

Horizon Report for The Law Society

Law in the Emerging Bio Age

August 2022



Contents

Introduction	3
Executive summary, Dr. Tara Chittenden, Foresight Manager	5
Mapping the deep dive: issue systems map	7
Humans and living systems: insights	10
Overview: the emerging 'bio age' – changing relations between humans and living systems	10
New Understandings	11
Second Chances	13
Rights For Nonhumans	15
Legal implications of the emerging Bio Age	16
How can law support the evolution of ethics in respect of evolving human understanding and capacity to manipulate living systems?	16
How can legal structures support second chances at improving human relations with living systems and our planet?	17
What will granting rights to nonhuman life forms do?	17
Making legal frameworks fit for the future	17
A legal profession for the Bio Age	19
Starting discussions and inciting insight	23
Appendix: a note on the scanning database	26
About the authors	27



Introduction

Activity in the Biosphere, alongside machine learning and emerging technologies, is creating a new generation of legal activity and ethical questions. Rapid developments in the fields of synthetic biology, biotechnology and bioenergy have already caused shifts in the biological risk landscape and are key drivers of future opportunities and threats.

From a legal perspective, extending our understanding beyond current risks to include emerging issues in these and related fields can play a vital role in informing future legal frameworks, liability cases and advice to impacted clients.

The findings in this report are intended to encourage interested legal professionals to observe and map previously unexplored areas of legal need and improve our understanding of the legal and regulatory environment that comes with the bio-changes being enacted across different parts of society. The increase in potential from bio-sensing and bio-hacking means that areas such as data transfer, sensing, communication technology and access to legal rights become of growing importance, not least in sectors such as healthcare, energy, construction, defence and education. Across all of our foresight work, scanning and analysis of cross-cutting themes such as 'data', 'privacy', 'trust', 'rights' and 'ethics' bring their own significance and societal impacts.

Our business environments face complex disruptions and emerging changes that are difficult to navigate and cannot be understood by one set of specialists alone. The Law Society's foresight programme demonstrates an understanding of our role as an influential multidisciplinary convenor in a fluid landscape for the legal profession and the law. Our Future Worlds 2050 work has already begun our engagement with members, cross-industry experts and left-field thinkers to explore longer-term horizons and business change.

You can find out more about this project here: <https://www.lawsociety.org.uk/topics/research/future-worlds-2050-project>

The Law Society is strongly committed both to scanning for change, and to building what we are calling foresight fluency within the organisation and with our members. In parallel with our work on Future Worlds 2050, we reviewed our scanning process better to understand priorities and the issues/challenges facing the profession longer term and to capture key areas of focus and uncertainty. In an ever-changing business climate, it seems inevitable that solicitors and lawyers face a future of change on a varied scale, depending on area of practice and client types. Innovation in services and service delivery will become a key differentiating factor and it is more important than ever for legal professionals to have access to potential future drivers, anticipate changes in client needs and the effects drivers such as the climate situation and biodiversity loss, coupled with emerging technologies, may have on how they, their clients and regulators operate.

Emerging risks that may occur at some point in the future are inherently difficult to assess, requiring a systematic approach to examining potential threats and opportunities. A proactive and systematic use of foresight information and futures tools can help the Law Society and our members to spot emerging trends, test resilience to potential future events and prepare for divergent futures. Our workshops in 2021/22 utilised tools including Three Horizons

and Futures Wheels (video flyovers of the sessions can be found on our Future Worlds page <https://www.lawsociety.org.uk/topics/research/future-worlds-2050-project>).

In *Law in the Emerging Bio Age*, the use of systems maps begins to explore how findings from the scanning process cluster into:

- i) **New understandings** of biotechnology and innovation;
- ii) **Second chances** in addressing planetary limits and compensating for past damage to the global ecosystem; and
- iii) **The rights of nonhumans** and the greater role of nature in decision-making.

Insights into the Bio Age from these systems maps offer a broadening array of options to develop incremental and differential innovations, alongside the ability to identify vulnerabilities and prevent undesirable outcomes and to ask questions of our legal, financial and governance institutions. Bio-innovation is expanding its knowledge frontiers at an ever-accelerating pace. The report observes that ‘changes in humanity’s capacity to reconceive, redesign, and re-engineer living systems at all scales are generating moral and ethical challenges’. The ‘bio-’ will undoubtedly be at the core of numerous innovations and ‘solutions’ that reach society by 2050. Along with these innovations come questions of IP and ownership, liability, bias, harm and rights. These in turn raise critical questions for policy, regulation, law and the legal profession. As a key first step beyond this report, we include a conversation guide and questions. The report itself is also accompanied by a series of ‘Postcards from the Future’ to help direct conversations around the topics and themes in the report findings and to assist readers to imagine their own place and influence in the Bio Age.

How to use this report

If you want the concise 40,000-foot view, read the *Executive summary*, on page 5.

If you want to understand the components of the emerging bio age, review *Mapping the deep dive*, page 7.

If you want to understand the trends and emerging changes driving the emerging bio age, read the *Humans and living systems* section, page 10.

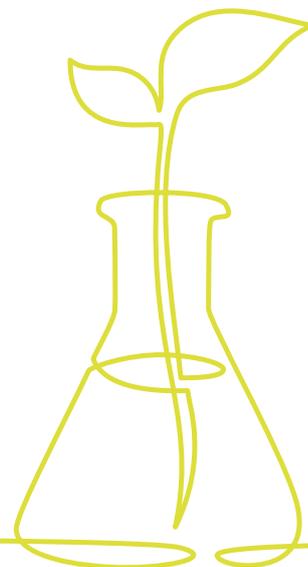
If what’s most important to you are the questions these changes raise for law and potential impacts on the legal profession, law, regulations, and contracting, read the *Legal implications of the emerging Bio Age* section, page 16.

If you simply want to cut to the chase and consider how you can best prepare your firm for these oncoming changes, read *A legal profession for the Bio Age*, page 19.

If you want to raise these issues with colleagues or staff in your organisation and explore potential risks and opportunities, consider the section on *Starting discussions and inciting insight*, page 23.

Welcome... to the emerging Bio Age.

**Dr. Tara Chittenden, Foresight Manager,
The Law Society**





Executive summary

Overview

This deep dive into what we might call the ‘emerging Bio Age’ – to distinguish it from the current digital Information Age – explores the evolving relationship between humans and living systems. That relationship will provoke new opportunities and risks that will demand oversight and new regulations, different contractual obligations, and create new alliances and conflicts as the rights of different human communities and natural systems themselves are challenged.

Via an extensive scanning and systems mapping process, Jigsaw Foresight with the Law Society have in this project identified implications of emerging changes in this area that we have grouped as follows:

- **New understandings** of biotechnology and innovation
- **Second chances** in addressing planetary limits and compensating for past damage to the global ecosystem
- **The rights of nonhumans** and the greater role of nature in decision-making

The legal profession is already being affected by these emerging changes. Our purpose in this report is to explore those impacts and raise the overarching question of how humans can be better ancestors to future generations of all species and what that would mean for legal ethics. We raise many questions, some more uncomfortable than others, which is why we invite you to actively engage with the findings in this report. To help guide you, we offer conversation prompts at the end of the report to kickstart conversations at a formal or informal level. We also offer a deck of ‘postcards’ – concise creative artefacts to spark

thoughtful ideas, connections, and conversations (available [here](#)).

Scanning process and systems map

As part of understanding a complicated topic, we identified categories of changes emerging that related to humans and living systems and mapped their interconnections. This creates an initial interconnected landscape of the issue, depicted visually as a **summary systems map (see page 7)**. Each of the elements represents a category of trends and emerging changes identified during a four-month horizon scanning effort. Subsidiary system maps appear later in this report, and information about the scanning database can be found in the appendix.

Report findings

The questions for the Law Society and the legal profession arise from the philosophical and ethical critiques of these shifts in humanity’s relationship to the planet and its living systems, and what that means in terms of ethics and rights. This in turn rebounds into the policy arena and decision-makers’ responsibilities in negotiating all of that by creating new laws and regulations – and working out how to enforce them. Three impact themes emerged from the general scanning data on this issue: *New understandings*, *Second chances*, and *Rights for nonhumans*.

New understandings

We begin with an exploration of the profound and surprising capabilities that are the direct result of advances in biotechnology research and innovation. Such discoveries have massive potential power for progress and may equally be weaponised or abused for exploitative ends. The efficacy of biotechnology

regulation and risk mitigation for a range of areas must be examined.

Second chances

In this section we discuss how law and ethics can support us to mitigate future damage by operating within planetary limits and compensate for past damage to the global ecosystem.

The practice of policy and law would need to tackle unintended consequences and perverse incentives, as well as a lack of transparency and accountability in financial disclosure and accounting practices.

Rights for nonhumans

We draw out here the emerging topic of rights for nonhumans. Rights have already been granted (and more are being sought in different jurisdictions globally) for elephants, trees, rivers, ecosystems, and landscapes. Rights for nonhumans communicates our dependence on and a greater role for nature in decision-making. The process and execution of a nonhuman rights-based framework in international and local law may differ radically from a human rights-based approach. For example, if rights were granted to nonhumans or living systems, then questions of liability for damage to the environment, such as climate change or biodiversity loss, arise.

Roundtable discussions

The Law Society hosted two roundtable discussions on this topic with lawyers, legal professionals, and topic experts. These discussions reviewed the existing topic system map and suggested additional implications for the legal profession, regulations, contracting, and policy. The roundtables aimed to elicit additional thoughts and insights on the scan results from a wider range of perspectives. The discussions were lively, critical, and creative; participants concluded this issue was urgent, under-discussed, and a topic the legal profession should engage. Highlights included:

- Commodification and the emphasis on economic growth reinforce the notion of humanity's dominion over nature rather than our embeddedness in nature and living systems – the legal profession must consider how to best support the transition to a circular economy.
- The legal profession should consider how to use the circular, interlinked frame of the issue system maps to cut through assumed hierarchies and look at interdependencies and connections.
- Consider what the issue might look like from the nonhuman, or the ecosystem, point of view.
- Explore the concepts of rights, identity, and personhood as critical to humans' relationship

to living systems, and our stewardship of environmental quality.

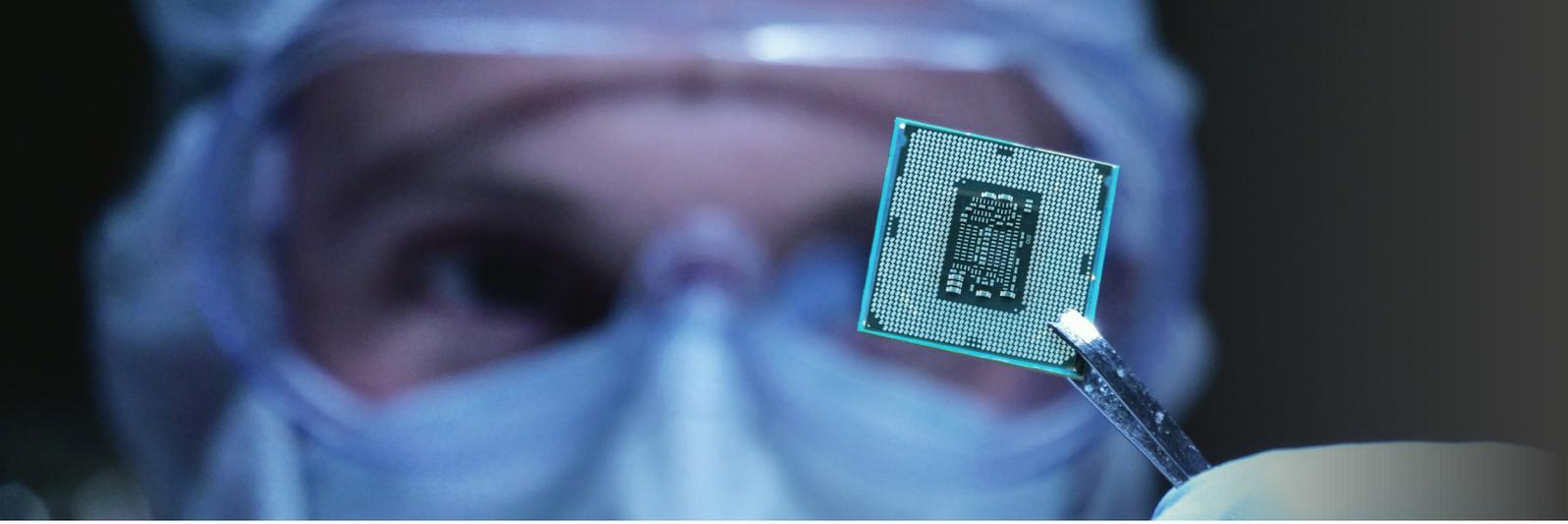
- Emphasise the moral and ethical framing of this issue, and what it might mean for the legal profession to embrace humanist, artistic, spiritual, and sacred perspectives that reframe our relationships with living systems and create a form of environmental guardianship that stems from the sacred.
- Risk, regulation, enforcement, and liability regarding all the facets of this complex system of innovations and issues demand uncomfortable conversations that we must face head-on with multiple stakeholders to assess where responsibility and accountability will lie regarding living systems and humanity's biosciences capabilities.
- Grappling with this issue demands long-term time frames and multiple timelines; we must avoid the constraints of political and business cycles.
- The legal profession needs to consider what all these points mean for training the next generation of lawyers and how best to equip them to support long-term solutions with the necessary innovations in legal frameworks.

A legal profession for the Bio Age

Whether you are based in a large or small law firm, an in-house legal department, a member of the Law Society staff, a policymaker or part of another expertise community, three patterns that need shifting, collectively, and at multiple levels, emerge from this deep dive:

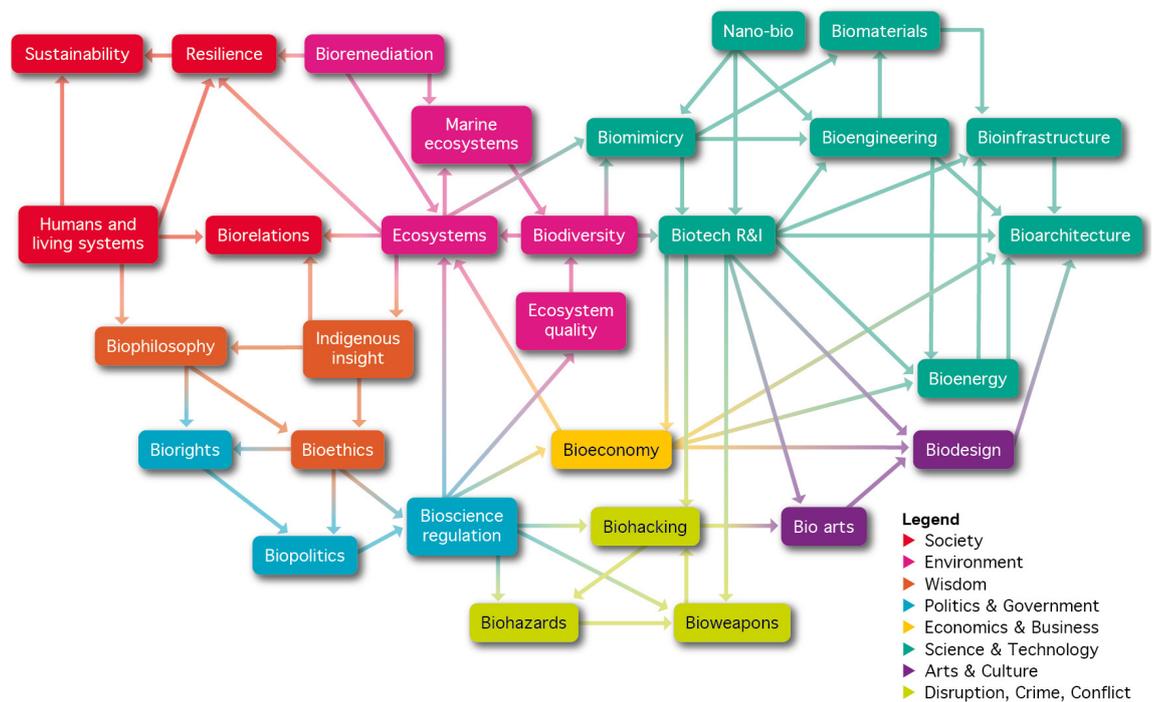
- Capacity building, leadership, and nurturing well-rounded next generation lawyers who are mission led as well as legally minded – lawyers for a blue planet; Developing a professional well-roundedness as well as a sense of shared purpose, collective responsibility and commitment to be agents of change across the legal profession.
- Reframing, repositioning, and connecting the legal profession to longer as well as shorter term horizons of uncertainty, disruption, and uncertainty, protecting time to explore longer horizons of change; and
- Reassessing impact and impact evaluation.

If we are to take account of living systems, then legal frameworks need to be fit for the more-than-human future.



Mapping the deep dive: issue systems map

As part of understanding a complicated topic, we identified categories of changes emerging that related to humans and living systems, and mapped their interconnections. This creates an initial systemic landscape of the issue, depicted visually as a summary systems map.



Emerging Bio Age: Summary Systems Map

Each of the elements represents a category of trends and emerging changes identified during a four-month horizon scanning effort. Subsidiary system maps highlight impacts, themes, and consequences for society and law.

The brief explanations of each element that follow are clustered by colour groups and by order of appearance on the map, moving from left to right and top to bottom.

Society

- **#Humans & living systems** – high-level issues exploring the evolving relationships between humans and the living fabric of the planet at every scale from cells up to ecosystems and bioregions, and rewards critical investigation of cultural differences in framing those relationships.
- **#Bio-relations** – specific trends and emerging changes in how people are structuring or restructuring their relationships with different lifeforms, from emailing trees to once more acknowledging all aspects of the sacred in the diversity of life.
- **#Sustainability** – new paradigms and approaches to adapting human systems to function within the limits of the larger living systems and planetary resources.
- **#Resilience** – ideas and models focussed on creating adaptive responses to systemic change that both heighten living system viability and reduce damage.

Environment

- **#Ecosystems** – emerging changes addressing rising awareness of the diversity across ecosystems, ecosystem monitoring, and ecosystem management, stewardship, and curation.
- **#Marine ecosystems** – the unique changes and emerging questions related to the marine environment, and marine life forms and ecosystems.
- **#Biodiversity** – the trends and emerging issues describing both the discoveries of new species and life forms on Earth as well as increases in extinctions.
- **#Ecosystem quality** – data describing current environmental and ecosystem viability as well as trends and emerging issues in pollution and resource degradation.
- **#Bioremediation** – the research and practices focussed on deliberate human action towards restoring species, ecologies, and living systems.

Wisdom

- **#Indigenous insight** – the extensive work in decolonizing perspectives on humans and their relationship to nature and living systems, opening a space of respectful attention to traditional ways of knowing and insights about the natural world.
- **#Biophilosophy** – diverse evolving philosophical perspectives on humans and their relationships with and within living systems.
- **#Bioethics** – examples of cultural perspectives, philosophical discussions, research, and issues related to responsibility and accountability with regard to decision-making and action affecting life and living systems, in the context of increasing human capability to tinker with life.

Politics & government

- **#Biorights** – specific policies, laws, and cases exploring and defining the rights of non-human living systems vis-a-vis humans and their societies.
- **#Biopolitics** – political perspectives, ideologies, emerging manifestos and principles, and political party perspectives on living systems and changes in human and non-human living systems.
- **#Bioscience regulation** – proposed or emerging regulatory regimes for use of bioengineering, biomaterials, bioenergy, bio-infrastructure, bio-architecture, nano-bio innovations, etc.

Economics & business

- **#Bioeconomy** – references to emerging economic opportunities and business models connected with commodifying living systems or the capacity to manipulate living systems, at all scales.

Science & technology

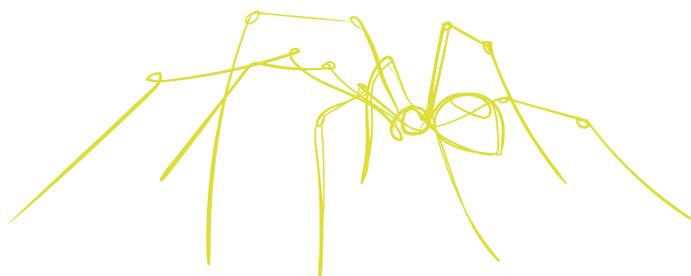
- **#Biotech R&I** – emerging insights and innovations focussed specifically on understanding and manipulating living systems and the elements of life.
- **#Biomimicry** – the growing community of practice in research, engineering, manufacturing, design, and related human activities that borrows ideas from natural systems and how they function to create new processes, materials, or commodities.
- **#Nano-bio** – changes focussed on the interface between manipulating living systems at the cellular or molecular level, and manipulating non-living material at the molecular or atomic level.
- **#Biomaterials** – innovations in chemistry and materials science based on unique substances naturally produced by various organisms – like spider silk, or barnacle glue.
- **#Bio-engineering** – the ability to manipulate and design living organisms at the cellular level using techniques such as CRISPR-Cas9 to edit DNA and shape cellular function.
- **#Bio-infrastructure** – innovations suggesting the potential for growing infrastructure rather than building it; pooktre or arborsculpture as one example.
- **#Bio-architecture/ecotecture** – innovations in architecture and built environment design that model structures on nature and living organisms, or that incorporate living organisms in the structure itself.
- **#Bioenergy** – emerging explorations in producing energy from living organisms, like algae as an electricity source.

Arts & culture

- **#Biodesign** – the design of everyday items borrowing from the structures and functions of living systems.
- **#Bio-arts** – examples of living systems manipulation specifically as part of artistic creation, in any of the arts – this may include traditional living systems art forms, such as bonsai or narcissus bulb sculpture, or bioengineering-based life sculpture.

Disruption, crime, conflict

- **#Biohacking** – changes related to the unregulated/grey market/black market manipulation of living organisms, for recreational, artistic, addictive, or criminal purposes.
- **#Bioweapons** – emergence of the discovery, or creation via bioengineering, of any organisms or material with potential to be deployed deliberately to cause harm to any life forms or ecosystems.
- **#Biohazards** – examples of unintended consequences harmful to any life forms or ecosystems from any use of human capacity to tinker with living systems, potential or realised.





Humans and living systems: insights

If we conceptualise human-nonhuman relations as a single integrated living system, we acknowledge the interdependence between species. This helps us understand how human actions have damaged the environment for all, for example with pervasive pollution, and have destroyed other species' habitats.

These new perceptions drive many researchers, philosophers, and analysts to call for radical transformations in human systems, such as economic degrowth and legal rights for nonhuman species and systems. The resulting conversations suggest a new direction for society, one in which people use fewer natural resources and organise and live differently from today. The research also addresses the challenges of climate change, biodiversity loss, and stresses on finite resources that are the context within which we live.

This work with the Law Society looks at long-range change, short-range change, disruptions, transformations, and potential turbulence. It maps the dynamic context in which law, lawyers, the legal system, and policy work, and with which they must engage. The following pages explore various emerging changes and their implications. These explorations invite the reader to reflect more deeply how we can be better ancestors and what that would mean for law. The insights are offered as possibilities and potentials for a range of different future outcomes: the research explored what is changing and what that might mean – it is not a vision of a preferred future, but rather an initial map of emergent possibilities, offered to help people consider the upsides, downsides, and trade-offs these changes imply.

Overview: the emerging 'bio age' – changing relations between humans and living systems

We are *in* nature and *of* nature – humans and their communities are evolving, living systems embedded in and interconnected with the planet-wrapping living system that is Earth's biosphere. This deep dive into what we might call the 'emerging Bio Age' explores the evolving relationship between humans and living systems. What characterises our relationship with living systems now? How was it different in the past? How might it change in the various futures we can imagine? How do different people and different cultures interact with the living systems around them?

Human capacity to create ever more powerful, more nuanced tools has evolved over the millennia, resulting in sometimes glorious, sometimes hair-raising advances in our capacity to tinker with living systems at all scales, from the inner mechanisms of cells to entire ecologies. If we can create synthetic life, should we? If we can tailor an animal's genetics, should we? What are the philosophical, ethical, and legal boundaries for these capabilities – how should we formalise accountability and responsibility for our rapidly expanding capacity to transform life?

This focussed horizon scanning effort collected trends and emerging changes relevant to humanity's capacity to manipulate living organisms and living systems. The scanning identified signals of change regarding new possibilities for sustainability and resilience. These explorations raise questions about the rights of living systems as entities and the rights of the traditional indigenous partners of those entities. Such traditional stewards have alternative perspectives that offer deeper insights, based on local context and embedded experience, than do distant policymakers sitting in urban offices devising regulations, or investors making economic decisions about those systems.

We began with an interest in the expanding capabilities that are the direct result of advances in biotechnology research and innovation. Where biotech manipulates the smallest forms of life – cells, viruses, DNA strands – it converges with nanotech, engineering at the scale of single molecules and atoms. When you understand how single cells and single strands of DNA manipulate and direct matter, the possibility arises to create entirely new materials. This could potentially mean organically based bio-energy systems, bio-infrastructure, and bio-architecture – more ecologically benign and resilient because they would be patterned after life and living systems. This opens up new aesthetic spaces as well, providing artists and designers with potentially novel living media. The explorations of bio-artists are but one step away from biohackers, people who explore more transgressive uses of biotech on their environment or on themselves. On a larger scale, such transgressions will inevitably mean bioweapons and bioterrorism.

Innovations seldom remain in the use case for which they were invented. Artists use them as media; children use them as games; organised crime converts them into an addictive vice – and the military-industrial complex weaponises them. The explorations of biohacking, the creation of bioweapons, and the resulting biohazards that come from less reflective, less responsible, and less accountable manipulation of living systems are also of concern regarding biodiversity and ecosystem quality.

Questions for the Law Society and legal profession arise from the philosophical and ethical critiques of these shifts in humanity's relationship to the planet and what that means for the law, legal ethics and rights. This in turn rebounds into the policy arena and decision makers' responsibilities in responding

to this issue by creating new laws and regulations and working out how to enforce them.

Considering business, what would new forms of contracts suitable for this emerging space look like?

What will due diligence that assures guardianship of nature for the duration of a contract look like?

What forms of natural asset financial disclosure might be needed?

How can respect for the sanctity of nature be written into contracts?

Three initial impact themes emerged from the general scanning data on this issue: *New Understandings, Second Chances, and Rights for Nonhumans*. The following pages describe each theme as a cluster of emerging changes and potential impacts and suggest questions arising for law and the legal profession. The major components of each theme are highlighted by an accompanying system map.

New understandings

This section uses examples of biotechnology innovations to highlight potential legal and ethical issues. Bio-robots that administer your own cellular material in medical procedures will transform personalised healthcare, while the 'organ-on-a-chip', which simulates certain functions of the organ, has potential for precision medicine. Ultimately, researchers hope to build a multi-organ chip model, the 'human-on-a-chip'.¹ Biocosmetics use bioactive materials and bio- and nano- technological processes to produce ultra-thin films for skin creams and microalgae pigments for cosmetics. Such modifications at the nanoscale raise questions of personal liability and risk, while expanding cellular-level personal data will need privacy under the law. President Macron of France reportedly refused a Russian Covid-19 test to protect his DNA from abuse², while American leaders have urged military personnel not to take genealogy-type DNA tests, warning of security risks.³ The protection of an individual's genetic material goes beyond who it is provided to and for what purpose, there is a risk of abuse for bioterrorism or bioweapons.

1 <https://biomedical-engineering-online.biomedcentral.com/track/pdf/10.1186/s12938-020-0752-0.pdf>

Accessed 15.5.22

2 <https://www.bbc.co.uk/news/world-europe-60346300> Accessed 15.5.22

3 <https://www.nytimes.com/2019/12/24/us/military-dna-tests.html> Accessed 15.5.22

Second chances

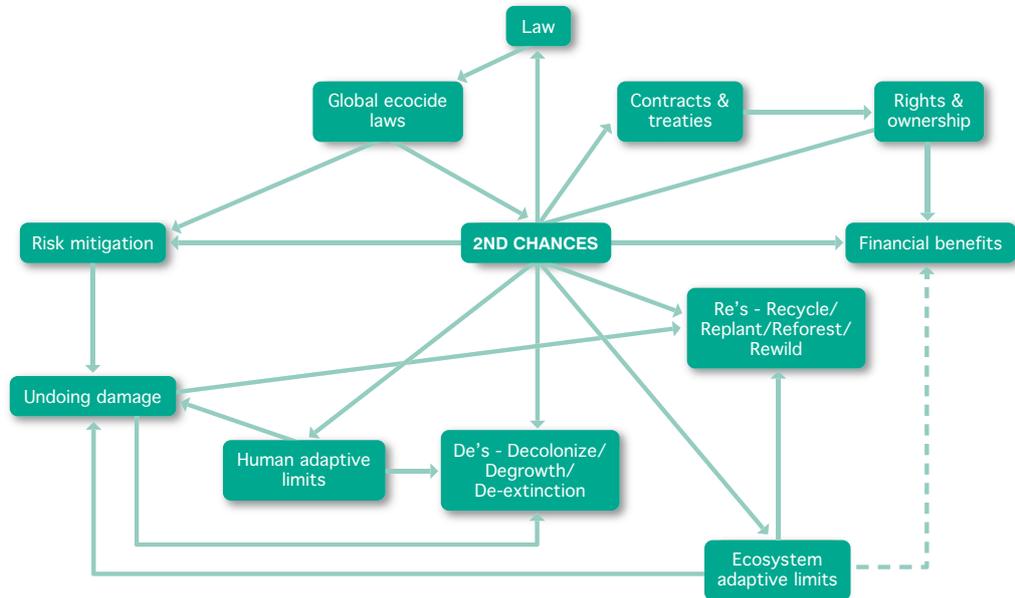
In this section we discuss how law and ethics can support us to mitigate future damage by operating within planetary limits and compensate for past damage to the global ecosystem.

At different levels of the system, we found that discussions around system-wide mitigation called attention to the notion of property as a form of dominion over nature which has led to the commodification of nature, damage to ecosystems, and biodiversity loss. New economic models are proposed, such as:

- **sustainable finance** (taking environmental, social and governance (ESG) considerations into account);
- **alternative investment vehicles**, such as natural asset companies (publicly tradable securities based on the biological services produced by forests, wetlands and so on);⁹
- **a circular economy**, where waste is eliminated, resources are circulated, and nature is regenerated; and
- **degrowth** (economic growth as a social objective is replaced with an equitable downscaling of production and consumption to reduce energy and raw material use).¹⁰

Models which challenge capitalism and the monetisation of nature also confront our human adaptive limits, which may be economic, political, social, and cultural. For example, island nations might approach sea resources as something to be harvested while other nations decry overfishing and biodiversity loss.

To mitigate against future damage, environmental stewardship frameworks measure and evaluate ecological performance and involve different vehicles in the legal system, from the Law of the Sea to agriculture subsidies. Such frameworks are criticised for their focus on short-term incremental targets, reflecting political and business cycles, rather than long-term binding goals which incorporate multiple human and natural timelines. The critique calls for indigenous knowledge and perspectives – based on centuries of living in close interaction with local and sometimes sacred ecosystems – to be taken into account in jurisprudence to counterbalance the prevailing ‘Western’ philosophy.¹¹ Indigenous wisdom is said to be grounded in the ‘law of the land’ not ‘law of man’¹² and initiatives to protect associated intellectual property rights from biopiracy are co-ordinated by the World Intellectual Property Organisation.¹³



Second chances thematic cluster

9 <https://www.nyse.com/introducing-natural-asset-companies> Accessed 15.5.22

10 <https://www.tandfonline.com/doi/full/10.1080/14747731.2020.1812222> Accessed 15.5.22

11 <https://www.un.org/en/academic-impact/we-are-indigenous-addressing-global-challenges-indigenous-knowledge> Accessed 15.5.22

12 <https://www.weforum.org/agenda/2022/01/wisdom-indigenous-leaders-world-2022-climate-change/> Accessed 15.5.22

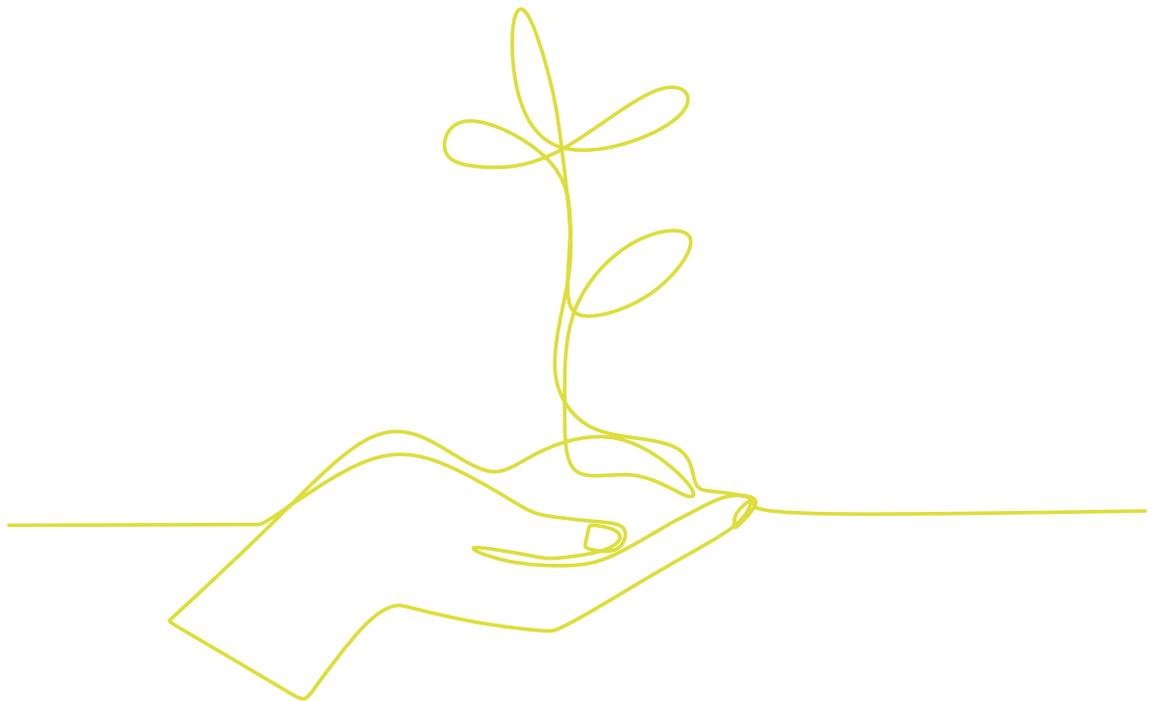
13 https://www.un.org/esa/socdev/unpfii/documents/session_10_WIPO.pdf Accessed 15.5.22

As law schools introduce courses on decolonising law, **‘difficult conversations about the ways in which history has influenced what the law is, how law is taught, what law is taught, who the law works for, and who the law does not work for’**¹⁴ are called for.

Many beliefs about the protection of nature arise from it being seen as sacred and concepts of stewardship link indigenous knowledge and the religious/spiritual, yet changes in land management and increased migration to cities have separated people from nature in more developed countries. At the local level, works to repair ecosystems, including re-planting seagrass, re-wetting bogs, re-wilding, re-cycling, and re-forestation are practical responses to past damage. At the global level, **recognition that international law for environmental governance is inadequate**, the campaign to **add ecocide to the jurisdiction of the International Criminal Court** has the support of nations, the European Union, and high-profile figures such as Pope Francis. If successful it will extend protection to the oceans and outer space, with implications for individuals, businesses, and governments.¹⁵

One extreme form of compensation for past damage is to bring back extinct plant and animal species, with implications for healthy ecosystems and biodiversity. Whether growing Judean date palms from salvaged ancient seeds to cloning the Pyrenean ibex or gene-editing the woolly mammoth, **de-extinction or ‘resurrection biology’ also challenges the scope of patent law** and the ethical considerations of cultural and symbolic significance of such species and their future exploitation based on novelty.¹⁶

There remains the question of how we make space for human-planet reconciliation. Are arts and culture the way to enable people to see new possibilities and reflect on old things in new ways?¹⁷ Do we need to offer reparations to nature and its guardians, for example by returning indigenous lands?¹⁸ Do we need a Desmond Tutu for the Anthropocene?



14 <https://www.tandfonline.com/doi/pdf/10.1080/03069400.2020.1827774?needAccess=true> Accessed 15.5.22

15 <https://static1.squarespace.com/static/5ca2608ab914493c64ef1f6d/t/60d7479cf8e7e5461534dd07/1624721314430/SE+Foundation+Commentary+and+core+text+revised+%281%29.pdf> Accessed 15.5.22

16 <https://academic.oup.com/jlb/article/7/1/Isaa017/5835678?login=true> Accessed 15.5.22

17 <https://www.unhcr.org/innovation/unsung/> Accessed 15.5.22

18 <https://thehill-com.cdn.ampproject.org/c/s/thehill.com/changing-america/sustainability/environment/587152-lumber-company-returns-waterfront-property-to?amp> Accessed 15.5.22

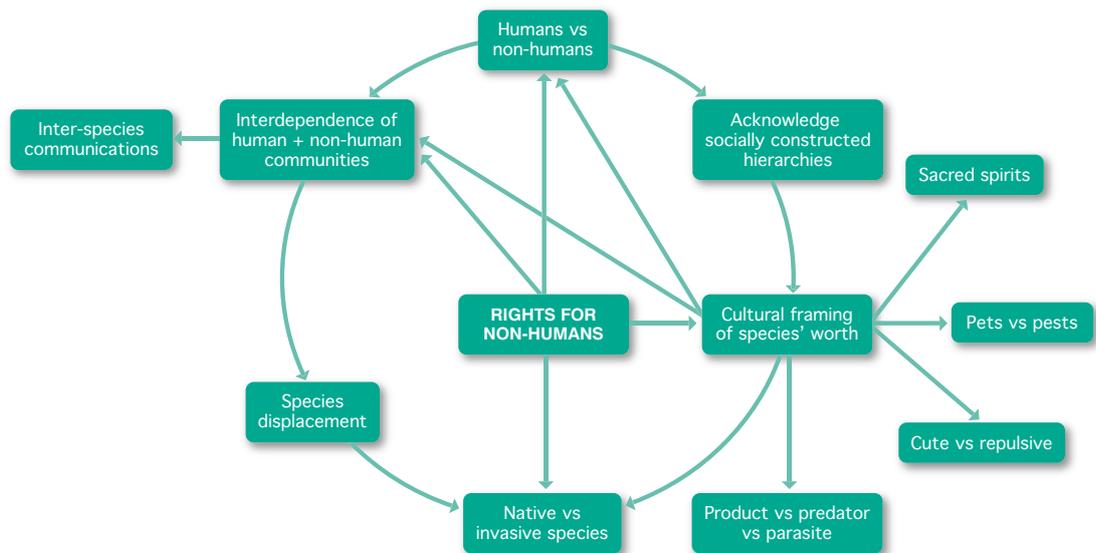
Rights for nonhumans

We draw out here the emerging topic of rights for nonhumans because rights have already been granted and more are being sought in different jurisdictions globally for elephants, trees, rivers, ecosystems, and landscapes. Rights for nonhumans communicates our dependence on and a greater role for nature in decision-making. The process and execution of a nonhuman rights-based framework in international and local law would likely differ from the human rights-based approach. For example, evolutionary development (including cognitive and emotional development) might be a right for nonhumans.¹⁹

When thinking about rights for nonhumans we acknowledge that human-constructed species hierarchies, i.e. cultural framings of nonhumans in binary groupings, determine who gets to live and who dies.²⁰ Current binaries include native and invasive, healthy and unhealthy, young and old, rare and common, cute and repulsive, pet and pest, sacred or profane. Such framings are sometimes applied to humans too. Using the example of ‘invasive’ species, we might consider how species

become displaced as conditions in one location become inhospitable, e.g. due to heat, drought, pressure of other species. This is increasingly the case with climate change and the Argentinian town of Santa Isabel was overrun with unpleasant beetles when their habitat overheated.²¹ Humans also move because of rising sea levels, crop failure, conflict, and poverty. Positive human feelings for ‘charismatic’²² nonhumans influence innovation and policy too, e.g. investment in new technology to talk to whales, people sending emails to trees, campaigns to ‘Save our English Oaks’.

Some argue that in the current system human rights are not properly protected or balanced. If taxonomies like the species hierarchy are important in allocating rights, then we need to think about how bio body hackers who make extreme physical changes, biorobots, human-animal chimerae, and autonomous robots will be treated. We already see that transgender people and people with different characteristics are ‘othered’ and the effect of negative societal responses to body changes clearly links to the ‘cute or repulsive’ binary of the species hierarchy.



Rights for nonhumans thematic cluster

19 <https://www.unepfi.org/news/themes/ecosystems/tnfd-launch/> Accessed 15.5.22

20 <https://www.sciencedirect.com/science/article/pii/S0743016721001583> Accessed 15.5.22 and

<https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00403/full> Accessed 15.5.22

21 <https://www.extendedforecast.net/article/millions-of-brown-beetles-in-argentina-due-to-intense-heat-728/?s=09> Accessed 15.5.22

22 https://www.academia.edu/25481411/Nonhuman_charisma Accessed 15.5.22



Legal implications of the emerging Bio Age

Changes in humanity's capacity to reconceive, redesign, and re-engineer living systems at all scales are generating moral and ethical challenges. These in turn raise critical questions for policy, regulation, law and the legal profession.

The sections below identify initial question sets and starting points for discussions of the three bio age themes in the previous section.

How can law support the evolution of ethics in respect of evolving human understanding and capacity to manipulate living systems?

Most would agree that biotechnology regulation should prioritise safety and there is currently an international moratorium on bio-geoengineering (using plants to change the planet's climate). Yet many biobased innovations such as gene drives and engineered pathogens have serious implications for biosecurity by, for example, the escape of gene-edited material beyond the target population or the illicit trading of biological materials.

We suggest biotechnology risk mitigation and regulation will need to be tightened in relation to:

- Equipment, materials, and research methods (licensing, ethical rules, duty and practice of care within manufacturing and research);
- Approvals (regulatory and societal); and
- Finished products (aesthetics, functionality, hybridity).

The roundtable discussions also raised a variety of issues and concerns:

- Regulation should be safety first, for example, when editing genes with CRISPR, how do we avoid unequivocal disasters? Is self-regulation the answer in other aspects of biotechnology? Will workable bottom-up community standards emerge that generate effective codes of conduct and widespread good practice? History suggests self-regulation in industry does not always achieve better standards and is open to abuse.
- Who regulates/enforces bodily autonomy relating to body hacking? Top-down regulation is weighted against those who understand the risks and will do it regardless. We are not comfortable having these conversations and so we move quickly to confrontation, bypassing shared understanding.
- How effective is enforcement? Sanctions for breaches of law and personal liability are powerful disincentives, how can their role be amplified and more systemic in future?
- How will the ability to augment and hack our own neurosystems and the bio-processes of cognition change how we view knowledge? And if some individuals choose to bio-hack their knowledge capacities, how will that impact the future of work and competition for jobs?

How can legal structures support second chances at improving human relations with living systems and our planet?

As we imagine a more-than-human legal system, what should be the role and the function of the law in society? This goes beyond the rule of law and the function of lawyers to what we want and how the law should respond, for example the law could be more preventative and facilitative.

We might want to consider the future protection and distribution of rights, obligations, duties, ownership, and financial benefits of individuals, tribes, corporations, and institutions and the legal vehicles which contain them, be that law, treaties, contracts, or custom and practice.

The practice of policy and law would need to tackle unintended consequences and perverse incentives, as well as a lack of transparency and accountability in financial disclosure and accounting practices. The role of regulation is essential to shedding light on hidden or damaging practices that some are determined to continue, such as:

- lobbying, corruption (*cui bono?*);
- short-termism (fossil fuels, deforestation, environmental governance); and
- green washing (bio-aviation fuel, IKEA accused of illegal logging, weak environmental certification systems).

Environmental policy and law would also need to embrace multiple time horizons, and on longer-term time horizons. Roundtable participants pointed out that environmental governance often focuses on short-term incremental goals that reflect political and business cycles, rather than long-term solutions which involve multiple timelines. Emphasis on evaluation and impact, on being able to demonstrate change, lends itself to the short-term, yet benefits will not be seen for years. The legal system needs to work closely with the policy sector in considering how to construct long-term binding goals for human relationships with living systems.

What will granting rights to nonhuman life forms do?

Widespread adoption of rights for nonhuman life forms would radically change the legal and ethical balance between humans and living systems. Such rights may be a staging post on the way to a very different system, that is circular rather than linear and far removed from the Western approach. There will be important decisions on who decides

what or who gets legal personhood, how that is implemented, and the ethics of everything having personhood. Should ‘every flower have an identity’? Perhaps we should challenge the very idea of rights as something vested in individuals and move towards a ‘whole systems’ framework of law, wherein rights are accorded in a nested natural hierarchy of dependence (Nature – People – Economics), as called for by the European Economic and Social Committee.²³

If rights were granted to nonhumans or living systems, then questions of liability for damage to the environment, such as climate change or biodiversity loss, arise in relation to the causal link between the damage and the person/entity causing it; attribution of liability; calculation of damages and so on (see also the Law Society’s Horizon Scanning report: Addressing Biodiversity Loss: <https://www.lawsociety.org.uk/topics/research/how-biodiversity-loss-could-disrupt-businesses-in-the-next-10-years>). Environmental stewardship frameworks may be useful here, although there would clearly be potential for local disputes, for example between neighbours. Beyond litigation against responsible parties, other concerns to consider are investor pressure, public procurement rules, financial institution decisions, and reputation-focused campaigns by civil society.

Roundtable discussions pointed out that many ideas about the rights and protection of nature arise from it being seen as sacred; concepts of stewardship/guardianship link indigenous and sacred. How do we create a form of guardianship that stems from the sacred? How are the rights of nature protected in a system like this? Acknowledging indigenous perspectives may mean jurisprudence being driven by philosophies. Are there dangers in prioritising indigenous knowledge over ‘western knowledge’ or of sanctifying ‘dead’ knowledge?

Making legal frameworks fit for the future

If we are to take account of living systems, then legal frameworks need to be fit for the more-than-human future. From our research, and the roundtable discussions, we found that:

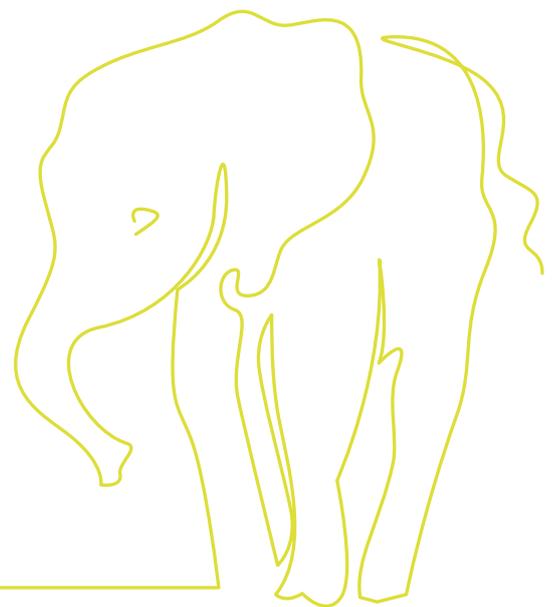
- Regulation is patchy and aims to promote safety and minimise abuse of biotechnology, yet there is a lack of accountability for safety and security of biotechnology that creates the risk of misuse by error or terror.

More work needs to focus on evaluation frameworks and metrics. This is relevant for lawyers to feel they have precise areas in which they

23 <https://www.eesc.europa.eu/sites/default/files/files/qe-03-20-586-en-n.pdf> Accessed 15.5.22

can act. If law/ethics is about impacts, how do we measure what makes a living system healthy?

- Gaps exist in international legal frameworks, with campaigns emerging for new laws to address them, e.g. ecocide law.
- Differences between jurisdictions have implications for the location of businesses and innovation. In some sectors regulation is seen as an obstacle to innovation and competition between countries creates pressure to reduce regulation. For example, a European Court of Justice decision brings gene editing under the GMO Directive, restricting plant/food crop research and investment while, post-Brexit, the UK government has indicated its intention to relax rules around GM and gene-edited plant crops and farm animals.
- Environmental regulation is developing apace with increasing protection of nature, nonhumans, ecosystems, and natural features, such as rivers.
- Some propose self-regulation to be the answer, using bottom-up community standards, codes of conduct, and people sharing good practice. Yet self-regulation in industry does not always achieve better standards and is open to abuse.
- Bioethics seeks to protect human and nonhuman welfare, yet public acceptability of biotechnology remains less than enthusiastic.
- Not enough attention is paid to social and cultural implications of new biotechnologies (e.g. human embryo editing, acknowledging indigenous knowledge) and ensuring equitable sharing of benefits of innovation (e.g. access to drugs in the global South, growers' output replaced by synthetic versions of their products).
- Biohacking (including DIY bio and bio art) is pushing the boundaries of biotechnology and how it is used; it will likely become mainstream. Greater and cheaper access to genetic material and equipment for DIY bio is accelerating despite the law being more restricted in Europe than in the US or China. It is possible to circumvent restrictions through online purchases; prohibition risks pushing DIY bio underground.





A legal profession for the Bio Age

Whether you are based in a large or small law firm, an in-house legal department, a member of the Law Society staff, a policymaker or part of another expertise community, three patterns that need shifting, collectively, and at multiple levels, emerge from this deep dive.

1. Agents of change: Capacity building, leadership, and nurturing well-rounded next generation lawyers who are mission led as well as legally minded – lawyers for a blue planet; as well as a sense of shared purpose, collective responsibility, and commitment to be agents of change across the legal profession.

- **Growing, and valuing, a new kind of lawyer.** In *Human Compatible: Artificial Intelligence and the Problem of Control*, Stuart Russell²⁴ argues that the biggest problem in problem solving is actually us humans being “nasty, envy-driven, irrational, inconsistent, unstable...”

But we need each other, and we need ideas from everywhere: psychology, economics, and moral philosophy, and to “melt, reform, and hammer those ideas into a structure that will be strong enough to resist... enormous strain...”

The profession needs more environmental lawyers, specifically a next generation network of lawyers who see themselves as agents of change. Next generation lawyers need to be equipped to play their part in the bigger story, both in their technical capability and in their convening and communication skills. For example, they need to know how to collaborate with purpose across specialisms, cultures, borders, and timeframes, and to encourage multi-disciplinarity and alliances across specialisms and borders.

- **Poets and philosophers as well as legal practitioners.** In *The Romantic Economist*²⁵ Richard Bronk wrote of the need for economists to have more than one mental model so that they could continue to question

“distortions and deficiencies in our vision and analysis because of the structuring effect of the conceptual and logical framework implied by a metaphor...”

²⁴ *Human Compatible: Artificial Intelligence and the Problem of Control* is a 2019 non-fiction book by computer scientist Stuart J. Russell. Publisher: Viking, October 8, 2019

²⁵ *The Romantic Economist: Imagination in Economics*. Publisher: Cambridge University Press, online publication date: March 2015

“When metaphors become buried...and cease to be questioned, there are two inevitable dangers. The first is that there may be important distortions and deficiencies in our vision and analysis because of the structuring effect of the conceptual and logical framework implied by the metaphor... The second danger is that when a metaphor hardens into one of the implicit and unquestioned metaphors of everyday or specialist language, it starts to have an impact not only on the way we see social or market reality but also on the way we structure that reality through our behaviour and the policies we advocate.”

We propose that in rethinking professional development to equip lawyers to hold challenging conversations on the environment, there is a need for a formal commitment to a wider liberal arts, moral, and ethical education, alongside the technical, and a mingling with other disciplines and professions.

- **Invested in learning new languages and being effective translators between specialist worlds.** To be effective in this more porous, more complex and fluid environment, lawyers need to get curious about, and learn the language of, other specialist areas, and of finance. Not complex accounting, but sufficient financial expertise to hold their own and make connections with boards and committees on how to think about financial liabilities.
- **Committed to nurturing new networks and network mindsets and skillsets.** This kind of intentional talent development will also need to acknowledge the consequences of Covid. For example, with virtual onboarding there is a challenge to create the networks and

camaraderie that last a professional lifetime. The development programmes that equip young lawyers to rise through the profession and grow in influence and impact, involve peer-to-peer learning journeys and communities that go outside the firm and overcome some new challenges. The growing role of AI in carrying out the kinds of tasks on which a trainee lawyer would cut their teeth, means that the journey in grafting and drafting is going to be very different for future lawyers. The new human-to-human and human-to-machine relationships that will characterize the new knowledge work of the law involve a competence in networks that we have only partially grasped.

- **Strengthening foresight fluency.** We would not be good futurists if we didn't encourage everyone in the legal profession to get better at foresight – and at base, that means expanding time horizons and raising the awareness of change.
- **2. Reframing the view:** reframing and repositioning; newly connect the legal profession, protecting time and space to explore longer horizons of change and uncertainties.
- **Multi-disciplinarity.** Commit to more multi-disciplinary conversations with the intention to 'break out of the legal bubble(s)'.
- **Outside in.** Engage seriously with outside, perhaps uncomfortable, perspectives. Professional perspectives differ, so make sure that in creating the immediate work products, you don't just talk to your own kind.
- **Creating collective.** These are huge issues which need huge action. Collective, international innovations are needed to save biodiversity, which will require international legal frameworks, incentive schemes, and protections. That, in turn, will take a different kind of convening of perspectives, forging of alliances and aligned action. For example, if you talk to western educated lawyers about the rights of nature, you often get mockery – the perspective is different in South America or New Zealand.
- **Folding the edges into the middle.** Activist momentum is flourishing in the margins, at the edges of the legal profession (e.g. Lawyers for Nature, ClientEarth), stitching together purpose and urgency. Seeding and feeding these 'between spaces,' at the margins, creates great value, allowing people and organisations to grow and find focus, purpose and energy without being stifled by the power structures in an existing culture. How can the Law Society, as well as influential individuals and law firms, work together to grow these seeds of desirable change, while protecting the

need to express uncomfortable insights? For example, in our research and conversations, we talked of tensions between different kinds of knowledge, the need to be willing to hold the sacred close in secular and capitalist contexts, to encourage emotionally and politically charged conversations about biohacking and the ownership of bodies. It is hard not to be funnelled into institutional orthodoxy and to have the self-discernment and willingness to doubt your own position. It is hard to hold open the space in which to probe and challenge but our research and roundtable discussions urge this as a necessity if we are to make the space for vital change.

- **Porous and connected.** For many larger firms, providing mentoring, training budgets, strategic exposure, and development plans to grow next generation lawyers are all part of strategic organisational development. For smaller firms, as well as for the larger ones, attention to networks can be part of the reframing. The Law Society plays its part in convening across firms and across disciplines and can, in turn, provide member firms with the means to start new and challenging conversations in new settings.
- **Reframing the hierarchies.** At a deeper level of this reframing the call is more profound: to shift our perspective and the narrative frame from thinking humans are separate from, or hierarchically superior to, nature to understanding we are of it. The current dominant frame is human- and individual-centred. Much teaching on bioethics is very tightly focused on practical actionability and not so tightly connected to bio philosophy and indigenous rights.
- **Changing the protagonists in the story.** Could legal frameworks allow an individual to take on a corporation and argue harm to an ecosystem? Or support new approaches, e.g. distributed financial system (SEEDs manifesto). Or could there be greater legal scrutiny of the financial aspects of decision-making around living systems? The financial sector is focussed on climate risk, biodiversity is an ancillary part. Can the next generation of lawyers take on other sectors and hold them accountable for the whole system? Can legal watchdogs and environmental lawyers monitor corporations' activities? For example, could a global legal system track and take on dirty industries being relocated to the global south to escape inclusion in CSR and liability?
- **From short to longer term, from attack to defence?** Geopolitics and environmental governance influence land politics and natural resource management and distribution: these

need long-term solutions; the legal sector can work with and influence policy and stakeholders over the long term.

3. Imagine and Measure to Change: reassessing impact and impact evaluation.

- **What's the baseline?** A systematic inventory would baseline what the UK legal profession currently does to monitor how their professional activities affect the relationship between humans and living systems. What are the stories, datapoints, of what is currently happening, and its impact on a living system? What changes would have you telling different stories? Tools such as SenseMaker® or Futurescaper, with crowdsourcing capabilities, could be the means to gather and aggregate data and illuminate bigger patterns that are not easily detectable otherwise. This broader awareness could help spot the seeds of change that could spread the shift from 'we are lawyers who happen to stay awake at night worrying about the environment' to 'we are environmental managers who happen to be change agents through carrying out our professional legal duty'.
- **Cut through to common standards.** How do we measure what makes a living system healthy? There are many different evaluation frameworks and metrics, for example: the World Economic Forum's Risk Register and its Common Metrics for Sustainable Value Creation; IPBES' Nature's Contribution to People frame. This is important for legal and policy precision, but it is hard to cut through to a common standard. What role can the legal profession play in contributing to a meaningful global approach to impact and impact evaluation? How is that then brought into shorter-term decision-making and action?
- **More foresight fluency!** Our work clearly identified a thirst to rethink the impact of lawyers on living systems. How do lawyers and their work support or constrain human actions that will improve relationships with living systems, recognising that even apparently minor actions can accumulate to substantial impact? How can living systems principles and qualities like sustainability be better enshrined in law and ethics? Foresight tools, and convening skills, can nurture the protected spaces in which to reimagine the intersection of law and policy at different levels of the system (local, system-wide), including who (individual, firm, nation) can do what regarding challenges to government environmental plans and performance. This demands commitment to make more time for the imagination, unfettered from deadline pressures.

- **The uses of discomfort.** Charged issues take emotionally intelligent leadership and a willingness not to know (yet). They demand taking the time to explore tensions, however uncomfortable. For example, regulation is supposed to be safety first, yet despite legal obstacles people will bio-body hack to augment and empower anyway, using pharmaceutical products in alternative ways. Who, in this case, is the expert? How much self-harm is permissible in bio-body hacking? These possibilities are outside the scope of our current research to explore but emphasise the need to reserve the time to create rich contexts in which to find sound ways forward.

What else should or could we be doing?

Several other strands of activity have come, not just from this deep dive and the accompanying roundtable discussions, but from two years partnering with the Law Society with the purpose of building an applied foresight fluency within the Society and the legal profession. Here are four further recommendations for action:

- **Take a convening lead in shaping adaptive governance.** How can law, and the legal profession, keep up with climate change/biodiversity loss or the adaptive changes and innovations needed to coordinate resource management and responses across organisational, sectoral, and geographic boundaries?²⁶
 - As a professional body, the Law Society has an unusual and vital chance to play an active part in convening and holding the space for uncomfortable and demanding conversations to explore emergent forms of environmental governance and the coordination of resources and activities. Disruption, complexity, uncertainty, the collision of timescales and cascades of impacts in rapid environmental change are the conditions in which we live now. Increasingly as a profession we need spaces for temporary reflective stability in which we can work together to shape change.
- **Writing it in.** Climate change, biodiversity, and water scarcity risks are not typically written into contracts. What are a lawyer's responsibilities here?
 - Initiatives like The Chancery Lane Project demonstrate one way to equip young lawyers to bring action around climate change down to a doable, everyday level of change agency. The project drafts clauses protecting nature and environmental systems that could be written into contracts. The creation of education programmes, checklists, and demonstration case studies

would illustrate how the contracting process itself can heighten attention on the breach of the planetary boundaries in ways current contracting does not reliably do. Even if the contracts continue not to include such clauses, the conversations will heighten awareness.

- **Getting ahead.** At the edges of the systems map are very early ideas about the next frontiers of change. One example is space as the next frontier of bio law – e.g. body hacking for performance in space, synthetic biology materials for use in space.
 - These new intersections of different areas of society and industries with bio law and ethics could merit an ongoing watch on a 'More-than-Earth' and 'More-than-Human' law and associated impacts on a new kind of next generation lawyer.
- **Partnering with the accountancy profession.** Both the legal and the accounting professions are experiencing similar moments of awareness about being mission led with an emphasis on an active response to climate change, loss of biodiversity, and the breach in planetary boundaries. How can the professions partner to create a new action space together, as challenges to the current norms and defaults in finance and investment?
 - Incentives are needed for organisations to make decisions on intangibles, make them stakeholders, and turn costs into assets;
 - Understanding what we are (un/)knowingly financing, demanding nature-related and biodiversity-specific financial disclosure, and asking the right due diligence questions. This could mean getting actively involved with the **Taskforce on Nature-related Financial Disclosures**.
 - Developing criteria for supporting financial decision-making and the rule of law.
 - Exploring the impact of new ecocide laws or financial institutions to counter ecocide and environmental destruction.
 - Addressing greenwashing: honing awareness of the bio-implications of the environmental sustainability goals (ESG).
 - Committing to joint programmes of training and awareness for banks and other financial institutions.

We offer these recommendations in the spirit of exploration and experimentation, and thank all the researchers and participants who contributed to the scan itself, the discussions, and the ideas that fed into this list or recommendations.



Starting discussions and inciting insight

This section contains questions to help spark a thoughtful discussion for anyone in the legal profession about the report findings.

You can also explore the postcard collection (available [here](#)) to help direct your conversations around the topics and themes in the report findings.

From the report:

“We are in nature and of nature - humans and their communities are evolving, living systems embedded in and interconnected with the planet-wrapping living system that is Earth’s biosphere.”

Conversation prompt

What might it look like for the legal, or any profession, to consciously view itself as being ‘in nature and of nature’. How might your working day and working practices change? What might your clients expect?

From the report:

“what we might call the ‘emerging Bio Age’ - to distinguish it from the current digital Information Age - explores the evolving relationship between humans and living systems.”

Conversation prompt

Are you seeing any weak signals of the ‘emerging Bio Age’ in your profession or life? What are they and how might they impact the world in the long term?



From the report:

“research involving human-animal chimaeras, containing cells from multiple species, raises many ethical questions, not least that of consciousness in the chimeric animal. While these concerns led the US National Institutes of Health to stop funding some chimaera research, researchers in Spain and China have created a human-monkey embryo. Questions of sentience also arise relating to lab-grown brain tissue, **whether it should have legal personhood.**”

Conversation prompt

In your opinion, how might the legal status of personhood evolve over the next few decades?

From the report:

“The practice of policy and law would **need to tackle unintended consequences and perverse incentives**, as well as a lack of transparency and accountability in financial disclosure and accounting practices. What is the role of regulation in shedding light on hidden or damaging practices that some are determined to continue: lobbying, corruption (*cui bono?*); short-termism (fossil fuels, deforestation, environmental governance); green washing (bio-aviation fuel, IKEA accused of illegal logging, weak certification systems).”

Conversation prompt

How could lawyers address the lack of transparency and accountability in financial disclosure and accounting practices?

From the report:

“**These ethical and moral dilemmas challenge social norms** and there is a growing critical discourse around future biotechnological innovation relating to who holds power, biocultural identity, and transhumanism. For example, if genetic markers of identity (e.g. sex, gender, race) no longer hold, then how is one’s relationship to self and others affected? New ways of thinking and being are required.”

Conversation prompt

Historically, what are some other ethical and moral dilemmas that the legal system has grappled with that you know of? How were or are those dilemmas being reconciled in the legal profession and what clues might that history hold for future ethical and moral dilemmas such as the ones detailed in the report?

From the report:

“**environmental stewardship frameworks** measure and evaluate ecological performance and involve different vehicles in the legal system, from the Law of the Sea to agriculture subsidies. Such frameworks are criticised for their focus on **short-term incremental targets**, reflecting political and business cycles, rather than long-term binding goals which incorporate multiple human and natural timelines.”

Conversation prompt

How might a longer-term approach to environmental stewardship in the legal system look from your perspective? What would the knock-on impacts be from where you are standing?

From the report:

“There remains the question of how we make space for human-planet reconciliation. Are arts and culture the way to enable people to see new possibilities and reflect on old things in new ways? Do we need to offer **reparations to nature and its guardians**, for example by returning indigenous lands? Do we need a Desmond Tutu for the Anthropocene?”

Conversation prompt

How might the legal profession ‘make space for human-planet reconciliation’?

From the report:

“The process and execution of **a nonhuman rights-based framework** in international and local law may differ radically from a human rights-based approach. For example, if rights were granted to nonhumans or living systems, then questions of liability for damage to the environment, such as climate change or biodiversity loss, arise.”

Conversation prompt

What are the implications of rights for nonhumans in your legal practice? Think about neighbourhood cats, endangered species, workplace robots?

From the report:

“Perhaps we should challenge the very idea of rights as something vested in individuals and move towards **a ‘whole systems’ framework of law**, wherein rights are accorded in a nested natural hierarchy (Nature – People – Economics) of dependence, as called for by the European Economic and Social Committee.”

Conversation prompt

How might a ‘whole systems’ framework of law affect your business, specialism or job? What are some of the knock-on impacts you can see of that potential change?





Appendix: a note on the scanning database

An Excel workbook of the scanning database can be accessed [here](#).

Items in the database above are categorised within nine columns:

1. **Title** – the title of the database item.
2. **Slack keywords** – a group of keywords informed by discussions on the Slack Bioscanning channel.
3. **System map keywords** – keywords used in the systems map.
4. **Type** – the type of media of the item, e.g. news article, blog, research paper.
5. **Legal, ethical implications** – some items have some comments on the legal and ethical implications of the item and are included in this column.
6. **JF Take** – some items have insights from Jigsaw Foresight’s researchers and are included in this column.
7. **Punchy quote** – some items have elements of the item that have been pulled out as a punchy quote or a useful statistic.
8. **URL** – the web URL link for the item if it was sourced online.
9. **Postcard** – this column tags certain items that were used in the 22nd February Bioscanning postcards. Items tagged ‘22-Feb’ were referenced in these postcards.

Jigsaw Foresight’s distinctive scanning approach moves from the informal and collaborative to the formal and codified. It starts with a Slack channel, in which the Jigsaw team and research fellows post articles, events, images and media that are pertinent to the topic (in this case relating to *Humans and Living Systems*). Team members comment, discuss and vote via emoji on the posts, collaboratively connecting thematic links as patterns start to emerge – out of which will evolve the systems map and final report. Items are initially tagged informally in the Slack channel before the scanning team begins to consolidate and group these tags into a more structured keywording system. Using these keywords, items are then coded with the appropriate metadata and entered into the scanning database which is housed on Notion. As the systems map emerges, the team creates a feedback loop by tagging the database according to the relevant systems map keywords. This specific database represents a selection of sources gathered from approximately four months of research and discussion, tagged according to wider scale, emergent trends.

About the authors

Dr. Wendy Schultz

Dr. Schultz is an academically trained futurist with over forty years of global foresight practice, and Director of Infinite Futures, as well as Futures Puzzlemaster at Jigsaw Foresight.

She has designed futures research projects for NGOs, government agencies, and businesses. Wendy specialises in participatory futures workshops – most recently online for the Law Society; for a global pharmaceutical company; for the ILO; for the International Institute of Islamic Thought; for *Africa Knows* in Arusha, Tanzania; and with the Geneva Centre for Security Policy in Bangkok, New York, and Geneva.

Recent research with the Jigsaw Foresight team includes scanning on the ‘next normal’ and emerging futures of work; with colleagues at SAMI Consulting she researched and drafted four global scenarios and multiple regional scenarios on the futures of research and innovation in a post-COVID world.

Wendy teaches futures studies in the Masters Program in Strategic Foresight at the University of Houston; is a Fellow of the Geneva Centre for Security Policy; a Senior Fellow of the Center for Post-Normal Policy and Futures Studies; a member of the Association of Professional Futurists; a Fellow of the World Futures Studies Federation; and a Fellow of the Royal Society for the Arts.

Dr. Trish O’Flynn

Dr Trish O’Flynn joined Jigsaw Foresight in 2021 after a twenty-year career across academia and national policy-making focussed on applied interdisciplinary solutions to contemporary challenges using systems thinking.

Trish’s research at the University of Reading and The Open University into the motivations of land managers’ responses to climate change and processes of grassroots innovation. Most recently Trish has worked across disciplines and international stakeholders to promote and evaluate the societal and economic impact of research at City, University of London.

In her earlier policy role at the Local Government Association, Trish was the national lead for civil contingencies, attending COBRA meetings in real life and war-gamed emergencies and developing likely future scenarios. As the national lead for regulatory policy, she contributed to early thinking around the principles of Better Regulation drawing on her experience as a local authority environmental health manager and practitioner. Her policy innovation – the ‘Unplugged’ licence – was enshrined in the Licensing Act 2003.



About Jigsaw Foresight

We are **agents, stewards and**

convenors of gracious disruption on a personal, collective and planetary scale, taking on knotty problems and worthwhile challenges in deep partnership with our clients. Our distinctive approach combines research-based expertise across foresight, storytelling, change and knowledge management with a hands-on approach and a commitment to building foresight fluency in whomever we work with. This is supported by a research and creative studio which distils complex ideas and challenges into shareable artefacts that inspire change and action.