NEUROLAW — Course Outline

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Neurolaw is a developing discipline at the intersection of law, neuroscience and philosophy. Advocates of neurolaw claim that recent scientific discoveries about the nature of human cognition, as well as the techniques and technologies that neuroscientists use, can be helpfully deployed to address a range of important legal questions. Some applications cited by neurolaw proponents include improved lie detection techniques, more objective and foolproof ways of assessing people's true mental capacity and thus their responsibility, more accurate ways of predicting individuals' propensities (e.g. their dangerousness and likelihood to (re)offend), the design of more effective laws due to greater insight and knowledge of what actually motivates humans to act in different ways, and even the promise of medical treatments for irresponsibility rather than just punishing offenders which is at best a blunt and at worst an ineffective instrument. Some proponents of neurolaw even claim that neuroscience conclusively shows that there is no such thing as responsibility, and hence that the law should be radically reformed to purge it of its archaic retributive aspirations, and that it should be re-designed in a more compassionate direction that focuses on deterrence, prevention and reform. This course introduces students to this exciting new interdisciplinary field by investigating the claims and arguments of opponents as well as advocates of neurolaw. Students will acquire an understanding of the terminology, concepts and methods – and most importantly, of the arguments on both sides of this debate – so that they can assess for themselves how much of what is claimed is hype and science fiction, and how much is supported by the science and the related arguments. Parallels will also be drawn with similar developments in psychology, addiction science and behavioural genetics to provide a historical and more cross-disciplinary perspective, but also to gesture at how other empirical sciences may be drawn upon to help solve problems (and perhaps to create new ones) within the legal context.

Tutorials will be devoted to a closer study of the set texts, to clarifying the lecture content and how the various neurotechnologies and techniques are meant to work, and to discussing the potential for their real-life application.

LECTURE	TOPIC
1	Introduction & Overview
2	Is Neuroscience Relevant to Law?
3	No Responsibility (free will and causation)
4	No Responsibility (consciousness is epiphenomenal)
5	Capacitarianism (assessing responsibility)
6	Critique of Capacitarianism
7	Memory (mind reading, lie detection, truth compelling)
8	Prediction of Behaviour (dangerousness, propensity, parole)
9	Intervention (treatments and restoration of competence)
10	Other Areas of Law (medical, tort, regulation, etc)
11	Limitations of Neuroscience
12	Other Sciences
13	An Integrative Framework for Sciences and Law

1. INTRODUCTION

This lecture will introduce students to neurolaw by going over some of the examples and topics that will be covered in later lectures. Examples will include the story of a 40 year old school teacher who was nearly imprisoned when he developed paedophylic tendencies due to a brain tumor that would have once gone undiagnosed, an overview of the long-standing debate about the moral responsibility of psychopaths, as well as key points in the debate about neural-based lie detection techniques, and whether neuroscience might help us to predict who is dangerous and likely to engage in criminal activity. Students will also be given a much-needed primer to the terminology, science and technology that they will encounter in these lectures and the related literature.

• Belcher, A. and W. Sinnott-Armstrong (2010). "Neurolaw." Wiley Interdisciplinary Reviews: Cognitive Science **1**(1): 18-22.
• Lekovic, G. P. (2008). "Neuroscience and the law" Surgical Neurology **69**: 99-101.
• Mobbs, D., H. C. Lau, et al. (2007). "Law, Responsibility, and the Brain" PLoS Biology **5**(4): 693-700.
• Jones, O. et al. (2009) "Brain Imaging for Legal Thinkers: A Guide for the Perplexed" Stanford Technology Law Review **5**: 48.

2. IS NEUROSCIENCE RELEVANT TO LAW?

This lecture motivates its discussion by explaining the attraction of using neuroscience within a legal context. For instance, the promise of a more objective and fool-proof way of assessing people's responsibility, of predicting people's future behaviour, and even medically treating the causes of people's irresponsibility rather than punishing them. It will also outline some authors' views about what reformative effects neuroscientific discoveries will (or at least, what effect they *ought to*) have upon the law. A critical perspective will then be introduced which points out the many differences and lack of alignment between neuroscience and law — differences that make it hard to see how neuroscience could have anything useful to offer to the law. However, these worries will eventually be set aside on account that they only support a cautious and critical approach, but not an outright rejection of neuroscience's relevance to the law.

• Greene, J. and J. D. Cohen (2004). For the law, neuroscience changes nothing and everything. Law & the Brain. S. Zeki and O. Goodenough. New York, Oxford University Press: 207-26.
• Gazzaniga, M. (2007) My Brain Made Me Do It. Defining Right and Wrong in Brain Science. Glannon, W., Dana Press, 183-194.
• Morse, S. J. (2007) New Neuroscience, Old Problems: Legal Implications of Brain Science. Defining Right and Wrong in Brain Science. Glannon, W., Dana Press, 195-205.
• Batts, S. (2009) "Brain Lesions and their Implications in Criminal Responsibility." Behavioral Sciences and the Law **27**: 261-72.

3. NO RESPONSIBILITY (FREE WILL AND CAUSATION)

It is often claimed that neuroscience poses a threat to responsibility. There are two different views about the way in which it allegedly does this, and this lecture will look at the first of them. On this first account, neuroscience reveals that we are just like every other part of the world – that our actions are caused by the same physical forces as everything else around us – that we therefore lack free will, and hence that we lack responsibility. On this account, we might admittedly keep on treating one another *as if* we were responsible for what we do, but this at best only serves a deterrent function, however retributive justifications of responsibility practices can't possibly be defended. This challenge from neuroscience will be met by the counter argument that if this is how neuroscience is meant to pose a threat to moral responsibility, then that is no different to how determinism (or God's foreknowledge for that matter) was meant to pose a threat to responsibility too, and this kind of challenge has arguably already been adequately addressed by compatibilist theories of responsibility.

• Dawkins, R. (2006). "Let's all stop beating Basil's car." – http://www.edge.org/q2006/q06_9.html#dawkins
• Sapolsky, R. M. (2004). "The frontal cortex and the criminal justice system." Philosophical Transactions of the Royal Society of London **359**: 1787-96.
• Morse, S. J. (2006). "Brain Overclaim Syndrome and Criminal Responsibility: A Diagnostic Note." Ohio State Journal of Criminal Law **3**: 397-412.

4. NO RESPONSIBILITY (CONSCIOUSNESS IS EPIPHENOMENAL)

This lecture will look at a second kind of threat that neuroscience has more recently been claimed to pose to legal responsibility practices. On this account, criminal responsibility presupposes voluntary control — for instance, the Model Penal Code postulates that we are only responsible for what we do voluntarily, or for what can be traced back to a prior voluntary act, and we also generally assume that our consciousness clearly reveals when our own actions are voluntary and when they are not. However, recent work in the fields of cognitive and social psychology as well as neuroscience – in particular, the work of Benjamin Libet and Daniel Wegner – shows that we are simply not the sorts of agents that we think we are. Despite our conviction that we consciously control our actions, and that we are consciously aware of when our actions were voluntary in this sense, our actions are in fact caused by lower level brain processes of which we have little or no awareness, and what appears in our consciousness is little more than *post hoc* confabulation. Two replies to this challenge will be offered: first, that the science is not yet as conclusive in this regard as authors who advocate this position claim; and second, that it is actually not even clear that consciousness must play this "driver's seat" role in order for us to be responsible for what we do.

• Sie, M. and A. Wouters (2009). "The BCN Challenge to Compatibilist Free Will and Personal Responsibility." Neuroethics **OnlineFirst:** 13 pages.
• Suhler, C. L. and P. S. Churchland (2009). "Control: conscious and otherwise." Trends in Cognitive Sciences **13**(8): 341-7.
• Davies, P. S. (forthcoming). Skepticism Concerning Human Agency: Sciences of the Self vs. 'Voluntariness' in the Law. Legal Responsibility and Neuroscience. N. Vincent. Oxford, UK, Oxford University Press.

5. CAPACITARIANISM (ASSESSING RESPONSIBILITY)

There are good reasons to resist the claim that neuroscience shows that responsibility does not exist — this was the point of the previous two weeks' lectures. Hence, running with the assumption that responsibility does in fact exist, this lecture will investigate the dominant *capacitarian* approach to assessing responsibility. On the capacitarian account, the degree of a person's responsibility tracks the degree to which they have the right kinds of mental capacities (and a range of other things) – i.e. that *responsibility tracks capacity* – and thus a role which neuroscience seems capable of playing is to help us to discover with greater precision (than folk psychological references to "cognitive and volitional capacities") what capacities are required for moral agency, what are the neural correlates of those capacities, and then to develop tools which can be used in the legal setting to assess individual people's capacities. The assessment of individual people's capacities might then be used in several contexts: assessments of fitness to stand trial, fitness to be punished, and perhaps even to qualify for parole. Critiques of capacitarianism will be considered in the following lecture.

• Glannon, W. (2005). "Neurobiology, Neuroimaging, and Free Will." Midwest Studies in Philosophy **XXIX:** 68-82.
• Aharoni, E., C. Funk, et al. (2008). "Can Neurological Evidence Help Courts Assess Criminal Responsibility? Lessons from Law and Neuroscience." Annals of the New York Academy of Sciences **1124:** 145-60.
• Amicus briefs for *Roper v. Simmons [2005]* and *Sullivan v. Florida [2009]*

6. CRITIQUE OF CAPACITARIANISM

The first part of this lecture will consider a range of common objections that are often raised against the capacitarian approach to assessing responsibility with neuroscientific tools. However, after explaining why most of these objections are not as worrisome as they initially appear, special attention will then be given to a different objection: namely, that the theoretical premise upon which capacitarianism is founded – i.e. that responsibility tracks capacity – might not be as sound as it first appears. To see why, suppose that full moral agency requires a certain degree of capacity for empathy. Now, if neuroscientific methods could show that a convicted criminal is physically incapable of empathy, would this necessarily diagnose them with a disorder and thus at least partly excuse them, or might it instead prove that they are indeed a callous and bad person? The same evidence seems to be compatible with both interpretations — viewed from one perspective, evidence of reduced capacity excuses (if only partially), but viewed from another perspective such evidence condemns. Neil Levy's

response, that this objection conflates two different sources of condemnation – one for who a person is, and the other for what a person does – will then be presented, to defend the capacitarian stance.

• Burns, J. M. and R. H. Swerdlow (2003). "Right Orbitogrontal Tumor With Pedophilia Symptom and Constructional Apraxia Sign." Archives of Neurology **60**: 437-40.
• Maibom, H. L. (2008). "The Mad, the Bad, and the Psychopath." Neuroethics **1**(3): 167-84.
• Levy, N. (2007). "The Responsibility of the Psychopath Revisited." Philosophy, Psychiatry & Psychology **14**(2): 129-38.
• Kaplan, L. V. (1977). "The Mad and the Bad: An Inquiry into the Disposition of the Criminally Insane." The Journal of Medicine and Philosophy **2**(3): 244-304

7. MEMORY

Testimonial evidence plays a crucial role in the legal process. However, our memory is at best unreliable, and at worst some witnesses simply can't be trusted. Given that our knowledge is encoded in our brain, that our brains control whether we will tell what we know or make up lies, and that neuroscience studies the brain, might neuroscience perhaps be able to help out here? This lecture will first describe several neuroscientific tools and techniques that are aimed at overcoming these and related problems. First, there are technologies most closely related to the polygraph which aim to detect lies, or rather, attempts at deception. Other technologies – the so-called "brain finger printing" techniques – aim to uncover who has first hand experience of some important evidence (this is the so-called "guilty knowledge" paradigm), and might thus know critical information about a given case. Then, there are also technologies most closely related to the "truth drug" sodium pentathol — for instance, transcranial magnetic stimulation which can allegedly be used to temporarily and relatively non-invasively subdue a person's ability to deceive, as well as deep brain stimulation and drugs that appear to enhance a subject's ability to recall what they know. (Mind reading will not be discussed, since beyond the most crude examples and laboratory-based experiments, it is largely still science fiction.) However, subsequently it will be argued that most of these techniques are still relatively under-developed, and that it is far from clear that their reliability is sufficiently high to warrant their use. (Other objections to the use of such techniques and technologies will be discussed in week 10.)

• Coukell, A. (2006). "No More Lies." Proto(Spring): 32-7.
• Simpson, J. R. (2008). "Functional MRI Lie Detection: Too Good to be True?" The Journal of the American Academy of Psychiatry and the Law **36**(4): 491-498.
• Kanwisher, N. (2009). The use of fMRI in Lie Detection: What Has Been Shown and What Has Not. Using Imaging to Identify Deceit. Bizzi, E. et al., American Academy of Arts and Sciences, 7-13.
• Luber, B. et al. (2009). "Non-Invasive Brain Stimulation in the Detection of Deception: Scientific Challenges and Ethical Consequences." Behavioral Sciences and the Law **27**: 191-208.

8. PREDICTION

Most of the topics discussed up to this point have had a temporally *backward*-looking focus, but the next two lectures will examine topics that look *forward* in time.

Various studies reveal that the brains of violent prisoners, people diagnosed with antisocial personality disorder, and psychopaths exhibit certain common structural and functional abnormalities — i.e. that certain parts of their brains are shaped or composed differently than healthy subjects, and that they exhibit different activation patterns. But if this is right, then mightn't it be useful to check for the presence of these abnormalities in the general population to identify individuals who are at risk of breaking the law in the future – i.e. to identify potentially dangerous individuals – and to take preventive measures if necessary? Should we perhaps install such devices at airports to identify potential terrorists, or screen childcare workers for propensity towards paedophilia? If not, then might we perhaps be justified in using such neuroscientific tests to assess prisoners' applications for parole — i.e. as a high-tech way of determining whether they still pose a danger to society or not? In fact, wouldn't we be negligent if we failed to use such techniques to protect society? After all, suppose that the capacitarians are right — i.e. that neuroscience will one day be able to reveal a person's mental capacities. If through such techniques we learned that a specific individual (still) lacks the capacity to control their angry impulses, then would it not be legitimate for us to infer that in the future this person might be more prone to getting into trouble with the law then others? This lecture will describe the

various proposed prediction-related uses of neurotechnology, however it will be argued that in most cases the science simply does not warrant using neurotechnology in this way. Although it would be an overstatement to say that such use of neurotechnology would be a modern-day equivalent of phrenology, important parallels can never the less be drawn.

• Eastman, N. and C. Campbell (2006). "Neuroscience and legal determination of criminal responsibility." Nature Reviews Neuroscience **7**(April): 311-8.
• Greely, H. T. (2004). Prediction, Litigation, Privacy, and Property: some possible legal implications of advances in neuroscience. Neuroscience and the Law: Brain, mind, and the Scales of Justice. Garland, B., Dana Press, 114-156.

9. INTERVENTION

Most of the techniques and technologies that have been cited so far are *diagnostic* — i.e. they are designed to *look at* rather than to *modify* the brain. However, neuroscience also offers a range of *intervention* techniques – for instance, psychopharmaceuticals, transcranial magnetic stimulation, deep brain stimulation and brain surgery – and these techniques might also present possible solutions to legal challenges. For instance, convicted sex offenders are already sometimes required to take cyproterone acetate – a drug that achieves chemical castration – in order to reduce their sex drive and thus to make it less likely that they will commit another offence. Similarly, in the USA courts have approved the involuntary administration of anti-psychotic medications to people for the purpose of restoring their competence to stand trial and to be punished (even to be executed). And finally, it has also been argued that if certain forms of criminal misconduct turn out to be caused by curable brain disorders, then we may in the future be able to treat the causes of criminal behaviour rather than punishing the victims of these diseases when they inevitably commit crimes — in some places around the world, brain surgery has already been trialed as a cure for drug addiction and the associated social and legal problems. This lecture will discuss the promise, and more importantly the dangers, involved in using such neuroscientific intervention techniques in this forward-looking legal context.

• Latzer, B. (2003). "Between madness and death: the medicate-to-execute controversy." Criminal Justice Ethics **22**(2): 3-14.
• Sandberg, A., W. Sinnott-Armstrong, et al. (forthcoming). "Cognitive Enhancement in Courts."
• Greely, H. T. (2008). "Neuroscience and Criminal Justice: Not Responsibility but Treatment." Kansas Law Review **56**: 1103-1138.

10. LIMITATIONS OF NEUROSCIENCE

Although the foregoing lectures have cited arguments *in favour of* and *against* neurolaw, this lecture will review a wide range of limitations to the use of neuroscience and neurotechnology within the legal context that are common to the different applications that have been discussed. These limitations will include applied ethics considerations, the role that normative judgments and historical factors play in informing responsibility assessments, inherent limitations to the current science and technology, and most importantly procedural legal barriers such as legislation governing the admissibility of scientific evidence (thresholds of reliability, probative value, etc), the legitimate role of expert witnesses and how their often-complex stories bear on specific legal arguments, privacy protections and the related question of whether information gained from neural lie detection techniques should be treated as testimonial or physical evidence, as well as asymmetries between the state's use of these technologies to secure convictions versus their use by the accused in the context of defending themselves.

• Fox, D. (2009). "The Right to Silence as Protecting Mental Control" Akron Law Review **42**: 763-801.
• Sinnott-Armstrong, W., A. Roskies, et al. (2008). "Brain Images as Legal Evidence." Episteme **5**(3): 359-73.
• Weisberg, D. S., F. C. Keil, et al. (2008). "The Seductive Allure of Neuroscience Explanations." Journal of Cognitive Neuroscience **20**(3): 470-7.
• Farahany, N. (working paper). "Incriminating Thoughts".

11. OTHER AREAS OF LAW

Criminal law is only one branch of the law, however neuroscience may arguably have an even greater impact on other branches of the law. For instance, within tort law neuroscience is already being used to assess the degree of brain damage suffered by plaintiffs, and more recently developed techniques claim to be able to offer an objective measure of a plaintiff's pain or mental anguish that might not only help us to distinguish malingerers from true sufferers, but also to provide a more objective basis for assessing pain and suffering damages claims. Within medical law, neuroscientific techniques may help us to assess the degree of a patient's competence to make self-regarding decisions (e.g. concerning treatments or end of life decisions), as well as providing a way to communicate with people suffering from locked-in-syndrome *via* brain-computer interfaces. And questions have also been raised about what sort of legislation must be put into place to prevent the rights of employees from unscrupulous employers who might otherwise wish to use such technologies in hiring and firing decisions and to conduct surveillance on their employees activities. This lecture will summarize the potential applications of neuroscience, neurotechnologies and related techniques for other branches of the law.

• Tovino, S. A. (2007). "Functional Neuroimaging and the Law: Trends and Directions for Future Scholarship." The American Journal of Bioethics **7**(9): 44-56.
• Kolber, A. (2007). "Pain Detection and the Privacy of Subjective Experience." American Journal of Law & Medicine **33**: 433-56.
• Meynen, G. (2009). "Exploring the similarities and differences between medical assessments of competence and criminal responsibility." Medicine, Health Care and Philosophy **12**(4): 443-51.
• Viens, A. M. (2007). "The Use of Functional Neuroimaging Technology in the Assessment of Loss and Damages in Tort Law." The American Journal of Bioethics **7**: 63-5.
• Marks, J. (forthcoming). "Neuroscience and National Security"

12. OTHER SCIENCES

Neuroscience is not the only branch of science that has potentially profound ramifications for the law. Psychology and psychiatry have re-shaped legal thinking and procedures since at least the 1700's. The science behind drug addiction, which conceptualizes this as a disease to be treated by medical professionals rather than as something that requires a response from legal institutions, also competes for jurisdiction over drug users. And more recently, behavioural genetics made media headlines when an Italian court reduced a convicted murderer's sentence by one year on account of the fact that he allegedly has genes which are linked to and thus predisposed him to violent behaviour. This lecture will provide examples of other sciences which have had similar effects upon the law. This will not only provide a perspective, but also an introduction to how empirical sciences may be drawn upon to help solve problems (and perhaps to create new ones) within the legal context.

• Eigen, J. P. (2004). "Delusion's odyssey: Charting the course of Victorian forensic psychiatry." International Journal of Law and Psychiatry **27**(5): 395-412.
• Morse, S. (2000). "Hooked on Hype: Addiction and Responsibility." Law and Philosophy **19**: 3-49.
• Denno, D. (2009). Behavioral Genetics Evidence in Criminal Cases: 1999-2007. The Impact of Behavioral Sciences on Criminal Law. Farahany, N., Oxford University Press, 317-354.
• Italian Court gives lighter sentence for murderer with 'bad genes' – http://www.uclshrp.com/bulletin/news/italian_court_gives_lighter_sentence_for_murderer_with_bad_genes/

13. AN INTEGRATIVE FRAMEWORK

This lecture will look back over the topics that have been covered in this course, and an attempt will be made to provide a more general theoretical framework for integrating scientific knowledge, technologies and techniques into legal processes and legal reasoning. It will be argued that philosophical compatibilism provides a useful tool for understanding how a range of different sciences might inform legal assessments of responsibility. In this context, the main points of the previous lectures will be highlighted to prepare students for the exam.

• McKenna, M. (2000). "Assessing Reasons-Responsive Compatibilism." International Journal of Philosophical Studies **8**(1): 89-124.