

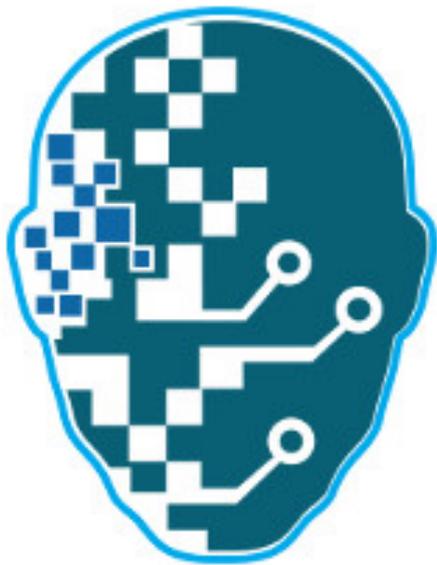
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# Human Enhancement and the Law

*Regulating for the Future*

St Anne's College - 7-8 January 2016

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E N H A N C E M E N T  
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R E G U L A T I N G F O R T H E F U T U R E

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### Introduction: Our Aims and Themes

The increasing production and use of what can broadly be categorised as ‘human enhancement technologies’ is creating challenges for existing legal frameworks. Examples of these new technologies include pharmacological substances that improve cognition, chemical enhancement in embryo development and hormonal techniques for increasing physical strength. These and similar technologies are not easily accommodated by current laws within individual jurisdictions, nor under EU-wide regulatory instruments and under international law.

The use of these technologies has implications in many legal contexts, particularly the regulation of use by professionals such as pilots and medical practitioners. These technologies will challenge legal conceptions of responsibility (both criminal and civil), as well as requiring new approaches to the regulation of pharmaceuticals and other such technologies.

This conference and resulting special edition of the *Journal of Law, Information and Science*, will aim to identify the legal issues that arise as a result of these developments in human enhancement technologies. Paper presentations and panel sessions will be directed at exploring the ways in which legal systems — both within jurisdictions and across borders — can and should respond to these issues. Our hope is that in bringing together scholars from a range of relevant disciplines — law, philosophy, politics, sociology and the sciences — the conference will facilitate the development of some answers to the thorny legal challenges enhancement technologies pose.

**Dr Imogen Goold- St Anne’s College, Oxford.**



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## General Information for Attendees

St Anne's College is located on Woodstock Road, a pleasant 20 minute walk (around one mile) from Oxford Train Station. The best way to get there is to walk down Botley Road past the Saïd Business School and over the river. Cross over at the traffic lights to George Street and follow until you reach the crossroads of Cornmarket Street and Magdalen Street (you will see a large Waterstones bookstore and Boswells in front of you). Turn left up Magdalen Street, which becomes St Giles, and continue walking for around ten minutes. The main entrance to St Anne's College is just beyond the Mathematical Institute on the right hand side of the road. If you reach St Antony's College you have gone too far. **You will be able to register at the desk in the Lodge on the morning of the 7th and 8th from 09:00 to 10:00** and be given directions to your room and the Tsuzuki Lecture Theatre (see page 24 for map). We will be welcoming all attendees in the Tsuzuki Theatre at 10:00.

There is **no parking available at St Anne's College**, however The North Oxford Park and Rides (Pear Tree and Water Eaton) are very convenient as the buses stop near the College. Please see the link <http://www.oxfordshire.gov.uk/cms/public-site/park-and-ride>. Bicycles should be parked in the area adjacent to the Banbury Road.

All attendees will be issued with personal access credentials for wifi on the OWL Guest network, which you will be able to pick up throughout the college.

For those staying at St Anne's **breakfast is served between 08:00 and 09:00** in the Dining Hall. For all those attending the conference there will be a **lunch available in Foyer B in the Ruth Deech Building at 13:00 -14:00** and the **Conference Dinner will be available in Seminar Room 9 from 19:00**. A vegetarian option is available for both lunch and dinner.

On Wednesday evening we will be holding an informal dinner at Gee's (<http://www.gees-restaurant.co.uk>) to which attendees are welcome to join, however this is not part of the formal schedule and is not included within the registration fee.

Check-in is available from the Porters' Lodge from 13:00 and you are asked to vacate rooms on your last day by 10:00. There is safe and secure storage at the Lodge for belongings. Please be sure to return your keys upon departure.

St Anne's has a strict "no smoking indoors" policy and asks that everyone smokes only at the 14 designated points, marked in red on map.

In the event of a fire, please follow the instructions of Lodge Porters and see the attached map to locate your nearest Fire Assembly Points. For those staying at St Anne's there is more safety information available on the back of each bedroom door. St Anne's College is a historic campus that has natural hazards and so visitors are respectfully reminded to take care of themselves throughout their visit.

**If you have any general queries or need any assistance during your stay, your first point of contact is the St Anne's Lodge (01865 274800). You may also contact:**

Tristan Cummings (Network Co-ordinator): 07463221005  
Lucia Santi-Exley (Accommodation Manager): 01865 284968

# Programme

Thursday, 7<sup>th</sup>  
January

8.30 – 9.15 Registration, Lodge

Tsuzuki Lecture Theatre

9.15 – 9.30 **Welcome – Dr Imogen Goold**

9.30 – 10.00 **Session 1 – What is ‘Enhancement’?**

Ana Nordberg – *What’s in a name? Defining the legal concept(s) of human enhancement*

10.00 – 11.00 **Keynote – Professor Ruud Ter Meulen**, University of Bristol – *Some Critical Reflections on the Idea of Cognitive Enhancement*

11.00 – 11.30 Morning Tea - Foyer B, Ruth Deech Building

Tsuzuki Lecture Theatre

11.30 – 1.15 **Session 2A – Criminal Responsibility I**

Rob Blakey - *The neuroscientific assault on criminology: Anticipating and explaining the response of criminal justice actors*

Danielle Hornstein and Dov Greenbaum – *Civil and criminal liability in the era of subconsciously controlled prosthetics mediated by artificial intelligence interfaces*

Lisa Claydon - *Examining criminal responsibility*

Bebhinn Donnelly-Lazarov - *Neuroenhancement and the Fundamentals of Criminal Responsibility*

Seminar Room 7

**Session 2B – Regulating Enhancement**

Aleksi Mikael Hupli – *Should everybody be allowed to use pharmaceutical neuroenhancers? Perspectives from current users*

Roshni Namboodiry – *Towards the regulation of therapeutic biological enhancement in humans*

Po-Hsiang Ou – *Regulating Human Enhancement: Food Law as Food for Thought*

Filippo Santoni de Sio - *Artificial agents and artificial virtue: the ethics of self-driving systems*

1.15 – 2.00 Lunch – Foyer B, Ruth Deech Building

2.00 – 3.45 Tsuzuki Lecture Theatre

**Session 3A – Criminal Responsibility II**

Nicole Vincent - *Moral Agency and Moral Enhancement*

Seminar Room 7

**Session 3B - Genetic Enhancement**

Marcelo de Araujo – *The ethics of editing the human genome with*

*CRISPR-Cas9*

Tom Douglas – *A Reply to Vincent*

Sophie Arkette – *CRISPR-Cas: a question of genomic enhancement*

Elizabeth Shaw - *The Non-voluntary Moral Enhancement of Offenders Through Direct Brain Interventions*

Andrea Bertolini – *Managing Evolution: Human Enhancement & the Law*

Jonny Pugh - *Justifying Non-Consensual Neuro-Interventions in Criminal Justice, and The Justification of Non-Consensual Medical Interventions in Infectious Disease Control*

Didier Coeurnelle - *The Right to (Radical) Life Extension Considered a Human Right*

3.45 – 4.15 Afternoon Tea - *Foyer B, Ruth Deech Building*

Tsuzuki Lecture Theatre

4.15 – 4.45 **Panel Session 1 – Genetic Enhancement**

Donna Dickenson (Chair): Jonathan Pugh, Elizabeth Hildt and Rumiana Yotova

4.45 – 5.45 **Keynote – Jan-Christoph Bublitz-** *Competition, Contradictions and Collective Interests: Ideal drugs in a non-ideal world*

6.30 Dinner – *Seminar Room 9, Ruth Deech Building*

Friday 8<sup>th</sup>

January

08:00-09:00

Breakfast – *Dining Hall*

Tsuzuki Lecture Theatre

9.00 – 10.00

**Keynote – Professor Karen Yeung**, King’s College London - *AI and Cognitive Computing in Medicine*

10.00 – 11.00

**Keynote – Professor Anton Vedder**, University of Tilburg – *An Obligation to Enhance?*

11.00 – 11.30

Morning Tea - *Foyer B, Ruth Deech Building*

Tsuzuki Lecture Theatre

Seminar Room 7

11.30 – 1.15

**Session 4A – Obliging Enhancement**

**Session 4B – Human Rights and Public Health**

Ori Lev - *Biomedical Enhancements: would it be permissible to coerce, require or induce persons to use them?*

Daniele Ruggiu - *The Right to Bodily Integrity in Enhanced Societies: The European Convention on Human Rights vis à vis the Challenge to the Human Body*

Urszula Kosielińska-Grabowska – *Admissibility of Human*

Lisa Forsberg - *‘Enhancement’, professional discretion, and*

*Enhancement. A Case of a Surgeon*

Natalie Salmanowitz - *The Use of Neurointerventions to Reduce Implicit Racial Bias in the Courtroom*

Jenny Krutzinna - *Cognitively Enhanced Children: Learnings from their Gifted Predecessors*

*judgements about what is good for people*

Alex McKeown - *Public Health Enhancement and Existential Risk*

1.15 – 2.00

Lunch – Foyer B, Ruth Deech Building

Tsuzuki Lecture Theatre

Seminar Room 7

2.00 – 3.45

**Session 5A – Enhancement and Harm**

**Session 5B – Challenges from Enhancement**

Marcello Ienca - *Hacking the Brain, Securing the Brain: Emerging Risks and Regulatory Options*

Britta van Beers - *The artificialisation of human life and the changing relationship between natural and artificial persons in law*

Cressida Auckland - *Damage to Protheses and Compensation for Harm*

Benjamin Mak - *'Relational No More?': The Enduring Importance of Relational Autonomy for Human Enhancement Technologies*

Nick Davis - *Examining the harms inherent in cognitive enhancement*

Carin Hunt - *Can't or Won't: Motivation Enhancement and our Achievements*

Antony Blackburn-Starza - *Empirically grounding new forms of harm in assisted conception services and genetic technologies*

3.45 – 4.15

Afternoon Tea - Foyer B, Ruth Deech Building

Tsuzuki Lecture Theatre

4.15 – 4.45

**Panel Session 2 – Enhancement - Harms, Benefits and Responsibilities**

Lisa Claydon (Chair): Imogen Goold, Carin Hunt, Roshni Namboodiry and Nick Fitz

4.45 – 5.45

**Keynote – Dr Hannah Maslen, University of Oxford - *Scientific Description, Philosophical Prescription and the Realities of Law***

5.45 – 6.00

**Closing Address – Dr Imogen Goold, University of Oxford**

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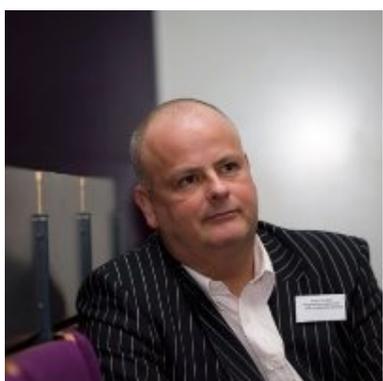
## Keynote Speakers

### Prof. Ruud ter Meulen, University of Bristol



Ruud ter Meulen is Emeritus Professor of Ethics in Medicine at the University of Bristol. He has been working on a broad range of issues in medical ethics, particularly issues of human enhancement, solidarity and justice in health care, ethical issues of health care reform and health policy, ethics of evidence based medicine, ethical issues of long-term care and ethics of research and research ethics committees. He was director of the Institute for Bioethics in Maastricht (The Netherlands) and Professor at the Department of Health Ethics and Philosophy at the University of Maastricht before moving to Bristol in 2005. He was Director of the Centre for Ethics in Medicine until his retirement in 2015. He has published about 150 articles, book chapters and edited volumes on a range of topics in bioethics. He is editor-in-chief of an academic volume on cognitive enhancement titled *Rethinking Cognitive Enhancement* to be published by Oxford University Press (2016). He is also working on a monograph on the concept of solidarity in health to be published by Cambridge University Press (2017).

### Prof. Anton Vedder, KU Leuven



Anton Vedder is Professor of Law and IT at KU Leuven Centre for IT and IP Law, Belgium. He holds a PhD in applied ethics from Utrecht University and his primary research interests are ethics, regulation, and the impact of innovative technologies on society. He is especially interested in the interplay of technological developments and the conceptualisation of basic moral and legal notions. Anton is a founding member of the International Society for Ethics and Information Technology (INSEIT). He was involved in one of the first collaborative European BIOMED I projects in the early 1990's and is still participating in various EU funded international research projects. He was a visiting scholar at

Georgetown University Law Center and the Kennedy Institute of Ethics (Washington, DC) and the University of Maryland. Recent subjects of teaching include: regulation, ethics, acceptance and legitimacy; health law; privacy and data protection, and technology and anti-terrorism policies (Tilburg); legal informatics; ICT-law.

### Dr Jan-Christoph Bublitz, University of Hamburg

Jan-Christoph Bublitz is a researcher and lecturer in criminal law and legal philosophy at the University of Hamburg who specialises in cognitive enhancement.

### Professor Karen Yeung

Karen Yeung is Professor of law at King's College London, specialising in regulatory government and emerging technology.

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## Dr Hannah Maslen



Hannah Maslen is a Research Fellow in Ethics at the Oxford Uehiro Centre for Practical Ethics. She has a background in philosophy, psychology and law, and currently works on the ethical, legal and social implications of various brain intervention and interface technologies at the Oxford Martin School, under the project title Mind and Machine. Amongst her recent publications is a series of articles on the ethics and regulation of brain stimulation devices, examined within both medical and commercial contexts. Her work on the latter resulted in her involvement with the European Commission's New and Emerging Technologies Working Group, in relation to which she has an advisory role. Hannah is currently working with this group to develop new paradigms for the regulatory assessment of devices sold for cognitive enhancement. Her broader research encompasses other technological and bioethical topics, such as the development and use of virtual reality and immersive technologies, as well as the use of enhancement technologies by the military. Beyond neuroethics, Hannah also works on the philosophy of moral emotions and their relevance in the criminal justice system. She has published a book on remorse and retributive punishment with Hart Publishing: *Remorse, Penal Theory and Sentencing*, Hart Publishing, Oxford. More information about Hannah and her research can be found at: <https://hannahmaslen.wordpress.com/>

## Abstracts

### Session 1 – What is ‘Enhancement’?

#### **Ana Nordberg – *What’s in a name? Defining the legal concept(s) of human enhancement***

Emerging technologies are paving the way for extraordinary advances. For example, recent advances on genetic editing technologies, such as CRISPR-Cas9, have demonstrated that precise genetic modification is an increasingly viable technological possibility. Gene editing technologies provide tools that allow researchers to modify with precision the genetic structure of any living organism. The possible applications for such technologies are many and include both plant, animal and human genetic interventions. In humans potential uses included medical, cosmetic and human enhancement. The Law is facing the challenge of reflecting on the legitimacy to legislate and whether the existing legal framework is appropriate to address the various social and ethical concerns. It is a delicate balancing act between human dignity, autonomy, non-discrimination, equality, and justice. Regulating technologies of such magnitude is urgent. However, in order to regulate technology and scientific research the legislator needs to in the first place determine legal definitions. Clear distinctions between medical treatment, cosmetic interventions and human enhancement are naturally difficult to establish. This paper provides a reflection on the importance of finding a legal definition of human enhancement and whether different legal fields may warrant different understandings of such concept. It will review a number of different and often divergent concepts and taxonomies of human enhancement and conclude with a proposal of a definition that may serve as a starting point for further debate.

#### **Professor Ruud Ter Meulen – *Some Critical Reflections on the Idea of Cognitive Enhancement***

There has been excitement among neuroscientists and bioethicists about ‘cognitive enhancement’, meaning an improvement of the cognitive and intellectual capacities of the brain by the use of pharmacological drugs and other technologies. This possibility raises important questions: What is meant by ‘improvement’ or, more specifically ‘improvement of the brain’? Does it mean merely

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improvements that result in better college grades or better work performance, or does it mean improvements that result in more wellbeing and happiness in individuals' personal lives? How can taking a drug improve these functions especially in healthy individuals free from clinical disorders?

While there is an increased interest in cognitive enhancement, and a strong ethical debate on the merits of cognitive enhancement, there has been limited critical appraisal of (i) what we mean by cognitive enhancement and (ii) whether we can or should aim to achieve this in healthy individuals. In my presentation I would like to highlight some evidence from the neurosciences that humans may face evolutionary, psychological and social limitations in increasing their cognition function. For example, the idea that healthy individuals are cognitively enhanced in linear fashion has been challenged by evidence that appeals to the inverted U-shaped function relating arousal and performance. There may also be significant psychological trade-offs in increasing attention in healthy individuals that include impairments in creativity, flexibility of thought, and global thinking. Furthermore, it is not clear whether drugs that are claimed to enhance cognition in some healthy individuals improve well-being, happiness and real life achievements in healthy individuals. There is in fact evidence that they do just the opposite where they induce depression in healthy individuals who take them.

Given that it is questionable that drugs like modafinil and methylphenidate meaningfully improve general cognitive function in healthy individuals, we should consider possible trade-offs that may arise from the potential risks of the healthy using these drugs. For instance, if a drug is addictive but improves memory should we allow its use among healthy individuals, particularly young ones whose brain are still in development? Since most healthy individuals do not always have access to balanced and unbiased evidence of the effects of these drugs on the brain and on the body, it might make their decision to take these drugs less informed and, in consequence, they might not be exercising their autonomy authentically. Finally, I would like to draw attention to the risks posed by enhancement practices in relation to public health, particularly in respect of addiction. This raises the question of whether cognitive drugs should be made widely available or whether policies should be restrictive towards their availability in view of the risks to public health.

## **Session 2A – Criminal Responsibility I**

**Rob Blakey - *The neuroscientific assault on criminology: Anticipating and explaining the response of criminal justice actors***

The capabilities of brain imaging technology are advancing, together with the novelty of its applications to increasingly complex behaviours, such as offending. While the value of the neuroscientific intrusion into sociological criminology is intensely disputed, it remains important to predict the response of criminal justice actors to brain attributions for offending. Here it is anticipated that criminal justice actors will perceive such attributions to pose a more serious threat to retributivism than is justified by logic, independent of the empirical science. This is the predicted result of neurocriminology being falsely identified as a perpetrator of necessarily genetic and unconscious attributions.

Such biases in lay reasoning may explain the anticipated response of criminal justice actors to neurocriminology – a response that will prioritise crime prediction and prevention over punishment based on culpability. However, while neuroscience will undermine faith in retributivism, it will not 'ultimately overthrow retributive justice as a principle of punishment' (Snead, 2007, p.1265). Instead, retributivism will be protected from grievous assault by the persistence of the intuitive separation of biological and social influences on offending, which is here termed attributional reductionism.

This argument is proposed by critically analysing and integrating typically disparate branches of research: mock jury experiments, correlational and focus group studies of legally and morally guided judgements of criminal liability and sentencing in response to neuroscience. The current study makes the novel contribution of furnishing this empirical evidence with a theory of the perceived uncontrollability of neural vulnerabilities to offending – a theory derived qualitatively and tested quantitatively using the media response to neurocriminology. This mixed methods

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content analysis finds an association between attributional reductionism and discourse of prediction and invasive prevention. This implies that reductionist interpretations of the newest kid to the criminological block – brain science – may influence the criminal justice response.

**Dov Greenbaum and Danielle Hornstein – Civil and criminal liability in the era of subconsciously controlled prosthetics mediated by artificial intelligence interfaces**

The use of prosthetics, both therapeutic and non-therapeutic, can raise a number of ethical and legal issues. These concerns can be substantially complicated by the incorporation of brain-machine interfaces (BMIs), especially those situated in the brain's posterior parietal cortex (PPC) that tap into subconscious thought. In addition to the ontological issues relating to ableness, free will, and autonomy, are the more pedestrian concerns relating to criminal and tort law. Tort law requires that the injured party be made whole, regardless of moral blameworthiness of the tortfeasor. This per se responsibility for the actions of yourself and your wards arguably also encompasses your subconsciously controlled prosthetic. But only for foreseeable harms; the law must account for not only biological uncertainties associated with the subconscious, but also the likely addition of unpredictable artificial intelligence interfaces. In contrast, criminal liability is associated with socially proscribed sanctions against morally wrong actions. Most legal systems, like the US Model Penal Code, §2.01, recognizes only an antiquated binary version of voluntary (liable) or involuntary (e.g., automatism; not-liable) acts. Further, section 2.02 requires that the criminal act be done with a minimal level of intent. It remains unclear how criminal law theories would apply in cases where the conscious brain is only a secondary or tertiary player after the artificial intelligence mediated subconscious unintentional action, particularly as automatism and unconsciousness are valid defenses. This paper aims to explore these and related concerns, proposing social and legal solutions for these emerging issues.

**Lisa Claydon- Examining criminal responsibility**

The criminal law expects us to be in control of our actions and one of the threshold conditions of criminal responsibility is that the accused's act is a conscious and voluntary act. What does this mean, and what does neurocognition have to say about how action is driven? This paper will consider what enhancement might mean in this context. It will also consider whether these insights have broader application to concerns about enhancement in law.

**Bebhinn Donnelly-Lazarov - Neuroenhancement and the Fundamentals of Criminal Responsibility**

At least three fundamental normative questions arise from the relationship between neuroenhancement and criminal responsibility: Can neuroenhancement be justified as a means to reduce offending; if (effective) enhancement is actually used, how, if at all, does this alter the criminal responsibility of the, now, 'neuroenhanced' offender; and what special responsibility does an offender have, if any, to submit to neuroenhancing techniques? Answers to these questions will have direct importance in sentencing practice and may even affect how we identify the proper criteria for criminal liability. In the process of reaching answers we must be attentive to the short and long-term psychiatric and medical effects of the treatments. Moreover, the conclusion that neuroenhancement can be thought justified, may affect how we view the very bond between citizens and their systems of governance. So, it cannot be denied that a number of fields of enquiry are in some way activated by the questions posed. Still, at root, the questions are normative ones that require conceptual analysis for their resolution. The paper shows why the questions must be so characterised and identifies and the kind of conceptual analysis that might assist in finding solutions to some of the key issues.

**Session 2B – Regulating Enhancement**

**Aleksi Mikael Hupli – Should everybody be allowed to use pharmaceutical neuroenhancers? Perspectives from current users**

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One of the issues around the pharmacological neuroenhancement debate has been whether individuals should be allowed to use them freely. This presentation gives preliminary analysis of how users perceive this issue of freedom to use cognitive enhancement drugs drawing on qualitative interviews (N=30) from current therapeutic and enhancement drug users in Finland and Holland. Although many of the informants did not see their own use as ethically problematic, many expressed variety of concerns if cognitive enhancement drugs became unregulated. User perspective is argued to be an important aspect to be considered when forming policies around human enhancement in general and pharmacological neuroenhancement in particular.

### ***Roshni Namboodiry – Towards the regulation of therapeutic biological enhancement in humans***

The hallmark of the human race is our determination to strive for improvement, for our quality of life and, more importantly, ourselves. We learnt to tame nature by discovering fire, domesticating animals, extracting nourishment and wealth from the earth, and developed tools to aid our ascent to the top of the food chain — from language, numbers and political boundaries to currency, weapons and medicine. And when science allows us to be the master of nature, offering possibilities to tinker away physiological flaws and fetters, the state is reluctant to confine the accomplishing of unparalleled heights of perfection, greatness, power.

Unprecedented technological advances have given rise to increasingly sophisticated means of improving cognitive and bodily functioning. The paper focuses on recent innovations facilitating the therapeutic betterment of the human body and seeks to justify them as the only kind of biological enhancement that ought to be legally and ethically permissible. Recognising that identifying enhancement of a “therapeutic” nature is itself rather problematic, the paper proposes a limited definition to insulate against abuse and ethically wrongful use of such innovations. Regulatory controls commensurate with different methods and levels of therapeutic enhancement are recommended on the basis of what has always been permissible in law.

The paper proceeds as follows: Part I seeks to categorise various methods of therapeutic enhancement that are presently regulated, effectively and otherwise, and which may be accomplished through consumer goods and services, practices, technologies, and medical products and procedures. Part II outlines emerging technologies for biological enhancement and submits arguments in favour of their use for therapeutic and curative purposes. Part III attempts to offer a restrictive definition of “therapeutic enhancement” premised on the analysis presented in the preceding Parts. Finally, Part IV proposes legal interventions and safeguards to regulate therapeutic forms of biological enhancement.

### ***Po-Hsiang Ou – Regulating Human Enhancement: Food Law as Food for Thought***

Human enhancement technologies pose new regulatory challenges. In their 2014 paper, Maslen et al. proposed to regulate cognitive enhancement devices (CEDs) in the EU through ‘extending the medical model’, which has triggered discussions about the distinction between ‘treatment’ and ‘enhancement’ as well as the changing concept of health. In this paper, I argue that the regulation of food technologies, especially regarding the rise of so-called ‘functional foods’ within the ‘pharma-nutrition interface’, can provide some interesting observations for the current CED debate.

This paper analyses three areas of EU food law: nutrition and health claims, food for special medical purposes (FSMP), and genetically modified (GM) food. The health claim regulation establishes a registration procedure for making health attributes on foods. Although the registration itself does not impose additional risk assessment, authorizations can include restrictions in the conditions of use. The FSMP regulation monitors specific food products that are intended for people whose nutritional requirements, due to special medical conditions, cannot be achieved by normal foods. Instead of ex ante authorization, food operators are only required to notify regulators when placing FSMPs on the market. Finally, on the regulation of GM food, the EU has set up very stringent requirements for risk assessment and emphasized the importance of the precautionary principle.

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Enhancement technologies, like functional/novel foods, also sit within the interface between 'medical' and 'normal' products. They could be regulated through a more market-oriented approach, similar to health claims, through an 'enhancement claim' regime. Alternatively, they can be regulated as a separated but not necessarily more restrictive regime for particular 'medical' purpose like FSMPs. In addition, the experience of GM food regulation suggests that stringent regulatory control may generate stigma and deter innovations. EU food regimes can therefore contribute to the discussion about regulating CEDs in particular and human enhancement in general.

### **Filippo Santoni de Sio - Artificial agents and artificial virtue: the ethics of self-driving systems**

In this paper I offer some methodological suggestions as to how to deal with so-called moral dilemmas deriving from the introduction of fully automated driving systems (aka "self-driving cars"). The recent development in automated driving technologies has raised the following two related issues. In the case of an emergency situation in which a (fully) autonomous vehicle cannot avoid a collision, but it has the chance to decide which vehicle (or person) to hit between two or more possible options, a) which kind of decision-making procedure should the vehicle follow in order to decide whom or what to hit? b) Assuming that the driver does not have the time or the chance to intervene in the car's decision at the time of the accident, who is responsible for the damages or losses caused by the vehicle's behaviour, the driver, the manufacturer, the programmer, etc.?

Whereas some philosophers and psychologists seem to think that in order to address these two questions we should primarily look at the philosophical principles as discussed in the "trolley problem" literature, and/or to consult (again) lay people moral intuitions about trolley-like cases, in this talk I recommend that we turn to legal reasoning. The main reason for this is that while that of self-driving cars is certainly a hard case for morality and the law; whether this is in essence a (totally) new hard case, is an open question. If (legal) justice, as claimed by Hume, is an "artificial virtue", then legal reasoning may turn out to be a helpful tool to cope with hard moral cases involving artificial agents.

As for the issues of the moral decision-making to be followed by self-driving cars, I suggest that before embarking in a fundamental philosophical discussion on the basic principles of ethics, we consider: a) how the law has already dealt with value conflicts in the regulation of decision-making in emergency scenarios, particularly in the cases discussed in the literature on the doctrine of necessity; b) whether and how the scenarios involving self-driving cars are relevantly different from the scenarios already covered by the law; c) whether we have moral or legal reasons to abandon, amend or enrich the traditional legal approach to emergency cases, in the light of some specific features of the self-driving cars, for instance the alleged ability of the machine to make quicker and more precise calculi and/or quicker and more rich evaluations of the environment.

As for the issue of the responsibility for the damages or losses caused by self-driving cars, following Pagallo (2013), I suggest to look at other similarly hard cases of attribution of responsibility in which moral intuitions conflict and the law has to strike a reasonable compromise between values and interests in tension, typically attributions of liability for the malfunction, misuse, or misbehaviour of technical products, animals, or children. Also, I suggest to consider philosophical debates on the foundation of tort law, in order to decide which regime of responsibility would better suit scenarios involving damages produced by artificial agents like self-driving cars.

### **Session 3A – Criminal Responsibility II**

#### **Nicole Vincent - Moral Agency and Moral Enhancement**

In a series of articles Thomas Douglas has developed and defended the idea of moral enhancement through the attenuation of counter-moral emotions. In his view "there are some emotions ... whose attenuation would sometimes count as a moral enhancement regardless of

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which plausible moral and psychological theories one accepted" (2008 231). He cites "a strong aversion to certain racial groups" and "the impulse towards violent aggression" (2008 231) as two examples of such counter-moral emotions.

However, John Harris has argued that the attenuation of counter-moral emotions would not result in moral enhancement. In his view, even if such interventions had the desired effects on our behavior, because these effects would be produced by restricting our freedom to act in immoral ways, this would not count as moral enhancement. On Harris's account "the sorts of traits or dispositions that seem to lead to wickedness or immorality are also the very same ones required not only for virtue but for any sort of moral life at all" (2011 104).

Douglas has offered a range of responses to Harris's "freedom" objection, and in the first critical section of this talk my aim will be to explain why Douglas's responses fundamentally miss the point of what Harris was saying. If I understand Harris right, while Douglas-style non-cognitive enhancement may indeed result in better behavior, that behavior would not qualify for the label "action", and in virtue of this it would not even be a legitimate target for moral evaluations.

Viewed from Harris's standpoint, what Douglas proposes is not moral enhancement but amoral enhancement. Harris's point, however, is not that biomedical interventions cannot produce moral enhancement, but rather that only cognitive enhancement – achieved through either traditional or biomedical techniques – can produce genuine moral enhancement. However, in the second critical section of this talk I will also argue that Harris's concerns and criticisms fail to engage with Douglas on terms that he could reasonably be expected to recognize and accept.

In my view, Harris's criticisms of Douglas fail for very similar sorts of reasons as why Douglas's responses to Harris fail to address Harris's concerns. Each author fails to engage with the other on terms that the other can reasonably be expected to recognize, and consequently both authors effectively talk past one another rather than engaging with each other. What underpins Douglas's and Harris's claims and arguments about moral enhancement are strikingly different views about moral agency, moral action, and moral evaluation. The aim of the last critical section of this talk will be to highlight the ways in which each author's views on moral enhancement at best only express but alas do not defend their particular views about agency and action, and to gesture at what a more fruitful approach to moral enhancement might look like.

### **Elizabeth Shaw - *The Moral Enhancement of Offenders Through Direct Brain Interventions***

Currently, certain biomedical interventions are being used within the criminal justice system in order to rehabilitate criminals. Examples include interventions for drug-addicted offenders and "chemical castration" for certain sexual offenders. In the future, it might become possible to modify a wider range of morally relevant characteristics, such as aggression, through direct brain interventions (DBIs).

One concern about these interventions is that they might be thought to undermine the offender's freedom. A number of theorists, including John Harris and Michael Hauskeller, have argued that it is morally objectionable for the state to deprive individuals of the freedom to choose to do immoral actions.

Harris seems to appeal to a metaphysical form of freedom, which requires the ability to do otherwise. However, this kind of freedom would not be removed by DBIs that (strongly) *inclined* an individual to act in a certain way but did not make it inevitable that the individual would do so. Furthermore, it is plausible that the behaviour of people who have not been subjected to DBI's is strongly influenced or determined by a range of "ordinary" factors such as their genes and upbringing. I will argue that DBI's do not pose a greater threat to metaphysical freedom than that posed by these ordinary factors.

In contrast, Hauskeller claims that DBIs can threaten a "relational" form of freedom. In his view the problem is the idea of *others* exerting control over our minds. I will argue that exerting this kind of control is only objectionable if it bypasses the agent's rational faculties. Hauskeller also

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argues that voluntary DBI's are problematic as they permit one's prior self to exert too much control over one's later self. I will reject this view, arguing in favour of voluntary moral enhancement of offenders.

**Jonny Pugh - *Justifying Non-Consensual Neuro-Interventions in Criminal Justice, and The Justification of Non-Consensual Medical Interventions in Infectious Disease Control***

Although a central tenet of medical ethics holds that it is permissible to perform a medical intervention on a competent individual only if that individual has given informed consent to that intervention, there are some circumstances in which it seems that this moral requirement may be trumped. For instance, in some circumstances, it might be claimed that it is morally permissible to carry out certain sorts of non-consensual interventions on competent individuals for the purpose of infectious disease control (IDC). In this paper, I shall explain how one might defend this practice, and consider the extent to which similar considerations might be invoked in favour of carrying out non-consensual medical interventions for the purposes of facilitating rehabilitation amongst criminal offenders. I shall describe two different moral frameworks that a defender of non-consensual medical interventions in IDC might invoke in order to justify such interventions. I shall then identify five desiderata that can be used to guide the assessments of the moral permissibility of non-consensual IDC interventions on either kind of fundamental justification. Following this analysis, I shall consider how the justification of non-consensual interventions for the purpose of IDC compares to the justification of non-consensual neuro-interventions for the purpose of facilitating criminal rehabilitation, according to these five desiderata. I shall argue that the analysis I provide suggests that a plausible case can be made in favour of carrying certain sorts of non-consensual interventions for the purpose facilitating rehabilitation amongst criminal offenders.

**Session 3B - Genetic Enhancement**

**Marcelo de Araujo – *The ethics of editing the human genome with CRISPR-Cas9***

CRISPR-Cas9 is a new gene-editing tool that thus far has proved to be much cheaper, easier to use, quicker, and more precise than other tools of this kind. CRISPR-Cas9 has already been used to genetically modify plants and animals such as e.g. pigs, macaques, and malaria carrying-mosquitoes.<sup>1</sup> In April 2015 CRISPR-Cas9 was used to edit the genome of non viable human embryos. This sparked a debate on the morality of further research involving the use of CRISPR-Cas9 on human embryos. Some scientists, philosophers, and policy makers asked for a "moratorium" on any research involving the use of CRISPR-Cas9 on human embryos. Some of the reasons offered for the "moratorium" is that this procedure paves the way for genetic human enhancement. In this paper I argue [1] that the call for a "moratorium" is short of rational justification. I also argue [2] that the current fear of genetic human enhancement is inconsistent with the practice, already regulated by law, of disclosing the intellectual profile of sperm donors in sperm banks; and [3] that the fear of genetic human enhancement involves a version of the "status quo bias".

**Sophie Arquette – *CRISPR-Cas: a question of genomic enhancement***

Recent case law, in which morality exclusions, in the Directive 98/44 and in the European Patent Convention (EPC), have spawned interpretations about what kind of entity is or can be considered embryonic, from the broad interpretation in *Oliver Br stle v. Greenpeace eV*, in Advocate General Bot's opinion whereby a capacity to commence development in parthenotes, in pluripotent and totipotent stem cells is a sufficient condition for embryo domain inclusion, irrespective of chromosome complement or a lack of uterine conditions, to that of a division between totipotent and pluripotent cells, in which the former, viewed to be the precursor for all cell lineages, is embryonic and unpatentable, the latter, not. Underpinning disputes about human embryonic stem cell research is whether such research encroaches upon human dignity, as delineated in a number of international instruments.

Exacerbating the current legal constraints is the potential application of CRISPR technology. The recent publication in *Protein & Cell* (2015) by a research team at Sun Yat-Sen University

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attempting  $\beta$ -globin gene modification – the gene responsible for a genetic blood disorder – suggests that the CRISPR-Cas9 system when applied to non-viable embryos is subject to variations in outcome, with some of the embryos failing to present Cas9 cuts; others presenting off-target mutations and error-prone DNA breaks. As an engineering technology, CRISPR – a bacterial defence system adapted to edit specific genomic sites when combined with the enzyme-cleaving Cas9 – has far reaching potential in eradicating life-threatening diseases. Disquiet has emerged as a result of the possibility of applying such a tool for enhancing physical and psychological traits. It is one thing to knock out, say, the NF2 gene responsible for the congenital condition, Neurofibromatosis 2, which could serve to ameliorate a range of adverse affects, both physical and prejudicial (societal reaction to disfigurement), the individual might experience in life, another thing to furnish an individual with genetic traits which increase intelligence, physical strength, or is it? Does exercising control over progeny run contrary to human dignity and bodily integrity?

### **Andrea Bertolini – *Managing Evolution: Human Enhancement & the Law***

Converging technologies (Nordmann, 2004) may shape the future of human evolution. The struggle for perfection is a deeply rooted aspiration of mankind, experiencing the ‘promethean shame’ (Anders, 1987) of human’s fragility (Heidegger, 1996) as opposed to artifact’s resilience. At the same time reducing vulnerability has always been the purpose driving the development of new technologies (Arendt, 1958) and definitely is not the prerogative of the cybernetic movement alone (Dupuy, 2008).

Yet, above mentioned technologies could substantially change the current scenario, in a way which is too complex – and to some extent too heavily dependant on serendipity – to clearly depict, but triggers opposite reactions. Enthusiasts (Bostrom, et al., 2006) suffer from what they define the *status quo bias*, that they claim affects opponents (Agar, 2010), who identify a radical threat to human dignity (Habermas, 2003).

The philosophical picture although clear is insufficient in providing normative criteria (Coeckelbergh, 2013), that instead are required in order to determine to which extent this new gift of the evil deity (Calabresi, 1996) ought to be accepted. A plainly favorable policy choice would in fact excessively burden those who would rather refuse the gift, since their decision would most likely place them outside society. If free human enhancement was allowed non-enhanced beings would amount to lesser beings who cannot compete and participate in daily life.

At the same time human enhancement would most likely represent a powerful tool for those who suffer from disabilities and various forms of deficiencies (Rodotà, 2013), allowing a fuller expression of their personal identities. To strike a balance, though the traditional concepts of human dignity and equality appear to be insufficient. A comparative analysis of the concepts, as well as their application under EU law shows how the former is normally understood in a negative fashion, as an outer limit to one’s freedom of choice and self determination. The latter instead leads to contradictory results.

### **Didier Coeurnelle - *The Right to (Radical) Life Extension Considered a Human Right***

Since the beginning of the 21st century, the idea that it is possible to radically enhance the length of life is not only science-fiction anymore, it is also becoming a possible scientific perspective. A growing number of scientists, philosophers and "longevitists" consider that human beings could live much longer and healthier lives, even possibly without dying of old age ("amortality"). Some private enterprises like Google Calico, Human Longevity Inc. and SENS Research Foundation make scientific research about these possibilities.

A longer and healthier life is enjoyed by the citizens who can benefit from it. This evolution is also positive for the whole society. A largely delayed senescence has positive ethical, economic and sociological consequences. It is better for a sustainable environment, for a peaceful society, for the level of well-being in the community and for the general level of wealth.

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The question of the ethical necessity of health research funding for this enhancement will be discussed. Should the States and international organizations promote and subsidize life extension? Taking in consideration, medical progresses and the possibilities to accelerate them, we can consider the right to health as defined in national laws, national constitutions and international treaties under a new light. We could envisage scientific research for a longer life as a moral obligation.

If radical life extension appears to be an enhancement made possible by scientific research, this research could be considered a new form of a Duty to rescue. In many countries, criminal law makes a legal requirement for citizens to assist people who could die if not helped. Is it possible to imagine this obligation on a larger scale as a duty to make scientific research for life extension?

### **Keynote – Jan-Christoph Bublitz: *Competition, Contradictions and Collective Interests: Ideal drugs in a non-ideal world***

After a decade of academic debate over cognitive enhancement, it's time to take stock of the arguments and recent proposals for regulation. Neuroethics has generated interesting analysis of key concepts such as authenticity or the value of naturalness, and legal scholars have proposed legal principles that pertain to the mind such as cognitive liberty. These discussions have contributed to a better understanding of central issues and have cast serious doubts on in-principle objections. Nonetheless, calls to adopt specific (permissive) regulatory models for enhancement drugs or devices appear premature, insofar as they fail to address collective interests in regulating competitive domains, mainly mental labor. While for the willing, cognitive enhancements may provide short-term benefits to cope with today's workplace demands, it appears short-sighted to assume that such increases in productivity will turn out to be conducive to personal well-being once enhancements are generally accepted and permissive policies adopted.

### **Keynote – Professor Anton Vedder: *An obligation to enhance?***

Can there ever be an obligation to enhance (oneself)? Of course, the answer to this question would eventually depend amongst others on the specific kind of enhancement involved. In my presentation I will nevertheless argue that some general conditions must apply before could reasonably assume that such an obligation exist. A comparison with the responsibility for one's (own) health against the background of the new possibilities opened up by e-health and m-health and lifestyle/wellness applications is part of my argument. The presentation would focus on the ethical aspects rather than on the legal ones.

### **Session 4A – Obliging Enhancement**

#### **Ori Lev - *Biomedical Enhancements: would it be permissible to coerce, require or induce persons to use them?***

There is an ongoing debate over the ethical permissibility of using biomedical enhancement interventions. This debate has generated a variety of concerns including freedom, fairness, equality, human dignity, authenticity, and integrity; one worry that stands out in this regard is the question of coercion. Curiously, although pointed out by many, this concern has not received close scrutiny. The first aim of this paper is to begin addressing this conceptual gap. In order to explore this concern, I employ Alan Wertheimer's understanding of coercion. According to Wertheimer's account coercion involves a wrongful threat in which one has little choice but to succumb. Moreover, the wrongfulness of the threat stems from the fact that it violates the coercee's rights. I suggest that if one accepts this account, it follows that coercing people to enhance would be impermissible.

Using this framework, the paper moves on to critically evaluate the claim that competition over jobs, goods, and positions coerces people to enhance. I argue, however, that competition pursued within a proper legal framework cannot be coercive since it neither involves a wrongful threat nor

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violates a person's rights. Nonetheless, I propose that although competition is not coercive, enhancing because of competitive pressure can be morally problematic as it could restrict personal autonomy and harm well-being. The paper explores strategies the State could devise in order to address both these concerns.

Having argued that coercion is impermissible, the paper turns to its second aim, namely exploring the question of whether there are *non-coercive* permissible ways to induce people to undertake biomedical enhancements. Using a number of hypothetical cases, I delineate criteria that could be used to determine whether a particular enhancement should be considered mandatory or optional. I suggest that in principle there could be cases in which an enhancement ought to be required. Establishing that a specific enhancement should be required will depend on meeting various criteria such as: effectiveness, importance, social benefit, safety, relation to other values such as bodily integrity and the magnitude of its unintended consequences. If the profile of the enhancement is such that it satisfies these criteria to a reasonable level making its use mandatory would be justified. Accordingly, failing to use such enhancement would be considered wrongful. If the enhancement does not meet these criteria to a sufficient level yet it is still overall beneficial, the enhancement should be considered optional. Specifically, the enhancement is such that failing to use it would not be wrongful, yet individuals remain free to undertake it if they wish to do so. Subsequently, I examine whether using incentives or penalties to induce individuals to use the enhancement would be justified. I argue that in general incentives to use the enhancement could be justified yet penalizing for failing to undertake an enhancement that is considered morally optional would not be justified.

### **Urszula Kosielińska-Grabowska – Admissibility of Human Enhancement. A Case of a Surgeon**

The paper presents a new model of analysis of the problem of the admissibility of the use of a variety of *human enhancement* (HE) measures, discussed on an example of the case of *human enhancement technologies* (HET) used by a surgeon. The tremendous growth of HET causes an urgent need to answer questions about the admissibility of improving human physical, mental and cognitive capacities. Philosophical discussions and disputes between bio-conservatives and bio-liberals concerning the limits of intervention in human nature, moral and legal admissibility of using such measures, as well as the goals HET should serve, have been recently gaining momentum, but the outcome remains unclear. The model analysis carried out for a *paradigmatic case* of HET used by a surgeon can also be applied in deciding on the admissibility of HE in other occupations, aimed at saving human lives, such as fire-fighters, rescuers or – in certain circumstances – police officers and soldiers.

The main difficulty, which made it impossible to reach a consensus in previous debates on HE, lies in the fundamental differences in the understanding of human nature – a concept that is commonly used in the arguments concerning the admissibility of HET and the acceptable limits of HE. The model proposed in the paper overcomes these difficulties by defining human nature in a normative way; as a normative concept defined by moral and legal reflection on the principles and social rules defining the limits of admissibility of using a particular HET.

The proposed model is based on a multifaceted analysis of the admissibility of measures used for HE, the results of using HET (real aspect), and the ends that the use of HET should serve (axiological aspect). This is followed by conceptual analysis, in which the so far dominant direction of reasoning concerning human nature is “turned around”. Rejecting the two extreme, and intellectually uninteresting, views on the impact of HET on human nature (i.e. the fully negative point of view: “HET never affect human nature” and the fully positive point of view: “HET always affect human nature”), we focus our analysis on the moderate position, according to which “HET sometimes interfere with human nature”. In this context, the analysis of using particular HET, their effects and the ends of their use leads to determining the normative concept of human nature, according to the following formula: when certain measures, effects and ends of a particular HET are socially acceptable, they do not affect human nature; but when some measures, effects and ends of a specific HET are socially unacceptable because they violate well-justified moral or legal rules or social conventions, we assume that they affect human nature.

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The proposed model of analysis is circular, which is, however, a method accepted by contemporary analytic philosophers (e.g. Peter F. Strawson). Moreover, a concept of human nature, determined in the normative way, can be in the future used by analogy to assess the admissibility of new measures developed within the HET area.

**Natalie Salmanowitz - *The Use of Neurointerventions to Reduce Implicit Racial Bias in the Courtroom***

The presumption of innocence and the right to a fair trial lie at the core of the United States justice system. While existing rules and practices serve to uphold these principles, the administration of justice is significantly compromised by a covert but influential factor: namely, implicit racial biases. These biases can lead to automatic associations between race and guilt, as well as impact the way in which judges and jurors interpret information throughout a trial. Despite the well-documented presence of implicit racial biases, few steps have been taken to ameliorate the problem in the courtroom setting. This paper suggests that enhancement via neurointerventions, such as computerized brain-training tasks and noninvasive brain stimulation techniques, has the potential to provide promising mitigation strategies in the near future. Through analyzing the various ethical and legal considerations, this paper contends that the use of neurointerventions with judges would be both justifiable and morally obligatory should safe and effective means become available. A similar argument is put forth for jurors, albeit in a more theoretical light due to practical and logistical barriers. Given that implicit racial biases can seriously undermine the fairness of the justice system, this paper ultimately asserts that unconventional de-biasing methods warrant legitimate attention and consideration.

**Jenny Krutzinna - *Cognitively Enhanced Children: Learnings from their Gifted Predecessors***

Despite the welfare of the child being the 'paramount consideration', it appears that the law is currently not objective in its application to children. There is an undeniable link between healthy child development and education, with the latter greatly impacting on mental health and general well-being. Drawing on the example of the differential treatment of gifted children in an educational context, I argue that the legal framework with regard to learning disabilities and cognitive impairments operates contrary to the proclaimed goal of protecting and promoting the welfare of the child. This, I argue, constitutes unjustified discrimination, especially since there is a case to be made that highly cognitively able children could be considered disabled under a social model of disability. Whilst the group of affected children is small at present, developments in cognitive enhancement technologies mean that many more children might in the future be discriminated against. In addition, since the most promising cognitive enhancement interventions involve genetic technologies, such as preimplantation genetic diagnosis, authorisation from the Human Fertilisation and Embryology Authority will likely be required. This means the state will be acting as a facilitator in 'creating' cognitively enhanced children, and as a result shares in the responsibility for such children and their particular welfare needs. Given the current treatment of gifted children in our educational and welfare system and the similarities to cognitively enhanced children, it is time to start regulating for the future.

**Session 4B – Human Rights and Public Health**

**Daniele Ruggiu - *The Right to Bodily Integrity in Enhanced Societies: The European Convention on Human Rights vis à vis the Challenge to the Human Body***

Modern societies are facing a new challenge. The development of enhancement technologies and their spread within the civil society will further complicate our societal context. With the rise of enhanced societies the pressure on the set of individual rights of liberal-democratic societies will increase. This probable future scenario leads us to put in question the robustness of the core of our regulatory framework: the human rights system existing in Europe. Although the human enhancement covers a multitude of different technological sectors (neuroscience, robotics, nanotechnologies, biotechnology, synthetic biology), giving rise to different concerns and opportunities, it mainly affects the relationship of the person with one's own body inevitably involving a set of individual rights such as individual autonomy, the right to bodily integrity, the

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non-discrimination principle, the right to information (free informed consent), the right to health. In this framework the right to physical and mental integrity, with its evident link with the self-determination principle, has a special importance. In this paper I mean to analyze the normative framework of the Council of Europe under the light of the right to bodily integrity with a particular attention to the corpus of decisions of the European Court of Human Rights. I will argue that in this framework a set of clear constraints for European countries already exists and is able to cope with the further development of enhancement technologies. It should not be considered as a mere limitation but as an opportunity to responsibly develop a robust governance arrangement on human enhancement.

**Lisa Forsberg - 'Enhancement', professional discretion, and judgements about what is good for people**

In England and Wales, whether a medical intervention is appropriately designated as an 'enhancement' or a 'treatment' is not determinative of its lawfulness. Indeed, nothing rides on an intervention's status as 'treatment'. Many interventions that would be classified as 'enhancements' on most definitions are also routinely provided as part of medical practice.

This might seem like good news if we do not think that there is anything morally problematic about routine use and availability of 'enhancement'. However, the fact that 'enhancement' interventions are not unlawful *per se* does not entail their availability on demand. Patients do not have a legal right to have their requests for interventions granted by physicians. Rather, patient access is determined according to a discretion-based system where physicians decide, on the basis of their professional judgement, whether the intervention would be good for, or in the best interests of, the patient (the 'welfare standard').

This paper argues that it is unclear how the welfare standard applies to the provision of 'enhancement' interventions to individuals who have decision-making capacity. On the one hand, it might be argued that the standard is too broad, because it involves value judgements that go beyond physicians' expertise, or that do not appropriately vest in the physician. On the other hand, it might be argued that the standard is too narrow, since it excludes considerations relating to the public interest, and most of the ethical concerns that have been raised in the literature on enhancement. The application of the welfare standard to decisions about 'enhancements', therefore, results in a position that should satisfy neither those who are in favour of enhancements being made available, nor those who oppose the same.

**Alex McKeown - Public Health Enhancement and Existential Risk**

I argue that legal provision of radical forms of enhancement - in particular some genetic enhancements - would be justifiable in certain circumstances in the interests of public health, not only to benefit the identifiable population already living, but also for populations yet to exist. In illustration I will use thought experiments involving existential risk 'doomsday' scenarios, and show how orthodox public health theory might entail pro-enhancement positions.

Theories of health are numerous and diverse, ranging from (apparently) value-free descriptive and statistical accounts, to those that are subjective and evaluative, via theoretical negotiations of and between these two poles. Public health needs are also diverse, and historically, geographically, socio-economically dynamic. What constitutes an appropriate policy response to this wealth of possibilities is determined by what the health needs happen to be in a given situation. Relatively benign needs will require commensurately benign responses. However, severe, immediate, widespread threats to population health may require more radical interventions.

Although the conventional boundaries of healthcare practice are typically remedial, it is not obvious why this should be in the case of public health, since the aim here is to improve and extend normal health and longevity, preventing illness rather than intervening after its onset. I contend that arguments regarding the exclusion of enhancements from appropriate healthcare practice are ineffective in public health. I will argue instead that the criterion of acceptability for a

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public health intervention is determined by the kind of need or threat that is present; the severity of that need, and the scale of the benefits achievable.

By extension, I argue that under certain circumstances, in the interests of public health, the legal provision and regulation of potentially radical enhancements would be necessary, and therefore justifiable, in the interests of both the existing population and as yet uncreated, future, ones.

### **Session 5A – Enhancement and Harm**

#### **Marcello Ienca and Roberto Andorno - *Hacking the Brain, Securing the Brain: Emerging Risks and Regulatory Options***

Brain-computers interfacing (BCI) technologies are being increasingly used in clinical medicine as assistive technologies for several classes of neurological patients. Outside the clinical setting they are commercialized as everyday technologies for healthy people to track brain activity and/or allow users to control computer devices with the brain. BCI applications have the potential of significantly improving the quality of life of patients (e.g. those suffering severe neuromuscular disorders) and enabling enhanced and more personalized user experience in communication, gaming and entertainment for general users. Yet the risks associated with the dysfunctional use of these technologies or their misuse for nefarious purposes remain largely unexplored.

Recent findings have shown that BCIs can be potentially co-opted for malicious activities such as detecting concealed autobiographical information from users (Rosenfeld, 2011) and extracting sensitive information about the users such as their pin codes, bank membership, and home location without the user's consent (Martinovic et al., 2012). In addition, real-life hacking experiments such as the Cody's Emokit project have demonstrated the feasibility of cracking encrypted raw data from consumer-grade BCI headsets (Conner, 2010). These findings open the prospects of extending the range of computer-crime to neural computation. This emerging breach for information insecurity can be labeled as *neurocrime* since it enables criminal activities which target neural information (Denning, Matsuoka, & Kohno, 2009). Hacking BCI systems, however, is not exclusively related to criminal activity. On the contrary, *white-hat* hacking projects, such as the Open BCI, aim at hacking neural devices with the purpose of enhancing them by opening their source code.

The objectives of this paper are both conceptual and normative. At the conceptual level, our goal is threefold. First, we delineate the differences between the malicious and the enhancement-oriented hacking of neural devices. Second, we outline the emerging risks for information security generated by pervasive neurotechnology with special focus on neurocrime. Third, we identify a special type of neurocrime called "brain-hacking". We believe this form of neurocrime is critical as it involves the direct access to and manipulation of the informational content of neural computation. The possibility of brain-hacking raises unprecedented issues in information security, personal privacy and content protection. The reason for that stems from the fact that it targets a highly sensitive type of information, i.e. neural information, and accesses or manipulates informational contents —such as thoughts, beliefs and desires— that are constitutive of someone's psychological integrity and self-identification as persons. We identify three types of brain-hacking according to the phase of the BCI cycle where the attack can occur. In addition, we discuss the implications of each type of hacking for the notions of privacy, data protection, security, cognitive liberty and legal responsibility.

At the normative level, we aim to address the major ethical and legal implications associated with brain-hacking and provide preliminary regulatory solutions at various levels: individual users, BCI producers, and policy and regulatory bodies. This contribution is aimed at eliciting a cooperative, interdisciplinary effort to proactively develop and implement safeguards that can help maximizing the benefits of brain technology for society at large while minimizing the privacy and security risks.

#### **Cressida Auckland - *Damage to Prostheses and Compensation for Harm***

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The legal regimes surrounding damage to the person and damage to property differ considerably. In this paper, we explore the challenges posed to this dichotomous approach by the increasingly blurred line between the human body and non-biological additions to that body. As prosthetic enhancements become more widespread, and as they become more intimately integrated into the human body, this bright distinction may mean that some who suffer harm will be unable to access adequate legal protections and compensation for the new forms of harm they may suffer. Given the blurring of this line, it may seem that the law should shift to regard damage to prosthetics as equivalent to harms to the person. Both affect bodily integrity, and both may have the kind of significant psychological impacts that demand a strong response from the law.

***Nick Davis - Examining the harms inherent in cognitive enhancement***

Advances in neuroscience and pharmacology have led to improvements in the cognitive performance of people with neurological disease and other forms of cognitive decline. However these same methods may also afford cognitive enhancement in people of otherwise normal cognitive abilities. Such 'cosmetic', or supranormal, cognitive enhancement offers opportunities to enrich our personal status, our interactions with others, and the common wealth of our community. In discussing the scientific and ethical ramifications of supranormal enhancement, it is common to stress the potential benefits of the intervention, while being less than clear about the possible drawbacks. Here I will examine the harms or side-effects associated with a range of cognitive enhancement interventions. I propose a taxonomy of harms in cognitive enhancement, with harms classified as (neuro)biological, as ethical, or as societal.

Biological harms are those which directly affect the person's biological functioning, such as when a pharmacological enhancer affects a person's mood or affects autonomic function. Ethical harms are those which touch on the usual concerns of ethical analysis, such as fairness and cheating, or on erosion of autonomy and coercion. Societal harms are harms that affect whole populations, and which are the province of governments, such as the shift towards an "enhanced society", or the use of use of enhancement in military contexts. In many cases the divisions between the classes of the taxonomy are not clear, such as when a parent makes a decision about enhancement for their child; in this case the ethical questions of consent and assent interact with the biological risk of harming the developing child.

This taxonomy of harms will help to focus the debate around cognitive enhancement. In particular it will help to clarify the appropriate network of stakeholders who should take an interest in each potential harm, and in developing a potential solution.

***Antony Blackburn-Starza - Empirically grounding new forms of damage in assisted conception services and genetic technologies***

This paper examines how empirical studies investigating the meanings that families attach to genetic information can inform discussions of harm and actionable damage in claims for compensation following errors in the provision of assisted conception and genetic services. Genetic enhancements, if possible and permissible, would likely require technical intervention to make alterations to the genome, involving but not limited to the use of IVF and other technologies, which can go wrong. Errors in some cases may result in physical damage or the failure to avoid physical damage in the form of manifest genetic disorders, but in other cases could result in a genotype that was not expected - yet the individual concerned is otherwise perfectly healthy. In these cases the absence of physical, deleterious harm makes proving actionable damage inherently problematic. However, empirical studies examining kinship in assisted conception services have demonstrated how patients using donor conception attach subjective value and meaning to genetic information, which can be tied in around concepts of reproductive autonomy, personal and familial identity and parenting. A disruption of patient expectations, as has been observed in sperm mix-up cases, can have very real effects on those concerned. By extension, it is possible that genome editing, especially when used in human reproduction, may involve similar constructions. This paper examines if and how the law can accommodate subjective understandings of genetics both for parents and children that challenge the conception of physical and bodily damage. These

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questions will only become more pertinent as assisted conception and genetic technologies through their increased use and availability continue to enter personal and social consciousness.

### **Session 5B – Challenges from Enhancement**

#### **Britta van Beers - *The artificialisation of human life and the changing relationship between natural and artificial persons in law***

Central to this paper is the legal distinction between two types of legal persons: on the one hand, natural persons, as human bearers of rights and duties are called in legal doctrine; and on the other hand, artificial persons, such as corporations or public bodies. Even if both natural and artificial persons can enter into contracts, incur debts, be sued, or own property, certain differences remain. Unlike natural persons, artificial persons cannot, for example, have parental rights, be given jail sentences, or vote. Furthermore, while corporate bodies are formed and dissolved upon resolution, the beginning and ending of natural personality coincide with the biological events of birth and death.

These basic differences between natural and artificial persons suggest a preliminary answer to the question of what makes the natural person natural in the first place. In certain contexts, the concept of natural personality presupposes an *embodied* subject, as in the case of jail sentences and the semi-organic outlines of natural personality; in others, a *human* subject, as in the case of parental rights or the right to vote. In that sense, natural personality is indeed premised on a certain nature, even if that 'nature' is legally constructed.

However, human enhancement technologies, such as medical biotechnology and artificial intelligence, have led to a vigorous interrogation of the naturalistic premises of law's concept of the natural person. Indeed, what do the terms *human* and *embodied* mean in an era of increasing artificialisation of human life? Correspondingly, several legal scholars have recently claimed that the technological artificialisation of human life also calls for an more artificial account of the natural person in law. Ultimately, this would also mean that humane enhancement technologies are making the legal distinction between natural persons and artificial persons redundant.

In this paper, I argue that, against all odds, the legal distinction between natural and artificial persons remains of importance. A critical discussion of several legal dilemmas posed by biomedical technologies, brings me to the conclusion that an artificialistic approach to legal personality cannot do justice to the complex interplay between law and the biological realities of human life within the currently emerging body of biolaw.

#### **Benjamin Mak - '*Relational No More?*': *The Enduring Importance of Relational Autonomy for Human Enhancement Technologies***

Human enhancement technologies (HETs) could make us more physically and mentally independent than we were ever before. Schaefer, Kahane and Savulescu (2014) suggest HETs can even enhance our capacity as moral beings by improving our autonomy. The continued development of HETs might appear to sound the death knell on relational autonomy (RA), which rests largely on a conception of persons as highly interdependent, vulnerable beings.

I argue however that (1) the development of HETs does not render RA redundant, (2) RA is more important than ever for designing and justifying regulatory approaches to challenges raised by enhancement, and (3) the importance of RA may be illustrated in the current regulation of HETs via tort law.

I justify (1) on two grounds: (a) human interdependence endures even with HETs; and (b) allowing the exercise of HETs by particular groups will have significant distributional and behavioural effects on resources and norms in society. Next, I advocate (2) on the basis that the development of HETs create new unforeseen vulnerabilities which communities of persons must cooperate to address and for which RA will be useful. In discussing (3), I consider how (a) RA could justify a strict liability or no-fault compensation scheme for tort claims for harms arising in

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relation to enhancement or failure to enhance. This issue is of particular significance currently given the difficulties of proving causation in negligence highlighted by Goold and Maslen (2015).

**Carin Hunt - *Can't or Won't: Motivation Enhancement and our Achievements***

We argue that achievement might be diminished, left intact, or aided by motivation enhancement in one way and by the enhancement of cognitive and physical capacities in another. As such 'enhanced' achievements should not be examined by ethicists concerned about their value or lack thereof without close consideration of the *type* of enhancement used and its precise *effects*. We offer a conceptual and empirical background to motivation with a view to understanding the morally relevant effects of its enhancement. We argue that sets of actions and outcomes acquire the value that qualifies them as 'achievements' when they have required effort above a certain threshold on behalf of the agent. It should follow that the amount of effort exerted reflects the appropriate measure of praise earned by an agent in respect of his achievement. Having shown that motivation's role in the exertion of effort is different from the role played by our cognitive and physical capacities, we argue that its enhancement affects achievement in a way different to that of cognitive and physical enhancement. The distinction between motivation and capacities is easy to blur as neither does much without the other, but in light of increasing evidence as to the motivation enhancing effects of certain 'enhancement' drugs it should be considered in this context.

**Keynote – Dr Hannah Maslen, University of Oxford- *Scientific Description, Philosophical Prescription and the Realities of Law***

Making recommendations about the regulation of human enhancement technologies requires forward thinking about the likely and possible responses of the law and other regulatory tools. It also requires analysis of the limits (if there are any) that should be imposed on technological development and use. It seems obvious that reaching conclusions about appropriate regulation requires collaboration between lawyers, philosophers and scientists: legal scholars can examine the way in which existing law and other regulatory tools are likely to govern the use of new enhancement technologies, and identify any regulatory gaps. Scientists can contribute factual detail and explanation of the realities of human enhancement technologies, especially in terms of mechanisms, risks and benefits. Philosophers can assess the extent to which the use of human enhancement technologies coheres or conflicts with different values, and the extent to which they contribute to the good life.

However, the three disciplines take very different approaches, and often pursue different questions, making successful collaboration a challenge. Whilst legal scholarship can provide answers about what the law does or would say, it rarely examines what the ideal laws should be. Whilst scientists are able to provide factual descriptions of the nature of mechanisms and effects of technologies, they rarely make value judgments regarding the desirability or permissibility of the use of these technologies by individuals in society. Whilst philosophers are in the business of making and supporting normative claims regarding the value and permissibility of technologies, they often work at a theoretical level to some extent abstracted from the detail of the legal (and sometimes the scientific) constraints and actualities.

In this talk, I use examples from the literature on cognitive enhancement to examine how these methodological differences should be reconciled, especially when the goal is to make concrete recommendations for policy. In particular, I consider (potential) professional duties to use cognitive enhancers and student use of cognitive enhancers in universities. I argue that more explicit reflection on the optimal methods of philosophical and legal enquiry with respect to enhancement can enable scholars from the respective disciplines to more constructively contribute to making recommendations for regulation, in collaboration with scientists.

