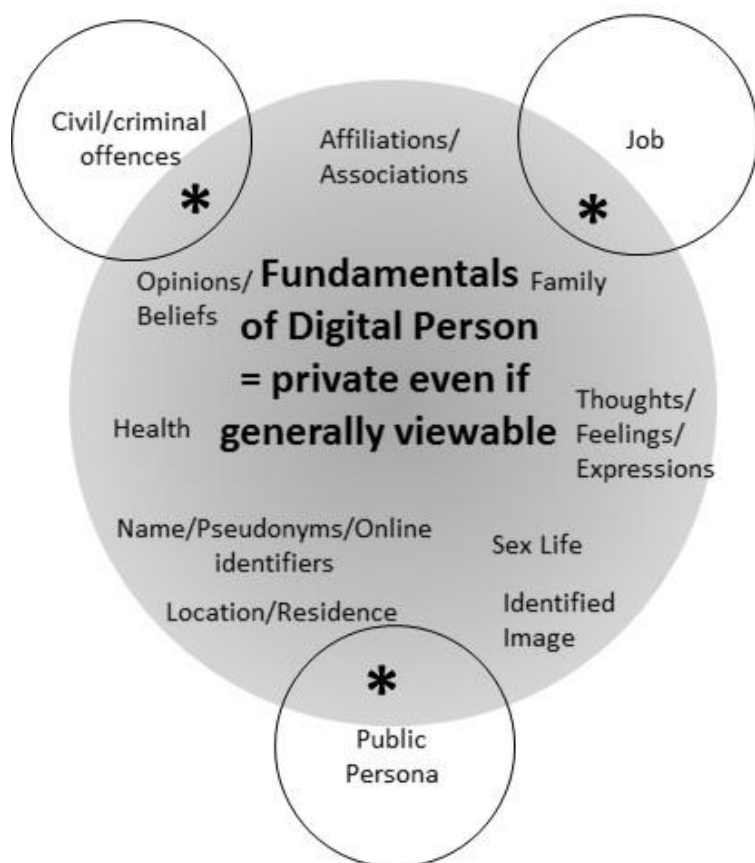


Fig. 4. Fundamentals of a digital person as proposed in 7 at page 23

¹⁵⁴ *Ibid*, 20.

¹⁵⁵ Matt Burgess, 'Deepfake porn is now mainstream. And major sites are cashing in' *Wired*, 27 August 2020 <https://www.wired.co.uk/article/deepfake-porn-websites-videos-law>, accessed 4 October 2020.

¹⁵⁶ Channel 4 News, 'Revealed: Trump campaign strategy to deter millions of Black Americans from voting in 2016' 28 Sep 2020 <https://www.channel4.com/news/revealed-trump-campaign-strategy-to-deter-millions-of-black-americans-from-voting-in-2016>, accessed 4 October 2020.

¹⁵⁷ Ben Heubl, 'How to find anyone's face online' (2020) *Engineering & Technology*, 15(9), 22-25.

Although my proposal considered tort law as a framework, on reflection it was proposing new duties (rather than enforcement of existing laws) applicable to all but addressed through intermediaries. I remain uncertain as to whether the proposal is at all realistic in a society where we continue to ‘amuse ourselves to death’, and the acceptability of intrusion or surveillance activities differs dependent upon context and jurisdiction. But as Brownsword says: ‘Coherentists might make heroic attempts to apply the existing rules, to make the existing rules fit, but sooner or later the disruption will have to be addressed head-on and a bespoke regulatory response made.’¹⁵⁸ He further argues that if we are not ready to accept that privacy is dead, we need a ‘fixed conception...to make the protective regime more robust by anchoring the ubiquitous idea of a reasonable expectation.’¹⁵⁹ Might the misuse of the digital person model be adapted for a ‘fixed’ response to some of the most egregious digital harms, and thus influence the technical design of products, services and processes?

Furthermore, I would like to return to questions of freedom of information that were explored in part in **13** and in practice by use of freedom of information request methodology. Parallel lines of cases have considered the question of whether Article 10 ECHR, which includes a right ‘to receive and impart information and ideas without interference by public authority’, therefore creates a right to request information from a public authority where refusal would constitute interference with Article 10. It can but it depends, the ECtHR has said, ‘in circumstances where access to the information is instrumental for the individual’s exercise of his or her right to freedom of expression’.¹⁶⁰ The Supreme Court has taken a different stance; Article 10 does not create a positive duty of disclosure on public authorities,¹⁶¹ and therefore Article 10 does not create a right in English law to request and receive information from public bodies, nor does it impact upon the terms of the Freedom of Information Act 2000.¹⁶² Knowledge that affects exercise of rights – for instance that might expose electoral influence or manipulation – is however increasingly in the hands of commercial bodies, as are records and knowledge crucial for the preservation of cultural memory longer term. Ovenden asks: ‘Since the digital shift has been driven by a relatively small number of powerful technology companies, who will be responsible for the control of history and for preserving society’s memory?’¹⁶³ What should be the role of public libraries and archives in taking control of these digital bodies of knowledge and so providing us with the means of examining how the world ‘has come to be the way it is’¹⁶⁴ and enabling understanding of the issues at stake. The Digital Economy Act 2017 confers a power on the Statistics Board to require the disclosure of information held by non-public commercial undertakings,¹⁶⁵ thus taking a tentative step towards combining privately held data with public sector information for the purposes of official statistics. We seem to be a long way off however from deciding if and how commercially-held digital data should be regarded as part of ‘society’s memory’ and how far individuals, public bodies or regulators should be able to access or archive such data for of important societal purposes, rather than in pursuance of individuals rights or complaints.

In relation to the use of algorithmic technologies by the public sector, it appears that, despite regular calls for regulation or legislation,¹⁶⁶ in practice the current political and operational environment is one that favours self-regulation and ‘ethical’ guidance (and this has been influenced strongly by some academic groupings), rather than approaches based on law and mandatory regulation that have consequences and red lines. A plethora of ethical guidelines and frameworks have emerged, both at a national and international level,¹⁶⁷ satisfying on the surface the ‘something must be done’ requirement but providing little or no consistency or firm protection. It is concerning, for instance, that in the Government Digital Service’s most recent Data Ethics Framework, ‘comply with the law’ only comes in at number 3 on the list of

¹⁵⁸ n32, 20.

¹⁵⁹ n8, 328.

¹⁶⁰ *Magyar Helsinki Bizottság v Hungary*, App. No. 18030/11 (8 November 2016), 156.

¹⁶¹ *Kennedy v The Charity Commission* [2014] UKSC 20.

¹⁶² *Moss v Information Commissioner and the Cabinet Office* [2020] UKUT 242 (AAC).

¹⁶³ Richard Ovenden, *Burning the Books; A History of Knowledge Under Attack* (John Murray 2020) 198.

¹⁶⁴ *Ibid*, 215.

¹⁶⁵ 2017 c.30, s80.

¹⁶⁶ Such as those by the Metropolitan Police Commissioner, Cressida Dick quoted in <https://www.wired.co.uk/article/regulate-facial-recognition-laws>.

¹⁶⁷ Some of which are highlighted in the Annex to Alexander Babuta, Marion Oswald, Ardi Janjeva, ‘Artificial intelligence and UK national security: policy considerations’ (2020) *RUSI Occasional Paper*.

actions!¹⁶⁸ Statements and questions such as 'define the public benefit' and 'How does the design and implementation of the project or algorithm respect human rights and democratic values?' evidence little real understanding of the necessity and proportionality tests in human rights law, both in respect of the design of a digital tool and to its deployment in an operational context. I appreciate that by chairing a body described as a data ethics committee, I could be accused of contributing to the problem. Ultimately, if the police force chose not to follow the committee's advice, the only immediate consequence would be reputational damage. However, my research has informed both the committee's terms of reference and the way that it operates, with law sitting at number 1 on the list. 'Algocare' is used to structure submissions to the committee, and various findings from the Work and subsequent research have informed advice provided on the design and 'operationalisation' of data analytics. This integration with the operational environment is, I would suggest, an example of the 'in house' legal research approach mentioned above. I intend to continue to champion the application of 'old' law to the deployment of new technologies by the State, the translation and reimagining of underlying principles to new contexts and where necessary, the need for new frameworks and forms of regulation.

6. General evaluation statement and conclusion

The process of preparing this Commentary has been a revealing and illuminating one, enabling me to revisit the issues and themes explored within the Work and to reconsider the methodologies and interdisciplinary nature of the research. I aim to have demonstrated that the Work has made a coherent, valuable and original contribution to knowledge in the field of Cyberlaw, and specifically within the overall theme and three sub-themes identified, and that the Work has led to further avenues of academic investigation as well as to practical and policy developments. In bringing practice experience into the academic field, I have developed mixed methods methodologies that make 'the best of both worlds' and have translated academic theories and legal principles into operational environments. Technological change has been a consistent theme through my varied career, whether as a user, adviser and now as a researcher. There is no doubt that this technological change will continue throughout the 2020s and beyond, and I hope to continue to contribute in a small way to considering how the law should deal with it.

¹⁶⁸ Government Digital Service 'Data Ethics Framework' Revised 16 September 2020
<https://www.gov.uk/government/publications/data-ethics-framework/data-ethics-framework-2020>, accessed 4 October 2020.

Bibliography

Cases

Catt v UK, App. No. 43514/15 (ECHR, 24 January 2019).

Google Spain v AEPD and Mario Costeja Gonzalez (C-131/12), 13 May 2014.

Kennedy v The Charity Commission [2014] UKSC 20.

Magyar Helsinki Bizottság v Hungary, App. No. 18030/11 (8 November 2016).

Morley v Information Commissioner and Surrey Heath Borough Council [2012] EA/2011/0173.

Moss v Information Commissioner and the Cabinet Office [2020] UKUT 242 (AAC).

R (Catt) v Commissioner of Police of the Metropolis & Anor and another [2015] UKSC 9.

R (on the application of Bridges) v Chief Constable of South Wales Police [2020] EWCA Civ 1058.

Surrey Heath Borough Council v IC and Morley [2014] UKUT 0330 (AAC).

Statutes

Digital Economy Act 2017, c.30.

Freedom of Information Act 2000, c. 36.

Books

Roger Brownsword, *Law, Technology and Society: Re-Imagining the Regulatory Environment* (Routledge 2019).

Roger Brownsword, *Law 3.0* (Routledge 2021).

Kieron O'Hara and Nigel Shadbolt, *The Spy in the coffee machine: the end of privacy as we know it* (1st edition, Oneworld 2008).

Mireille Hildebrandt and Kieron O'Hara (eds) *Life and the Law in the Era of Data-Driven Agency* (Edward Elgar 2020).

Lawrence Lessig, *Code: Version 2.0* (Basic Books 2006).

Helen Nissenbaum, *Privacy in Context* (Stanford University Press 2010).

Jan Oster, *Media Freedom as a Fundamental Right* (Cambridge University Press 2015).

Richard Ovenden, *Burning the Books; A History of Knowledge Under Attack* (John Murray 2020).

Neil Postman, *Amusing Ourselves to Death: Public Discourse in the Age of Show Business* (Penguin 1985).

Book chapters

Laura Cahillane, 'The Use of History in Law: Avoiding the Pitfalls' in Laura Cahillane and Jennifer Schweppe (eds) *Legal Research Methods: Principles and Practicalities* (Clarus 2016).

Fiona Cownie and Anthony Bradney, 'Socio-legal studies: A challenge to the doctrinal approach' in Dawn Watkins and Mandy Burton (eds) *Research Methods in Law, Second Edition* (Routledge 2018).

Michael Doherty, 'Getting Down and Dirty: The Case for Empirical Legal Research' in Laura Cahillane and Jennifer Scheppe (eds) *Legal Research Methods: Principles and Practicalities* (Clarus 2016).

Lilian Edwards, 'With Great Power Comes Great Responsibility?': The Rise of Platform Liability' in Lilian Edwards (ed) *Law, Policy and the Internet* (Hart 2019).

Mireille Hildebrandt, 'Code Driven Law. Scaling the Past and Freezing the Future' in Simon Deakin and Christopher Markou (eds) *Critical Perspectives on Law and Artificial Intelligence* (Hart Publishers 2020 Forthcoming).

Terry Hutchinson, 'Doctrinal Research: Researching the Jury' in Dawn Watkins and Mandy Burton (eds) *Research Methods in Law, Second Edition* (Routledge 2018).

Shane Kilcommins, 'Doctrinal Legal Method (Black-Letterism): Assumptions, Commitments and Shortcomings' in Laura Cahillane and Jennifer Scheppe (eds) *Legal Research Methods: Principles and Practicalities* (Clarus 2016).

Andrew Le Sueur, 'Robot government: automated decision-making and its implications for Parliament' in A Horne and A Le Sueur (eds) *Parliament: Legislation and Accountability* (Hart Publishing 2016).

Fiona de Londras, 'Participatory Research: Some Provocations for Doctoral Students in Law' in Laura Cahillane and Jennifer Scheppe (eds), *Legal Research Methods: Principles and Practicalities* (Clarus 2016).

Darren O'Donovan, 'Socio-Legal Methodology: Conceptual Underpinnings, Justifications and Practical Pitfalls' in Laura Cahillane and Jennifer Scheppe (eds) *Legal Research Methods: Principles and Practicalities* (Clarus 2016).

Marion Oswald and Alexander Babuta, 'Machine Learning Predictive Algorithms and the Policing of Future Crimes: Governance and Oversight' (October 31, 2019) in John L.M. McDaniel and Ken Pease OBE (eds) *Policing and Artificial Intelligence* (Routledge, Forthcoming 2021).

Christopher T. Marsden, 'The Regulated End of Internet Law, and the Return to Computer and Information Law?' in Kevin Werbach (ed) *After the Digital Tornado* (Cambridge University Press 2020).

Teresa Scantamburlo, Andrew Charlesworth and Nello Cristianini, 'Machine Decisions and Human Consequences' in K. Yeung & M. Lodge (Eds) *Algorithmic Regulation* (Oxford University Press 2019).

Michael Veale and Irina Brass, 'Administration by Algorithm? Public Management Meets Public Sector Machine Learning' in K. Yeung & M. Lodge (Eds) *Algorithmic Regulation* (Oxford University Press 2019).

Karen Yeung, 'Why Worry about Decision-Making by Machine?' in K. Yeung & M. Lodge (Eds) *Algorithmic Regulation* (Oxford University Press 2019).

Official publications

David Anderson, 'A Question of Trust: Report of the Investigatory Powers Review' (June 2015).

Centre for Data Ethics and Innovation, 'Addressing trust in public sector data use' (20 July 2020).

Committee on Standards in Public Life, 'Artificial Intelligence and Public Standards: A Review by the Committee on Standards in Public Life' (February 2020).

Government Digital Service, 'Data Ethics Framework' Revised 16 September 2020.

Wendy Hall and Jerome Pesenti, 'Growing the Artificial Intelligence Industry in the UK' (London: Department for Digital, Culture, Media and Sport and Department for Business, Energy and Industrial Strategy, 2017).

House of Commons Science and Technology Committee, 'Algorithms in Decision-Making' (Fourth Report of Session 2017-19, 15 May 2018) HC 351.

House of Lords Select Committee on Artificial Intelligence, 'AI in the UK: ready, willing and able?' (Report of Session 2017-19, 2018) HL Paper 100.

Information Commissioner's Office, 'Age appropriate design: a code of practice for online services' (2020).

Law Commission, 'Data Sharing between Public Bodies: A Scoping Report' (2014, LAW COM No 351) HC 505.

The Law Society of England and Wales, 'Algorithms in the Criminal Justice System' (4 June 2019).

The Parliamentary Office of Science and Technology, 'Interpretable machine learning' POSTNOTE Number 633, October 2020.

James Tobin, 'Predictive and Decision-making Algorithms in Public Policy' *House of Lords Library Research Briefing* (3 February 2020).

Journal articles

Wendy A. Bach and Sameer M. Ashar 'Critical Theory and Clinical Stance' (2019) *Clinical Law Review* 26(81), 81-97.

Eric Barendt, 'Problems with the 'reasonable expectation of privacy' test' (2016) *Journal of Media Law* 8(2), 129-137.

Richard A. Berk, Susan B. Sorenson and Geoffrey Barnes, 'Forecasting Domestic Violence: A Machine Learning Approach to Help Inform Arraignment Decisions' (2016) *Journal of Empirical Legal Studies* 31(1), 94-115.

Bruce G. Buchanan and Thomas E. Headrick, 'Some Speculation about Artificial Intelligence and Legal Reasoning' (1970) *Stanford Law Review* 23(1), 40-62.

Jennifer Cobbe, 'Administrative law and the machines of government: Judicial review of automated public-sector decision-making' (2019) *Legal Studies* 39(4), 636-655.

Julie E. Cohen, 'What Privacy Is For' *Harvard Law Review* (2013) 126, 1904-1933.

Fons Coomans and Fred Gunfeld and Menno T Kamminga, 'Methods of Human Rights Research: A Primer' (2010) 32 *Hum Rts Q* 179, 183-184.

Jon Crowcroft, 'How to Tell When a Digital Technology Is *Not* Ready for You' (2020) *Patterns* 1(1).

Frank H. Easterbrook, 'Cyberspace and the *Law of the Horse*' 1996 *University of Chicago Legal Forum* 207 (1996).

N. J. Duncan and T. Hutchinson, 'Defining and describing what we do: Doctrinal legal research' (2012) *Deakin Law Review* 17(1), 83-119.

Sally Gunz, 'Testing Educational Assumptions in the Context of the Non-Traditional Legal Career as a Corporate Lawyer' (1990) 24 *Law Tchr* 266.

Sally Gunz & Hugh Gunz, 'Ethical Decision Making and the Employed Lawyer' (2008) *Journal of Business Ethics*, 81(4), 927-944.

Lawrence Lessig, 'The Law of the Horse: What Cyberlaw Might Teach' (1999) 113 *Harvard Law Review* 501-549.

Orla Lynskey, 'Criminal justice profiling and EU data protection law: precarious protection from predictive policing' (2019) *International Journal of Law in Context* 15(2), 162-176.

Mireille Hildebrandt, 'Privacy As Protection of the Incomputable Self: From Agnostic to Agonistic Machine Learning' (2019) *Theoretical Inquiries of Law* 20(1), 83-121.

Ben Heubl, 'How to find anyone's face online' (2020) *Engineering & Technology*, 15(9), 22-25.

Kyriakos N. Kotsoglou and Marion Oswald, 'The long arm of the algorithm? Automated Facial Recognition as evidence and trigger for police intervention' (2020) *Forensic Science International: Synergy* 2, 86-89.

Orla Lynskey, 'Criminal justice profiling and EU data protection law: Precarious protection from predictive policing' (2019) *International Journal of Law in Context* 15(2), 162-176.

Daithí Mac Síthigh, 'The road to responsibilities: new attitudes towards Internet intermediaries' (2020) *Information & Communications Technology Law* 29(1), 1-21.

C. McCrudden, 'Legal research and social sciences' (2006) *Law Quarterly Review* 122, 632–50.

Andrew Murray, 'Looking back at the Law of the Horse: Why Cyberlaw and the Rule of Law are Important' (2013) *ScriptEd* 10(3).

Marion Oswald, 'Share and share alike - attitudes towards data sharing in the UK public sector' (2014) *Privacy and Data Protection* 14(3), 15.

Marion Oswald and Jamie Grace, 'The COVID-19 Contact Tracing App In England and 'Experimental Proportionality' (June 24, 2020). Forthcoming, *Public Law*.

Christine Rinik, 'Data trusts: more data than trust? The perspective of the data subject in the face of a growing problem' (2020) *International Review of Law, Computers & Technology* 34(3), 342-363.

Theunis Robert Roux, 'The Incorporation Problem in Interdisciplinary Legal Research: Some Conceptual Issues and a Practical Illustration' (2015) *Erasmus Law Review* 2, 39-42.

James B. Rule, 'Contextual Integrity and its Discontents: A Critique of Helen Nissenbaum's Normative Arguments' (2019) *Policy & Internet* 11, 260-279.

Javier Sánchez-Monedero & Lina Dencik, 'The politics of deceptive borders: 'biomarkers of deceit' and the case of iBorderCtrl' (2020) *Information, Communication & Society*.

Ashley Savage and Richard Hyde, 'Local Authority Handling of Freedom of Information Requests: Lessons from a Research Project' (2013) *European Journal of Current Legal Issues* 19(2).

Wendy Schrama, 'How to carry out interdisciplinary legal research: Some experiences with an interdisciplinary research method' (2011) *Utrecht Law Review* 7(1) 147–162.

Mathias M. Siems, 'The Taxonomy of Interdisciplinary Legal Research: Finding The Way Out of The Desert' (2009) *Journal of Commonwealth Law and Legal Education* 7(1), 5-17.

Mathias Siems, 'Legal originality' (2008) *Oxford Journal of Legal Studies* 28, 147–164.

David Spiegelhalter, 'Should We Trust Algorithms?' (2020) *Harvard Data Science Review* 2(1).

Sanne Taekema and Wibren van der Burg, 'Introduction: The Incorporation Problem in Interdisciplinary Legal Research' (2015) *Erasmus Law Review* 2, 55-64.

Karen Yeung, 'Algorithmic Regulation: A Critical Interrogation' (2018) *Regulation & Governance* 4, 505-523.

John Zerilli et al., 'Transparency in Algorithmic and Human Decision-Making: Is There a Double Standard?' (2019) *Philos. Technol.* 32, 661–683.

Reports

All Party Parliamentary Group on Data Analytics, 'Trust, Transparency and Tech: Building Ethical Data Policies for the Public Good' (May 2019).

Amnesty International, 'We Sense Trouble: Automated Discrimination and Mass Surveillance in Predictive Policing in the Netherlands' (2020) EU 35/2971/2020.

Alexander Babuta, Marion Oswald and Ardi Janjeva, 'Artificial Intelligence and UK National Security: Policy Considerations' (2020) *RUSI Occasional Paper*.

Alexander Babuta and Marion Oswald, 'Data Analytics and Algorithms in Policing in England and Wales: Towards A New Policy Framework' (2020) *RUSI Occasional Paper*.

Council of Australian law Deans, CALD Statement on the Nature of Research (May and October 2005).

Danny Buerkli and Margot Gagliani, 'How to make AI work for government and for people' (2018) Centre for Public Impact.

Hannah Couchman, 'Policing by Machine' *Liberty* (January 2019).

Colin Gavaghan et al., 'Government Use of Artificial Intelligence in New Zealand: Final Report on Phase 1 of the New Zealand Law Foundation's Artificial Intelligence and Law in New Zealand Project' (New Zealand Law Foundation, Wellington 2019).

Ian Kearns and Rick Muir, 'Data-Driven Policing and Public Value' The Police Foundation (March 2019).

Marion Oswald, Helen James, Emma Nottingham, Rachel Hendry and Sophie Woodman, 'Have 'Generation Tagged' Lost Their Privacy? A report on the consultation workshop to discuss the legislative, regulatory and ethical framework surrounding the depiction of young children on digital, online and broadcast media' (2017).

Karen Yeung, 'A Study of the Implications of Advanced Digital Technologies (Including AI Systems) for the Concept of Responsibility Within a Human Rights Framework' (November 9, 2018). MSI-AUT (2018) 05.

Conference papers

Martha Minow, 'Archetypal Legal Scholarship – A Field Guide' in AALS Workshop for New Law Teachers (AALS, 2006).

Michael Veale and Max Van Kleek and Reuben Binns, 'Fairness and Accountability Design Needs for Algorithmic Support in High-Stakes Public Sector Decision-Making' (April 21, 2018). Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI'18).

Working papers/white papers

Reuben Binns, 'Human Judgement in Algorithmic Loops; Individual Justice and Automated Decision-Making' (September 11, 2019). Available at SSRN: <https://ssrn.com/abstract=3452030>

Kieron O'Hara, 'A general definition of trust' (2012) Southampton, GB. University of Southampton <https://eprints.soton.ac.uk/341800/>.

Kieron O'Hara, 'Data Trusts: Ethics, Architecture and Governance for Trustworthy Data Stewardship' (2019) *Web Science Institute White Papers*, Southampton, University of Southampton.

Kieron O'Hara, Nigel Shadbolt and Wendy Hall, 'A Pragmatic Approach to the Right to be Forgotten' (2016) Global Commission on Internet Governance Paper No. 26.

Marion Oswald and Kyriakos Kotsoglou, 'Not 'very English' - On the Use of the Polygraph by the Penal System in England and Wales' (September 3, 2020). Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3686069.

Bart van Klink and Sanne Taekema, 'A Dynamic Model of Interdisciplinarity: Limits and Possibilities of Interdisciplinary Research into Law' (2008) Tilburg University Legal Studies Working Paper No. 010/2008, Tilburg Working Paper Series on Jurisprudence and Legal History No. 08-02.

Internet sources

BBC News, 'Online Harms bill: Warning over 'unacceptable' delay' (29 June 2020) <https://www.bbc.co.uk/news/technology-53222665>.

Big Brother Watch, 'A Closer Look at Experian Big Data and Artificial Intelligence in Durham Police' (April 6, 2018) <https://bigbrotherwatch.org.uk/2018/04/a-closer-look-at-experian-big-data-and-artificial-intelligence-in-durham-police/>.

Matt Burgess, 'Deepfake porn is now mainstream. And major sites are cashing in' *Wired*, 27 August 2020 <https://www.wired.co.uk/article/deepfake-porn-websites-videos-law>.

Channel 4 News, 'Revealed: Trump campaign strategy to deter millions of Black Americans from voting in 2016' 28 Sep 2020 <https://www.channel4.com/news/revealed-trump-campaign-strategy-to-deter-millions-of-black-americans-from-voting-in-2016>.

Paul Daly, 'Algorithms, Administrative Law and Administrative Justice' *Administrative Law Matters blog*, August 26, 2020 <https://www.administrativelawmatters.com/blog/2020/08/26/algorithms-administrative-law-and-administrative-justice/>.

Edward Malnick, 'Former MI5 chief warns police and intelligence officers could blame AI for controversial or racist decisions' *The Telegraph* (23 March 2019) <https://www.telegraph.co.uk/politics/2019/03/23/former-mi5-chief-warns-police-intelligence-officers-could-blame/>.

Laura Silver, 'Smartphone Ownership Is Growing Rapidly Around the World, but Not Always Equally' (*Pew Research Center*, Feb 5, 2019) <https://www.pewresearch.org/global/2019/02/05/smartphone-ownership-is-growing-rapidly-around-the-world-but-not-always-equally/>.

Society for Computers and Law, 'Predictions: Final Treats' (10 December 2014) <https://www.scl.org/blog/3261-predictions-final-treats>.

Society for Computers and Law, 'Predictions 2014: Batch2' (6 December 2013) <https://www.scl.org/blog/2971-predictions-2014-batch-2>.

US Department of Defense News Briefing (February 12, 2002)
[https://archive.defense.gov/Transcripts/Transcript.aspx?TranscriptID=2636.](https://archive.defense.gov/Transcripts/Transcript.aspx?TranscriptID=2636)

Appendix A – Co-author declarations

Alexander Babuta – page 33

Jamie Grace – page 34

Helen Ryan (James) and Emma Nottingham – page 35

DECLARATION OF CO-AUTHORSHIP OF PUBLISHED WORK

(Please use one form per co-author per publication)

Section A
Name of candidate: Marion Oswald
Name of co-author: Alexander Babuta
Full bibliographical details of the publication (including authors):
Babuta and Oswald 'Machine learning predictive algorithms and the policing of future crimes: governance and oversight' in Policing and Artificial Intelligence, eds. Dr John L.M. McDaniel and Prof Ken Pease OBE (2020 Routledge).
Babuta and Oswald 2019. 'Data Analytics and Algorithmic Bias in Policing' Peer-reviewed commissioned report
Alexander Babuta, Marion Oswald and Christine Rinik (2018) 'Algorithms, Predictive Policing and Criminal Justice Decision-Making' *Whitehall Report* (published by the Royal United Services Institute on 21 September 2018)

Section B
DECLARATION BY CANDIDATE (delete as appropriate)
I declare that my contribution to all of the above publications was as:

(ii) joint author


My specific contribution to the publications was (maximum 50 words):

As a joint author with significant responsibility for the underlying research, drafting and content.

Signed:M. Oswald(candidate)10/12/19.....(date)

Section C
STATEMENT BY CO-AUTHOR (delete as appropriate)

(i) I agree with the above declaration by the candidate

Signed:  A. Babuta.....(co-author)10/12/19 (date)

DECLARATION OF CO-AUTHORSHIP OF PUBLISHED WORK

(Please use one form per co-author per publication)

Section A

Name of candidate: Marion Oswald

Name of co-author: Jamie Grace

Full bibliographical details of the publication (including authors):

Marion Oswald, Jamie Grace, Sheena Urwin & Geoffrey C. Barnes (2018) Algorithmic risk assessment policing models: lessons from the Durham HART model and 'Experimental' proportionality, Information & Communications Technology Law, DOI: [10.1080/13600834.2018.1458455](https://doi.org/10.1080/13600834.2018.1458455) (A)

Marion Oswald, Jamie Grace 2016. Intelligence, policing and the use of algorithmic analysis: a freedom of information-based study. *Journal of Information Rights, Policy & Practice*, 1. (1). (B)

Jamie Grace, Marion Oswald 2016. 'Being on our radar does not necessarily mean being under our microscope' The Regulation and Retention of Police Intelligence. *European Journal of Current Legal Issues*, 22. (1). (C)

Section B

DECLARATION BY CANDIDATE (*delete as appropriate*)

I declare that my contribution to the above publication was as:

- (i) principal author in respect of A
- (ii) joint author in respect of B and C

My specific contribution to the publication was (*maximum 50 words*):

In respect of A, lead author organising other contributions and managing the research input from Durham Constabulary

In respect of B and C, as joint author of the content and structure, including in respect of B, managing the analysis of the freedom of information responses

Signed:M. Oswald.....(candidate)10/12/19.....(date)

Section C

STATEMENT BY CO-AUTHOR

- (i) I agree with the above declaration by the candidate

Signed:J. Grace.....(co-author)12.12.2019 (date)

DECLARATION OF CO-AUTHORSHIP OF PUBLISHED WORK

(Please use one form per co-author per publication)

Section A

Name of candidate: Marion Oswald

Name of co-author: Helen James (Ryan), Emma Nottingham

Full bibliographical details of the publication (including authors):

Marion Oswald, Helen James, Emma Nottingham 2016. The not-so-secret life of five year olds: legal and ethical issues relating to disclosure of information and the depiction of children on broadcast and social media. *Journal of Media Law*, 8. (2).

Section B

DECLARATION BY CANDIDATE (*delete as appropriate*)

I declare that my contribution to the above publication was as:

- (i) principal author

My specific contribution to the publication was (maximum 50 words):

Initiator of the underlying research and the 'Generation Tagged' theory, organiser of the joint author contributions and supervisor of the Twitter and privacy related research.

Signed:M. Oswald.....(candidate)10/12/19.....(date)

Section C

STATEMENT BY CO-AUTHOR (*delete as appropriate*)

- (i) I agree with the above declaration by the candidate

Signed: .E.Nottingham & Helen Ryan (James) (co-authors) 10/12/19..... (date)

Appendix B – Publications

1	Peer-reviewed Chapter	Marion Oswald, 'Seek and ye shall not necessarily find' in Kieron O'Hara, M-H. Carolyn Nguyen and Peter Haynes (eds), <i>Digital Enlightenment Yearbook 2014</i> (IOS Press 2014) 99-115.
2	Peer-reviewed Report	Alexander Babuta and Marion Oswald, 'Data Analytics and Algorithmic Bias in Policing' (2019) <i>RUSI Briefing Paper</i> .
3		Alexander Babuta, Marion Oswald and Christine Rinik, 'Algorithms, Predictive Policing and Criminal Justice Decision-Making' (2018) <i>RUSI Whitehall Report</i> .
4	Peer-reviewed Article	Marion Oswald, 'Technologies in the twilight zone: early lie detectors, machine learning and reformist legal realism' (2020) <i>International Review of Law, Computers & Technology</i> , 34:2, 214-231.
5		Marion Oswald, 'Algorithmic-assisted decision-making in the public sector: framing the issues using administrative law rules governing discretionary power' (2018) <i>Phil. Trans. R. Soc. A</i> , 376:2128.
6		Marion Oswald, Jamie Grace, Sheena Urwin & Geoffrey C. Barnes, 'Algorithmic risk assessment policing models: lessons from the Durham HART model and 'Experimental' proportionality' (2018) <i>Information & Communications Technology Law</i> , 27:2, 223-250.
7		Marion Oswald, 'Jordan's dilemma: Can large parties still be intimate? Redefining public, private and the misuse of the digital person' (2017) <i>Information & Communications Technology Law</i> , 26:1, 6-31.
8		Marion Oswald, Jamie Grace, 'Intelligence, policing and the use of algorithmic analysis: a freedom of information-based study' (2016) <i>Journal of Information Rights, Policy & Practice</i> , 1:1.
9		Marion Oswald, Helen James and Emma Nottingham, 'The not-so-secret life of five year olds: legal and ethical issues relating to disclosure of information and the depiction of children on broadcast and social media' (2016) <i>Journal of Media Law</i> , 8:2, 198-228.
10		Jamie Grace and Marion Oswald, "Being on our radar does not necessarily mean being under our microscope' The Regulation and Retention of Police Intelligence' (2016) <i>European Journal of Current Legal Issues</i> , 22:1.
11		Marion Oswald, 'Share and share alike? An examination of trust, anonymisation and data sharing with particular reference to an exploratory research project investigating attitudes to sharing personal data with the public sector' (2014) <i>Script-ed</i> , 11:3.
12		Marion Oswald, 'Mandatory reporting of child abuse - necessary medicine for 'nervous Nellies' or a remedy too far?' (2013) <i>International Data Privacy Law</i> , 3:4, 269-277.
13		Marion Oswald, 'Freedom of information in cyberspace: What now for copyright?' (2012) <i>International Review of Law, Computers & Technology</i> , 26:2-3, 245-255.
14		Marion Oswald, 'Facebook group implies consent to disclosure' (2012) <i>International Data Privacy Law</i> , 3:1, 51-60.