**Debate & Dialogue**

**What’s Law got to do withGood Science? \***

1. **Introduction**

Neither law and medicine, nor law and science, sit in easy partnership. We generally imagine them as having radically different priorities and practices: law, it is said, prizes argument, trades in competing claims, and works towards what ought to be, whereas medicine and science value accuracy and seek truth, and give priority to facts. Law is also widely seen as illiterate when it comes to matters medical or scientific. There are regular complaints that courts operate outside of their competence when handling such matters; they are seen as poor performers when it comes to gauging when and in what ways deference to medical and scientific expertise is, or is not, due. Relatedly, law has been accused of demoralising medicine, and the so-called ‘law lag’—namely, law’s inability to keep up with science and technology—is widely seen as unfortunate but unavoidable. There is also a sense that when law turns its attention to medicine, science and technology, it tends to obsess about limits, whether outright prohibitions or simply moratoria and ‘red tape’ obstructions. The picture, in short, is not a happy one, especially for law: amidst strong popular desire for caring medicine and responsible research and innovation—for processes, institutions and actors that will articulate, procure and sustain what we as societies want from medicine, science and technology—law and lawyers are deemed to dawdle, or to deter the wrong things, in the wrong ways and at the wrong times.

Some however see it differently, and our debate and dialogue takes its lead from them. As a general rule, this different way of thinking is characterised by curiosity about discrete but parallel bodies of research on the relationships between science and technology and other authoritative social institutions, including the law. In legal circles, it has recently attracted enough interest to be described as an emergent legal field; here, by way of convenient shorthand, we’ll call this field ‘law and science’.

As a field, law and science engages openly and actively with regulation scholarship. Interestingly, it is also open to Science and Technology Studies (STS), its far better-established, cross-disciplinary counterpart which has its own detailed accounts of the relationships between science, technology and the law (e.g. Felt et al, 2017). To date, law and science has been dominated by engagements with topics and themes concerning criminal justice, evidence, reproduction and parenthood, medicine, the environment, information technology, and intellectual property (e.g., Harrington, 2017; Pottage, 2011; Reece, 1998). More and more, however, it seems interested in deeper and broader engagement—and in particular, in conceptual questions concerning the partnerships, actual and potential, between law and science. In places, these questions focus on how science should be handled in legal settings (Jasanoff 2015), or on forming sub-fields such as ‘law, regulation and technology’ (Brownsword and Goodwin 2012; Brownsword, Scotford and Yeung, 2017). Elsewhere, the emphasis is on drawing out the ubiquity of connections between law and science (Faulkner, Lange and Lawless, 2012), how science and law are ‘co-produced’ (building on Jasanoff, 2004), and the importance of ‘social studies of law’ (Cloatre and Pickersgill, 2014).

In this debate and dialogue we seek to contribute to these conversations about this new field of law and science. Specifically, we seek to build on the idea that deeper and broader engagement between STS and sociolegal scholarship, and between these and other separate but parallel fields analysing science, technology and law, is to be welcomed. Our jumping-off point is Charis Thompson’s *Good Science,* a book thatflags ethics rather than law as its point of departure—the work is self-described as an ‘ethical choreography’. Thompson’s earlier ground-breaking scholarship in social studies of science, has proven to be a valuable resource for legal scholars. In particular, her ethnography of assisted reproduction (Thompson 2005) which tracked the complex dynamics of science, kinship, gender, economics, law and other matters at play in what she termed the ‘ontological choreography’ of the ART clinic has informed legal approaches to and understandings of the governance of reproduction. In *Good Science* she builds on her conclusion concerning the implications of her ART study for future relations between science and society, focusing this time on the geopolitics and biopolitics of stem cell research. As Thompson notes, stem cell research was the ‘object of more interdisciplinary *ethical* debate and labor than is typical of advances in science and technology’ (2013, 5) and she contends that such ethical attention is essential to the progress of ‘good science’. Our pieces engage with this ethical choreography, with the aim of examining how law and regulation too are implicated in the production of ‘good science’. For us, in other words, *Good Science* speaks to more than the regulation of stem cell research, and our contributions reflect this. We focus on particular topics which resonated for us in Thompson’s book – from the place of human rights in the regulation of science and technology, to parallels with the UK’s approach to regulation of mitochondrial donation, and the politics of animal research and animal rights. Thompson’s response endorses this approach, and our hope is that other readers will find other jumping-off points in her important volume to bring to an ongoing conversation about science and its relationship to law, ethics and society.

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**2. To talk about science is to talk about ethics—but not about rights?**

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Charis Thompson’s *Making Parents* (2005) is, I think, a terrific book. I am also a fan of her 2004 essay on CITES and the African elephant, so I had a sense I would enjoy *Good Science*. I was right: *Good Science* is a very good read, replete with insight, learning and flair. It has an abundance of powerful phrases and frames: ‘sciences that “have ethics”’, and ‘the end of the beginning of’ stem cell research, were particular favourites of mine. It also introduces and makes good use of a method Thompson calls ‘triage’ (a method she developed in order to fill a gap in the ethnographer’s approach), and it even has endnotes that are both germane and genuinely interesting.

I read *Good Science* as a book about science and ethics, rather than a book about stem cell research in South Korea, Singapore and the US in the first years of this century. I read it that way because it suited me, and I think most of us do this most of the time: a riot of the new can be stimulating but resonance is nice, too. My interest in the right to science, and more broadly in the relationship between the human rights, law and bioethics, meant that I was looking for resonance with *rights* or *human* *rights*. I found it in a range of places—from Thompson’s discussion of the need for a ‘flexible architecture of reciprocity’ in stem cell research (p. 188), to her explanation of why we should desist from using animals as research subjects. But I had to work harder than expected, which brings me to the question I want to ask in this short reflection piece: Why was that? Specifically, why does a book that makes the case for ‘sciences that have ethics’ have so little to say about human rights or human rights law?

The question is not designed to shove, to prod or even to nudge. There is no hubris on my part; no move to substitute rights-based approaches to science for ‘sciences that have ethics’. It is just that if ethics is construed broadly (as it is in *Good Science*[[1]](#footnote-1)), and if what Thompson calls the ‘ethical choreography of science’ enrols and produces many actors (and many things, too), I can’t help but ask: What happened to human rights—both human rights as law, and rights talk more generally?

Thompson says that ‘Scientific futures cannot be created *de novo*; they must make sense in terms of the repertoire available in a given place’ (p. 259). Aren’t human rights part of the repertoire in a range of places, both local and global? This seems likely given their internationalisation and institutionalisation in recent decades, and the rising profile of economic and social rights (in particular the right to health and, more particularly, the right to have access to essential medicines (Murphy, 2013)). And as I see it, the criticism that human rights has faced from advocates of development, global health and reproductive justice make it more likely still that human rights are part of the way in which scientific futures are sketched. So, what then does it say, and with what effects, that Charis Thompson and I seek to know the world in such different ways?

In what follows I am going to think aloud about this. I have two ideas. First, Thompson does not engage with rights or human rights because she is steeped both in sociology, especially science and technology studies (widely known by its acronym, STS), and in what she describes as ‘transnational feminisms’ (p. 9). Many feminist scholars—within and out-with the field of law—steer clear of human rights, preferring to focus instead on ‘reproductive justice’ (Browner, 2016; Morgan, 2015). In similar vein, neither sociology in general, nor STS in particular, has been interested in rights in the way that the fields of law and philosophy, and also international relations, political science, anthropology and history, have been.

It is not, to be fair, a one-way street. Human rights law scholarship, for its part, has not been particularly interested in STS, even STS *à la carte* (cf. Murphy and Ó Cuinn, 2013). And the right to science, though it is now drawing interest, remains one of the least commented upon rights within the international bill of rights, wherein it features in both the Universal Declaration on Human Rights (1945) and the International Covenant on Economic, Social and Cultural Rights (1966). Equally, most international human rights scholars who engage with questions of reproduction do so not by reference to science and technology, but rather via a public health orientation, with a focus on securing safe motherhood, ending forced sterilisation and guaranteeing access to modern (not high-tech) forms of contraception (Murphy, 2017). Sociological ways of seeing haven’t had much traction either, though the recent shift in international human rights law from a singular focus on advocacy and standard-setting, and the rising interest in economic and social rights (Saul, Kinley and Mowbray, 2014; Young, 2012), do seem to be producing opportunities for human rights law scholars to be less normatively-inclined (Erdman, 2015).

Moving now to my second idea: in *Good Science*, Thompson is writing about science and about ethics, and potentially each of these stands in the way of engagement with rights and human rights, and especially with human rights law. Legal scholars—those most closely associated with rights—generally do not see science as an object of study, at least not in the way that sociologists and transnational feminists do. The legal field, seen by and large as an autonomous site, is what grabs and holds attention. True, we could look at law in the space of science, and science in the space of law, but to date (especially if we exclude the fields of evidence law and intellectual property law) few have done this (cf. Pottage, 2008; Silbey and Ewick, 2003). Perhaps one reason for the gap is that, like me, many legal scholars simply smile and nod when they read that the poet Sylvia Plath said ‘The day I went into physics class it was death’. We smile and nod because we sense we know how she felt; we sense a soul mate who, like us, was well aware that science is ‘different’.

Lawyers’ engagement with ethics is problematic, too. Age-old debates about law and morality are of course familiar to us, and ‘law and ethics’ trips off the tongue almost as easily as ‘law and politics’. Equally, many of us see law as having some sort of moral basis: in the absence of that, law would be politics or legalism, and we want law’s normativity to be ‘bigger and better’ than either of these. To evidence this we need only take the example of a human rights court, say the European Court of Human Rights. For such a court, being either too legalistic or too political brings judicial power into question and put the court’s legitimacy at risk. By contrast, the idea of the court as a moral actor has strong, legitimacy-maintaining appeal.

It seems to me that lawyers aren’t, however, curious enough about pairings such as law and morality, law and ethics, and human rights and bioethics. Larger groupings are neglected, too, including ‘ELSI’, which stands for the ethical, legal, and social implications (of new biotechnologies), ‘ELSI 2.0’, the reformed version, and ‘ELSPETH’, which is *Good Science’s* turbo-charged version featuring politics, economics, theology and history, in addition to ethics, law and sociology. Ask yourself: how many lawyers have been interested in what prompts these combinations, and what makes some more durable than others? I think the answer has to be that few if any of us have been interested in such questions.

Looking at my own field, international human rights law, when and why do we use the phrase ‘the legal and the ethical’? Equally, when and why do we elide the legal and the ethical, and when and why do we emphasise one more than the other? Also, what do others think of our practices of connection and disconnection? I find few answers, or even discussions of such questions. The movement to extend human rights responsibilities to businesses has, of course, brought demands from the latter for clarity on what is a legal responsibility, and what is an ethical one. And, in the field of health care, there have been claims that the rise of human rights law has provoked, or hastened, a demoralisation of medicine (Montgomery, 2006). But in the field of science and technology, I think the jury is still out.

For instance, far more bioethicists than legal scholars have had something (mostly critical) to say about the Universal Declaration on Bioethics and Human Rights (2005). And the European Court of Human Rights—widely seen as the ‘jewel in the crown’ of human rights law—has offered no guidance on why it sees assisted reproductive technology as raising ‘sensitive moral and ethical issues’ or what meaning it gives to the constituent terms. These gaps are problematic, in part because the Court tends to use its own declaration that moral and ethical issues are in play as a trigger for granting broad regulatory discretion to states, even if this means turning a blind eye to rising levels of cross-border reproductive treatment (*S.H. and Others v. Austria*, 2011). Looking more broadly, the global ‘success story’ of access to antiretrovirals is hard to read, too (Murphy, 2013). Is it a human rights success story (as many international human rights lawyers claim) or is it something else?

The point is not about who gets credit, or about everything being ‘this’ or ‘that’ (‘law’ or ‘ethics’, and so on). Rather, what I am saying is that we—the lawyers—need to be more interested in the divergences, the overlaps and, more broadly, the relationships between the fields that populate ELSI, ELSPETH and the like. But, again it is not a one-way street: there are bioethicists, and science and technology ‘entrepreneurs’ too, who are guilty of misrepresenting law. The entrepreneurs, and some bioethicists, like to peddle the ‘science lag’—the idea that when it comes to science and technology, the law is always going to be behind, limping a little. There is a sense, too, that law is all about limits, and, relatedly, that it should be boxed-off so as to avoid corrupting the inquiry, scientific or ethical, that needs to be pure and, of course, prior. Furthermore, when bioethicists look specifically at human rights, and human rights law, framings can be one-dimensional (Murphy and Turkmendag, 2014; Murphy, 2018), and really rather dated by comparison with the conversations that human rights legal scholars are having about ‘human rights experimentalism’ (De Búrca, 2017) and the like.

To sum up: I read *Good Science*—a book about science and ethics that foregrounds ‘sciences that have ethics’—expecting it to engage with my field of expertise. I hoped for resonance with rights and human rights, and with human rights law, too. I didn’t depart empty-handed: *Good Science* is a book that challenges and sparks ideas. But neither was I reassured. Overall, I am confused: Is it really the case that to talk about science is to talk about ethics, but not about rights?

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**3. Good regulation of science: A matter of rhetorics**

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Charis Thompson’s *Good Science* is an important contribution to the growing literature describing and evaluating the co-production of science, which involves a complex relationship between scientific knowledge, moral discourse, ethics, risk, science communication, policy and practice (Jasanoff, 2004). Thompson focuses on legitimation of human embryonic stem cell (hESC) research in the US. That legitimation, she argues, grew from a ‘pro-cures’ rhetoric, which emphasised the potential of respite from devastating diseases and medical conditions, and relatedly, a ‘procurial’ framing of innovation, which focused on procurement of human cells and procurement protocols. Thompson’s observations on hESC research made me think of the UK’s recent debate about mitochondrial donation, which culminated in the Human Fertilisation and Embryology (Mitochondrial Donation) Regulations 2015. In this short piece, I reflect on what Thompson would call ‘the ethical choreography’ of that debate. I focus in particular on what the debate adds to our knowledge of pro-cures rhetoric and the procurial framing.

Mitochondrial disease is maternally inherited and causes various severe human diseases often affecting organs and tissues, including the brain, heart, muscles, pancreas and kidneys (Mitapilov et al., 2013). Mitochondrial replacement techniques (MRT) transfer a mother’s nuclear DNA to a donated egg containing healthy mitochondria, such that children born using these techniques will have nuclear DNA from both the intended parents and mitochondrial DNA from the donor. These changes in the germ cells and embryo can also be passed to the next generations. But the UK’s public consultation process on MRT showed that there was a general support for permitting mitochondrial donation to avoid transmitting mitochondria disease as long as it was safe, effective and well regulated (Department of Health, 2014; HFEA, 2013b; Nuffield Council on Bioethics, 2012). That general support is not a global phenomenon: to date, the UK is the only jurisdiction in the world to legally permit human germline modification. The questions I want to raise are, first, whether a ‘pro-cures’ rhetoric and a ‘procurial’ framing, identified by Thompson, played a role in legitimising MRT in the UK, and second, whether, for reasons outlined below, these could be an obstacle to *good regulation of science* both nationally and across borders.

In *Good Science* Thompson shows that in the US, innovation and cures were ‘bundled together as promise and potential’ (p. 38), as was also evident in the UK’s MRT debate. Since the embryo debates of the 1980s, the British public has been consulted about various aspects of embryo research, including human admixed embryos (Fox, 2015) and has been generally permissive and pro research (Mulkay, 1997). Yet, little was known about how the public would react to MRT, as it not only involves well-established assisted reproduction techniques but also the modification of the germline which might be transmitted to subsequent generations. Initially, MRT was framed as a cure that would alleviate suffering of the families that were affected by the disease. During the public consultation process, the promoters of MRT were careful to frame MRT as a ‘treatment’, ‘therapy’ or ‘cure’, rather than a reproductive technology involving a form of germline modification (Turkmendag 2018). Their view prevailed but there were strong dissenting opinions, which emphasised that MRT did not treat an existing child with a faulty mitochondria, but rather produced a child without such DNA (Turkmendag 2018). The critics also pointed out that affected families could instead use donated eggs to avoid transmission of the disease, and that a desire to have a genetically-related child should not justify taking the risk of germline modification, which might affect subsequent generations (House of Commons, 2014).

During the public consultation, there was prominent coverage of one patient’s story—Sharon Bernardi who lost eight children due to mitochondrial disease. One interesting aspect of this coverage was how, at times, ‘treatment’ became blurred with ‘a right to treatment’. Thus, Bernardi once claimed: ‘It is everyone’s *right* to have a healthy child’ (MailOnline, ‘Three parented baby’, 17 February 2013) [emphasis added]. The relationship between these two framings merits further exploration. Is the latter, for example, more likely to provoke counter-claims—from say disability rights campaigners? Is it also more likely to suppress the focus on treatment, and more broadly on cures, because of the longstanding association between rights and freedoms or entitlements? And finally, does a rights-based approach make it harder to bring out the familial dimension of the issue?

A second, pronounced aspect of the UK’s recent MRT debate was the low-level of attention to egg donation and, more particularly, to egg donors. As noted earlier, in *Good Science*, Thompson argues that in the US debates about hESC research, advocates of such research worked hard to operationalise ethical objections to such research as ‘a problem with the *procurement* of research material (human embryos and gametes and hESC lines)’ [emphasis in original], and to frame solutions ‘as a process of delineating acceptable means of procurement’ (p. 29). Because ‘procurement’ objections in the US and elsewhere have focused far more on embryos than on eggs, the UK’s MRT debate offers an opportunity to assess whether procurement objections and concerns are actually the same across different types of research and reproductive material.

Unlike embryos, eggs are often seen as ethically unproblematic reproductive material by scientists (Marchant, 2006). Experience in the UK, both before and during the MRT debate, suggests this is too simplistic, not least because if women do not come forward as egg donors, neither the basic research nor the clinical practice is possible. Crucially, there is an ongoing donor shortage in the UK, a problem that is often associated with the Government’s removal of anonymity from gamete and embryo donors in 2004 (HFEA, 2011). The recent MRT debate added a twist to the policy on anonymity and the general trend towards the child’s right-to-know. During the MRT debate, evidence submitted to the House of Commons’ Science and Technology Committee suggested that donor anonymity would help to recruit egg donors and implement MRT in practice (House of Commons, 2014). Similarly in its report on MRT, the independent ethics’ advisory group, the Nuffield Council on Bioethics, noted that the legal status of the mitochondrial donor would influence the perception of recipient families as to any social relationship that could be created by MRT, and the number and typical profile of donors willing to come forward (Nuffield Council on Bioethics, 2012: para 3.21). Mitochondrial donors, it seemed, were ‘different’: maintaining their anonymity was a desirable policy, both to make MRT more socially acceptable to the public and to procure egg donors.

One rhetorical strategy adopted by advocates of MRT was to construe mitochondria donation as more akin to tissue donation than to egg donation in a fertility context. This strategy emphasised that, compared to nuclear DNA, mitochondrial DNA was relatively insignificant in one’s genetic make-up; that mitochondria donation would not create a parental linkage and therefore ‘mitochondria donors’ did not need to be identifiable to the resultant child (Jones and Holmes, 2013). Furthermore, in their media briefings, scientists who had developed the techniques repeatedly used a ‘battery replacement’ metaphor to downplay the significance of mitochondria (Baker and Semino, 2014; Baylis, 2013). What could possibly go wrong if mitochondria was just the battery of the cell, and the procedure was as simple and safe as a battery replacement?

There was far less attention to the fact that the egg donor whose mitochondria is used for MRT goes through the same physical and psychological burden of egg retrieval (e.g., daily injections, hormonal stimulation, blood tests, screening and surgery) as the egg donor. Moreover, even if we agree that donating genetic material does not make one a parent, the mitochondria donation process still has a social significance for the woman who provides the egg, the intended parents who receive it, and, potentially, the child who might born as a result. Yet, in the UK MRT debates, the mitochondria donor emerged as ‘different’ to her peers. Ultimately, she was ‘rendered invisible’ (Haimes and Taylor, 2016): the UK Government took the view that mitochondrial donors should *not* be treated as equal to egg donors in respect of the information to be collected and made available, since mitochondrial DNA is not as significant as nuclear DNA in determining one’s genetic identity (Department of Health, 2014). This “calculus of genes”, simplified accounts of how genes determine the resulting child’s characteristics and identity, played a significant role in shaping the public

c debate and the regulations (Turkmendag 2018).

In *Good Science*, Thompson describes multidisciplinary efforts in normalisation and consolidation of hESC research as the ‘ethical choreography of science’, and notes that attempts to ‘invent around’ ethical roadblocks by scientists were transformative for the field (p. 5). My response, drawing on the UK’s recent MRT debate, is that such attempts to ‘invent around’ are not ethically unproblematic. In particular, in reading *Good Science*, I could not help thinking about the pros and cons of the pro-cures rhetoric and pro-curial framing in legitimating research on human reproductive cells. Although scientific progress in this field depends on both the optimism of the public and employing successful procurement strategies, it seems that such approaches also divert attention from important ethical dilemmas such as promoting gene technologies as a panacea for all problems, including the presumed need for a genetically related child (Baylis, 2017) and locating women (and their eggs) as the ethically acceptable resource for this line of research (Baylis and McLeod 2007). In the UK, proponents of MRT performed a very successful ethical choreography to legitimise the clinical translation of research to help families in need, but did this cause impoverishment of public ethical debate over these novel techniques? Will we have a chance to revisit the overlooked ethical dilemmas without a fear of going backwards or not moving forwards? After all, good regulation of science should involve opening the ‘black box’ of the law that governs it, examining the assumptions, expectations, and claims that played a role in shaping the regulations, and acknowledging that there are always voices heard and the voices silenced. The good regulation of science should not merely aim to remove the ethical road blocks on our way to reach the aimed destination as soon as possible but also make the journey meaningful, enjoyable, safe and fair.

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**4. Good science and the politics of animal research**

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Charis Thompson’s *Good Science* explores what we mean by the concept of good science – an inquiry that, as Thérèse Murphy’s contribution shows, is intrinsically linked to questions of ethics. By the final chapter—which turns to the place of the animal in the constitution of good science—it is clear that the interrogation of good science is also entangled in a broader politics in which animals play a key role both in enabling, and in setting limits, to research. While Murphy notes the frequent elision of rights discourse in the science/ethics nexus, rights talk does emerge in this final chapter. Having traced the process by which animal use in science (and stem cell science in particular) has become routinised, Thompson examines the politics spawned by scientific and other forms of animal use, analysing how animal rights activists in the US have mobilised rights discourse and law to contest animal use or to influence human relations with animals through, for example, mandatory neutering laws. In thus engaging with animal rights talk Thompson ventures into thorny philosophical territory, encompassing the role of the animal and animality in our broader political culture, and highlighting what she sees as troubling parallels with slavery and human emancipation drawn by the animal rights movement (Thompson, 2013: 215). For the most part I am persuaded by Thompson’s depiction of the part played by animals in this ethical choreography. Certainly, *Good Science* plays a vital role in rendering the scientific violence inflicted on animals as often ‘absent referents’ (Adams, 2010) visible. However, as I suggest below, in places her account slips into the human exceptionalism that can taint otherwise laudable efforts to engage ethically with animal subjects, while in practice I suspect that the normalisation of animal (ab)use may be more difficult to contest than she allows.

Casting animals as ‘substitutive subjects’, Thompson demonstrates how, since the early days of vivisection, animals have figured literally as human stand-ins (she notes that Vesalius dissected female animals, their body parts and fetuses because he couldn’t dissect pregnant women). Subsequently, and post-Nuremberg, she suggests that ‘non-human animals have also become a mandatory *bioethical* substitute for unethical experimentation on human subjects of research’ (Thompson, 2013: 191). Thompson shows how this paradigm has become deeply entrenched throughout biomedical research and ethics, while animals’ role as human surrogates continues to be reinforced by the ongoing shortage of human bodies and body parts for research which is seen to necessitate animal replacements.

Problematically, however, such a paradigm of good science is grounded in the familiar contradiction of assuming animals to be biologically akin to humans, but ethically unlike them. This paradox has prompted earlier ethical and rights-based criticisms of animal research (e.g. Noske, 1989; Regan, 1984). Thompson takes this critique further by highlighting a different aspect of animals’ ‘double nature’, showing how simultaneously they are integral to the practice of bioresearch but also invoked to establish the boundaries of ethical research. Thus, for instance, she demonstrates how animals played an important boundary-defining role in shaping the US consensus to prohibit human reproductive cloning and germ-line human-animal chimeras. Yet, Thompson demonstrates the haziness of these human/animal border zones and the ‘(constantly shifting and contested) boundary maintenance as to the difference between humans and animals, and what was thus to be considered ethically acceptable’ (Thompson, 2013: 205).

Her core argument: that technologies have now progressed to the point where animal models should be jettisoned in the interests of both science and ethics, is compelling. Importantly, this challenge to the animal use paradigm is grounded in the notions of good science and good regulation, rather than in animal rights philosophy which often positions itself in opposition to science – a stance which Thompson views as counterproductive. She traces how the animal research subject is itself a product of science—first via the creation of more standardised animal models and more recently by ‘humanisation’ of the animal model through transgenic and other technologies. In the stem cell context animal models have been pivotal. Thus, the first mammalian embryonic stem cells were isolated in the mouse in the late 1970s while, decades later, the first proof that induced pluripotent stem cells (derived from adult cells) could produce a live birth was also a result of mouse experimentation. Indeed, as Thompson observes, ‘the “knockout mouse” is an embodiment of the substitutional sequential logic of animal models in biomedical research’ (Thompson, 2013: 194)—a product of the entwined logic of both ethics and best scientific practice dictating that research be done in animals first (Thompson, 2013: 193). However, in yet another paradox, she argues that a solution to the issue of animal use has emerged from within this animal-based research and the replacement technologies it has spawned. In a related move, she proposes that the lead in contesting animal use must come from within biomedical science (Thompson, 2013: 190). In this regard Thompson contends that the limits of animal usefulness have now been reached, since once ‘the level of humanization needed becomes so extreme… the effort could be directed instead to animating *in vitro* systems’ (Thompson, 2013: 206). Simultaneously she posits that existing regulatory structures for approving research on living beings are inadequate to cope with the blurred lines between human, animal and embryonic models, prompting the important question of what it would mean to ‘move beyond the discrete committees of research with living beings, and to reconsider entwined research subjecthood in stem cell research?’ (Thompson, 2013: 208; Fox, 2015).

Thompson’s key recommendation is that ‘substitutive research subjects, including non-human animal models be progressively decommissioned from the human biomedical research enterprise as a matter of explicit policy’ (Thompson, 2013: 190) since they are *no longer* the best option (Thompson, 2013: 189). Interestingly this position is broadly congruent with a policy commitment by the then (Conservative/Liberal Democrat) Coalition Government in the UK in 2010 to reduce use of animals in science. This spawned a delivery plan (Home Office, 2014) which likewise echoes aspects of Thompson’s argument. It recommends that the 3Rs (the well-established principles of replacing, reducing and refining animal models) must be central to a ‘science based approach’ and affirms that ‘[t]he scientific imperative for developing new approaches to research and development is very strong’ (Home Office, 2014: 2). Like Thompson, the Home Office also positions stem cell research as offering a viable alternative to animal technologies (Home Office, 2014: 2).

Yet, strikingly, and reflecting the entrenched nature of animal use that Thompson identifies, the Delivery Plan also accepts ‘a continuing need for properly regulated and ethically constructed research using animals’ (Home Office, 2014: 4). Arguably this reflects a scientific mindset imbricated in a wider animal use culture which may prove more resistant to change than Thompson supposes when she suggests that science and ethics are not opposed when it comes to the phasing out of animal research.[[2]](#footnote-2) I also suspect that she underestimates how entrenched the notion of animal sacrifice has become in law as well as science (Lynch, 1988). As noted above, Thompson locates her analysis within an ‘underlying landscape of animal politics’, focusing on recent political controversies in California that have spawned the enactment of (often contradictory) laws on a range of issues, from mandatory neutering of pets to criminalisation of new forms of animal rights activism. She notes that animal use practices (including consumption of meat and leather and the deployment of animals as workers, pets, and in dog fighting and horseracing enterprises, as well as in scientific laboratories) vary hugely ‘in terms of the gender, race, class and affective context of the human worlds in which each figures’, and in their relationship to law (Thompson, 2013: 210). As a highly regulated and deeply lucrative practice, the scientific use of animals is legally condoned by legislation, such as the UK Animals (Scientific Procedures) Act 1986 and the US Animal Welfare Act 1966, which legitimises the sacrifice of animal bodies, and may – like scientific culture – prove highly resistant to change.

Certainly though, and notwithstanding my view that eradication of animal exploitation may be more difficult to accomplish than she allows, Thompson’s interrogation of the animals’ place in constituting good science helps to counteract the prevailing tendency to erase animal bodies in the ‘ethical choreography’ of biotechnologies. Inevitably, in a single chapter she is unable to tease out all of the implications of her argument. For instance, while her contention that we have reached a juncture where neither good science nor good ethics any longer demand the use of animals as human surrogates is compellingly made, it fails to grapple with the paradox that the use of animals in scientific procedures has actually risen over the past couple of decades following a decline in the 1970s and 80s. Largely this is due to the breeding of genetically altered animals (Home Office, 2016). Over this period the species of animal used in research have certainly shifted, so that more experiments are now conducted on mice and fish rather than so called ‘higher’ mammals who are accorded enhanced legal protection. While this may be read as progress, in my view this shift underlines the need to unpack the concept of ‘the animal model’ and interrogate how we categorise ‘lesser’, and hence more readily ‘killable’, living beings. Equally we need to examine law is implicated in such categorisations. Indeed, notwithstanding fleeting reference to various laws and attempts to legislate and Thompson’s recognition that different practices stand in different relations to law, the chapter does not systematically address law’s role in constructing the research subject. In this, it differs from her earlier work on animals. In the conservation context, she memorably demonstrated how law—notably the CITES treaty—was actively involved, alongside conservation practices, in producing the African elephant (Thompson, 2004). In the context of biotechnology, applying a similar analysis to the process of how laboratory animals are produced through law, as well as created by science, would surely be instructive. Unpacking this co-production of the research subject may help open up new ways to think about how law could be mobilised in response to Thompson’s call to abandon the animal research paradigm.

With regard to ethical approaches, by outlining and complicating the spectrum of positions applicable to human relations with animals, Thompson hints at how an alternative ethics may be developed. Thus, she suggests that while animal use positions are typically rooted in dominion of humans over other animals, they may also encompass versions of a co-dependence ethic which sees the livelihoods of human and animals as intertwined (Thompson, 2013: 210). She flags up the potential of the ethic of care—‘the farmer or rancher who knows and cares best for the animals that are his or her livelihood, or the pet owner who would do anything for her pet’, while acknowledging that it may fail to answer the deontological demand of animal rights advocates not to use animals as a means to another’s end (Thompson, 2013: 212). It would have been fascinating, had space permitted, to see how this argument from care theory might have been more fully developed and applied to the animal research model in the light of recent work on the place of care and affect in the laboratory (Friese, 2013). One quibble is that at certain points Thompson’s position seems tainted by human exceptionalism, as in her claim noted above that it is contentious for animal activists to draw parallels with human slavery since such strategies perpetuate the animality of slavery itself (Thompson, 2013: 215). In fact, as Marjorie Spiegel has demonstrated, such analogies are offensive only to those who buy into the specieist argument of human superiority (Spiegel, 1996). Hence, it is arguable that if one follows Thompson in eschewing animal rights, alternative approaches may prove less effective in contesting animal abuse. Relatedly, for Thompson, animals serve as simply one example of the substitutive subject, since she highlights how science has also experimented upon the bodies of slaves, immigrants, Native Americans, prisoners and the poor, while women and minorities have needed to fight ‘to be self-subjects (as opposed to objects, or subjects substituted for the bodies of others) of research’ (Thompson, 2013: 214-5). Once again the consequences of her argument concerning animal models for new visions of the research subject are not developed in this volume but offer a fascinating trajectory for future research. Initiating such conversations about the role of animals as active or potential legal subjects and co-producers of the ethical choreography of scientific research will surely be an enduring legacy of this monograph.

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**5. RESPONSE FROM CHARIS THOMPSON**

**What’s law got to do with good science?**

**A right to science, good regulation of science, and the politics of animal research, for example**

It was an honour to read the incisive critiques of and generous engagements with *Good Science* contained in this *Debate & Dialogue* section. The pieces by Thérèse Murphy, Ilke Turkmendag, and Marie Fox each identify areas where more attention to the law would strengthen and expand the work, and each has opened up new research questions for me. All are pioneering scholars of the terrain where Law and Society and Science and Technology Studies productively enrich one another. I was previously familiar with their work and am now much enjoying reading their work more systematically; their commentaries are deeply informed in each case by their own scholarship. In her critique, Thérèse Murphy asks what role rights play in adjudicating and innovating in sciences that, like stem cell research, have ethics, and questions *Good Science*’s relative absence of engagement with human rights. Ilke Turkmendag applies to the UK mitochondrial DNA case my argument about California stem cell research that when biomedical cures are seen as paramount, other vital moral perspectives get shut out. She argues that good regulation is essential to the legitimacy of new technologies in the UK, and thus that the absence of excluded moral perspectives within regulation has a negative effect on public trust in the sciences in question. Marie Fox pushes me on my argument for ending substitutive research subjecthood for animals, underlining how difficult such an undertaking would be, and pushes me on lines of inquiry barely begun in a too truncated chapter.

In ‘To talk about science is to talk about ethics—but not about rights?’ Thérèse Murphy writes: ‘In reading *Good Science* I was looking for resonance with *rights* or *human* *rights*. I found it in a range of places . . . But I had to work harder than expected, which brings me to the question I want to ask in this short reflection piece: Why was that?’ Murphy speculates that my disciplinary place within STS and transnational feminisms might in part be responsible for my paying little attention to human rights. She also asks, however, if I fail according to my own explanatory criterion of drawing on ‘the repertoire available in a given place (p. 259)’. Murphy (see e.g. Murphy 2013) asks, ‘(a)ren’t human rights part of the repertoire in a range of places, both local and global?’ I agree that disciplinary inclinations matter, but it is also important that human rights did not figure centrally in the debates we were having and that were being waged nationally at the time. The EU and the US are different in this regard.

I grew up in a United Nations / World Health Organization family, so the links between human rights and health fundamentally shape my understanding of the post-second World War world. And yet, Murphy is right that human rights are not a central analytic frame in *Good Science*. With the help of Amazon, I discovered that I mostly used rights in the context of various kinds of minoritarian rights threatened by the status quo, as opposed to the universalist-aspiring ‘human rights’. I use the expression ‘disability rights’ 20 times, ‘animal rights’ 15 times, and ‘minority rights’ 7 times. And where I use rights in more majoritarian ways, it is to point to their use to strengthen, rather than allow citizens to petition (as human rights can when functioning at their best), the state. Thus, I comment on the passage of California’s Stem Cell Research and Cures Act that it established ‘a constitutional right’ ‘to conduct stem cell research’, and I refer to the legal background provided by property rights, a women’s right to choose, and the right to reproductive privacy that were argued in US constitutional terms. The only times I talk about human rights per se are in describing our goals for a more inclusive ELSI or ELSPETH curriculum, placing human rights under the ‘L’ that stands for ‘legal’ aspects in these acronyms, and in referencing the Universal Declaration on Bioethics and Human Rights as a recent text in the evolving international background conditions for post-WWII and, more recently, post-1970s research ethics out of which oversight of US stem cell research developed.

In other words, Murphy is correct that ‘rights or human rights’ are present in ‘a range of places’, but that rights, and especially human rights, are not centred. This is true even though I have never spent more time listening to and speaking at events that featured academic lawyers than during the early years of human pluripotent stem cell research. Murphy notes that, in general, lawyers have been slow to consider science and ethics in relation to human rights. I am not an expert like her, but I would add that among academic lawyers concerned with California stem cell research at the time, the principal interest was in intellectual property and patent law (and their conditions of possibility, such as informed consent, acceptable derivation of stem cell lines, licensing and technology transfer), not human rights. As regards my own disciplinary commitments, it is true that transnational and intersectional feminisms can lead one to be very wary of human rights, on the grounds that shared humanity, and thus one’s ability to access rights to common humanity to redress settler, colonial, state, masculinist, racist, or for that matter, corporate, power (or even health care itself in the US), is not something that can be taken for granted. Race, class, gender, sexuality, citizenship, religion and disability are too often decisive; indeed, a major focus of *Good Science* is how hard it is to bring any kind of shared notion of humanity, social good, or redistribution in to consideration in the US biomedical innovation culture I was describing.

The main reason I didn’t have much to say about human rights, however, was that they didn’t come up. Those were not the terms in which the debates I was following were conducted. Science and Technology Studies takes its methodological empiricism very seriously, and so to that extent this could be said to be related to my STS sensibilities. The procurial frame I characterised combined a moral imperative assumed to have the consent of every citizen of California to seek cures, combined with an economic innovation logic that included subsidising the pre-competitive part of the R&D chain, and then in the case of Proposition 71—uniquely, perhaps—ethically and economically de-risking a considerable part of the competitive part of the bench-to-bedside innovation process, to promise regenerative (trickle down) economic activity and biomedical cures. Economic and ethical processes and language were thus empirically paramount, and my archive and ethnographic sites dictated my emphasis accordingly. Triage, the method I elaborated to examine how different lives were positioned and valued within this frame, revealed appeals to rights almost exclusively in the minoritarian sense, as a way to speak about those left out. Even then, justice, a more redistributive term, often replaced rights, as in ‘disability justice’ rather than ‘disability rights’.

Shortly after *Good Science* was published, the so-called ‘right to try’ movement took off nationally, and culminated in the federal 21st Century Cures Act of December 2016, three years after the book’s publication. That Act, resolutely pro-cures in its framing, challenged the speed of the FDA regulatory process and continued the US patient activist challenge to heretofore fundamental epistemic and regulatory building blocks of good science such as randomised, controlled trials and the funding for, sequence of, and reporting from pre-treatment clinical trials. Murphy’s commentary suggests that the use of the phrase ‘right to try’ would make an excellent research project for thinking about how ethics and rights (albeit still not human rights, I’d argue) can shed light on one another. Murphy’s work on ‘the right to science’ would be an excellent way to approach this question.

The second piece, Ilke Turkmendag’s ‘Good Regulation of Science: A Matter of Rhetorics’, begins by placing *Good Science* in the Jasanoff (a lawyer and pre-eminent Harvard STS scholar) co-productionist strain of STS, correctly identifying my training and my interests in the links between science and democracy, and in the differences among national social contracts for science. Turkmendag asks whether my argument about the legitimisation of US human pluripotent stem cell research through the ethical choreography of the ‘procurial’ frame can be applied to the British process that led to the Human Fertilisation and Embryology (Mitochondrial Donation) Regulations 2015. Turkmendag deftly shows that the UK debate focused on particular individuals afflicted by mitochondrial disease and the potential of MRT to alleviate that suffering, eclipsing the fact that Britain was thereby becoming the ‘only jurisdiction in the world to legally permit human germline modification’. As I found for the US case, she finds that several important bioscapes, or kinds of lives and sets of concerns, are marginalised by this pro-cures framing. Furthermore, rather similar concerns were side-lined in both cases, including egg donation, inequality of access, and disability justice.

Like me, Turkmendag is interested in differences. She asks about differences between ‘procurement objections and concerns’ ‘across different types of research and reproductive material’, whereas I focus most of my comparative attention on the differences between political parties within national settings, and those between nations. The fascinating part of Turkmendag’s commentary, then, from my perspective, is in how she characterises legitimacy for (reproductive) research and innovation in the UK, and its consequences for what ‘pro-cures’ implies in the two countries. Turkmendag describes the UK as a place where science is generally considered legitimate if it is ‘safe, effective, and well-regulated’. My time serving on the Nuffield Council Working Group on Genome Editing has shown me that public consultation, current limits to science, solidarity, the robustness of the HFEA (itself grounded in British scientific priority in embryology and clinical priority in reproductive technology and its ethical regulation), and coming to a sensible scientific consensus after a decent period of time are paramount, whereas in the US, my service on ethics committees has focused on compliance with rules for the provenance and procurement of biomaterials and the right treatment of putative research subjects (humans, animals, embryos). Dissent is solicited but not with the purpose of incorporating it into regulation in the UK; in the US, dissent that matters politically is worked around and operationalised into acceptable procurement, where other kinds of dissent are ignored because they are thought to belong elsewhere. In other words, there are significant differences in what public engagement and dissent in this field means and how it is handled in these two countries.

There are consequences to these differences. In the UK, Turkmendag argues, good regulation matters in securing public trust for innovation. Ethical perspectives that got sidelined through the overly narrow focus on individuals with disease weaken regulation and thus have an impact on public trust. To increase legitimacy, a way needs to be found for these dissenting perspectives to make their way into the resulting regulation. In the US, however, regulation is widely seen as standing in the way of innovation, good science and access to treatment, and federal regulations are frequently seen as restrictive, especially in reproductive, regenerative and genomic sciences. Ethics committees (and the policy documents that enact the requisite ethical choreography) become the routes through which acceptable pathways around politically salient dissent are secured and normalised. These UK / US differences don’t just imply different understandings of public engagement, of ethics and of legitimacy; they stem from and in turn reinforce different meanings of substantive democracy and different solutions as to how to manage pluralism to promote ethically challenging science and its associated economic activity in these two national contexts. The contexts are both pro-cures, favouring individual biomedical treatment over social justice concerns; nonetheless, how they get there is quite different.

The third and final commentary, Marie Fox’s ‘Good Science and the Politics of Animal Research’, knowledgably situates my arguments about the future of animal models in good science into a broader field of animal rights scholarship and ‘the animal and animality in our broader political context’. As she rightly notes, I argue that the animal model is a historical ‘product of the entwined logic of both ethics and best scientific practice dictating that research be done in animals first’, and so I steer clear of making the debate appear to be one of ethics versus science. My ‘challenge to the animal use paradigm is grounded in the notions of good science and good regulation’, and is informed by the fact that the actions of cell-based therapies and cell-free biologics do not appear to transfer straightforwardly from animal models to humans, and thus more and more transgenic and humanising efforts are necessary to keep animal models fit for purpose. It is hard to argue this is good for the animals in question and contravening trends to make *in vitro* and *in silica* models better (such as disease-in-dish models, 3D bio-printing, organoids, and big data) shift the cost-benefit balance away from using animals to using *in vivo*-ised *in silica* and *in vitro* models instead. I point out that these arguments from good science against what I call ‘substitutive research subjecthood’ also apply to moving away from long histories of using some kinds of humans to stand in for others in biomedical research.

I found in my field work around regenerative medicine, however, that decommissioning animals from scientific and clinical model work will take a much more concerted effort than simply switching model systems once that cost-benefit point has been reached. Epistemological and regulatory standards are deeply imbricated with animal models and a large-scale shift to different model systems that is also decommissioning of animals will require multi-jurisdictional work, infrastructural coordination and alternate ways of characterising cell lines and documenting safety and efficacy. The cost and care required to decommission the animals themselves will not be insignificant, and, as Fox points out, the economic consequences of reducing the animal model business would also be significant. Furthermore, rhetorically, (spokespeople for) scientists and some animal rights activists are deeply committed to an oppositional view, as I illustrate with how easily the language of ‘kitty killers’ vs ‘terrorism’ was invoked at the University of California during my research for the book. Fox gives a fascinating reading of a 2014 UK Home Office plan to extend the three Rs to develop alternative model systems similar to spirit to those for which I argue, that simultaneously reaffirmed the need to keep animal models going. Fox’s observations lend further support to my argument about the complexity and scale of the undertaking. In *Good Science,* I called for an explicit set of benchmarks and the identification of international leadership for such an effort precisely because of how difficult this task appeared.

Although my argument is grounded in good science, I also make a ‘greater moral universe’ argument that is geared toward making it less daunting to begin rhetorically to decommission animals in research. The basic idea is that, in a pluralist liberal democracy, it makes sense to give a special seat at the table to those for whom a particular class of subjects or objects are sustained recipients of concern and included in their moral universe; thus, it ought to be possible for a society to move toward greater animal rights without oneself having to identify with animal rights activists in belief or action. The ‘greater moral universe’ of a given society is the one arrived at by summing the subjects and objects of significant communities of care. This argument is made too quickly, however. Fox points to other directions of research not pursued that arise from the rather condensed chapter, including examining care more thoroughly (I argue that in the US, animals in research are bounded by the verbs named in their committee, namely care and use, but I only gesture at the richness of caring for and about animals in research that others are exploring so fruitfully), and noticing the role of the law as I did in my work on CITES and the African elephant. She and I agree on the difficulty of resisting human exceptionalism in certain political contexts, and of taking hierarchies seriously in which some humans and some animals are more killable than others, and in which to treat and / or name a human as a non-human animal has long been used as a way of denying humanity.

Overall, like Murphy’s and Turkmendag’s, Fox’s commentary left me educated and excited jointly to raise and pursue new research avenues. I am honoured to have been able to engage with these generous and generative readings; thank you.

1. As ‘an overarching normative term … ranging in its application from political contests over funding, rhetoric, and institution-building to matters of personal belief and normative arguments made by scholars and activists hailing from a range of disciplines and social locations’ (2013: 26). [↑](#footnote-ref-1)
2. The HO Delivery Plan also highlights conservatism on the part of journal editors and peer review panels to accept publications based on non-animal techniques in lieu of ‘traditional’ animal models, and the difficulties of framing an international consensus to reduce animal research (Home Office, 2014: para 1.3). [↑](#footnote-ref-2)