



A 64-year-old Manhattan ad man comes home from work, strangles his wife, and throws her body out their high-rise window to make it look like suicide. The defense argues that the man’s brain scans, which reveal a large cyst pressing on his frontal lobes, should be admitted as evidence that he cannot be held criminally responsible for his actions. (*People v. Weinstein*)

A psychologist on trial for overbilling Medicare explains that his was a case of misunderstanding, not intent to defraud. Taking advantage of a newly commercialized research protocol, he offers brain scanning results purporting to show that he’s not lying. (*US v. Semrau*)

The U.S. Supreme Court rules that the Eighth Amendment prohibits sentences of mandatory life without parole for juveniles convicted of homicide. The decision references a body of neuroscientific evidence that adolescent brains, including regions related to behavior control, are not fully developed. (*Miller v. Alabama*)

These and hundreds of criminal and civil cases like them demonstrate that law and neuroscience increasingly intersect, and that the intersection – neurolaw – is important to get right.

It is a complex field filled with promise and pitfalls, one that often calls upon lawyers, judges, and other members of the legal community to understand the nature of neuroscientific evidence, to rethink assumptions, and to make hard choices.

The MacArthur Foundation Research Network on Law and Neuroscience was established to help explore and identify the opportunities and limitations in this new terrain. In presentations across the country of their experimental and conceptual research, network scientists and legal scholars have fielded dozens of questions by judges, attorneys, and advocates just beginning to explore neurolaw and its impact. These are the most common.

COURTS HAVE ALWAYS HAD TO DEAL WITH SCIENCE. WHAT’S NEW ABOUT NEUROLAW?

First, a lot in law hinges on how brains work. In criminal law, for instance: What was this criminal’s mental state at the time of his act? What does this person remember, and how accurately? How can we decrease bias in legal decision-making? Civil law seeks similar answers about what’s going in a person’s brain: What level of pain is this person actually experiencing? Can this person competently enter into a contract or administer her own affairs?

Second, the last 20 years have seen the creation of new technologies and methods that enable us to learn—noninvasively—not only about the structure of a person’s brain but also about how it actually functions as it perceives, deliberates, and chooses actions.

Third, while much of the science is still a work in progress, it is already making its way to the courts, which are—for better or for worse—seeing a rapid rise in offers of neuroscientific evidence.

Given these developments, it's important to ensure that neuroscientific evidence is properly understood and evaluated, so that it may aid, rather than potentially mislead or hinder, the administration of justice.

WHEN IT COMES TO APPLYING SOMETHING AS COMPLEX AS NEUROSCIENCE IN COURT, SHOULDN'T WE BE CAUTIOUS?

Absolutely. Our understandings of various brain operations are constantly evolving, and brain-imaging technologies are necessarily imperfect. For instance, different techniques operate on different principles, which allow different inferences. Even though the brain's form and functions are generally the same across the species, they vary somewhat from person to person. And it is no simple matter to conclude that specific behaviors of interest to the legal system are caused by particular brain features or activities.

Nevertheless, neuroscience has made some remarkable—and remarkably pertinent—advances in our understanding. To ignore them would be a serious mistake. The best approach is to be both informed and cautious.

WHAT ARE THE NEUROSCIENTIFIC TECHNOLOGIES, AND HOW DO THEY WORK?

There are now a variety of brain imaging techniques in use, each known by an acronym: EEG, MEG, fMRI, PET, SPECT, etc.

Generally speaking, each technique enables inferences about brains by detecting electrical activity (EEG), small magnetic fields accompanying electrical activity (MEG), changes in brain blood flow (fMRI), or brain metabolism (PET and SPECT). Each has its advantages and disadvantages.

THIS IS ALL INTERESTING, BUT DO I REALLY NEED TO KNOW ABOUT NEUROSCIENCE?

The short answer is yes.

Judges, policymakers, attorneys, and law students who must grapple with legal issues involving memory, brain injury, pain, emotions, addiction, dementia, brain death, violence, responsibility, psychoses, behaviors of adolescents and of the elderly, and the like will often find in neurolaw both useful insights and potentially new frameworks for thinking about the issues.

Society uses law, in part, to change, channel, and sometimes judge or punish human behavior. Behavior comes from brains. So the better we can understand how brains work—how and why people behave as they do, and how legal interventions might best inspire constructive changes in future behavior—the better we can all help law do its job.

I'M INTERESTED. WHERE CAN I LEARN MORE?

The MacArthur Foundation Research Network on Law and Neuroscience offers some excellent resources for both novices and those who have already begun to follow developments in the field.

To get oriented, visit [the Network's gateway website](#). In addition to downloading knowledge briefs, introductions, and other publications, you can

- Search an extensive [bibliography](#)
- Subscribe to [Neurolaw News](#), a free e-newsletter that covers the latest neurolaw publications, conferences, and information.
- Access lectures by some of the nation's most respected neuroscientists and legal scholars, via cross-links to the [Network's YouTube videos](#).

For a more complete overview of the science, its applications, and its legal implications:

"Law and Neuroscience." O. Jones, R. Marois, M. Farah, & H. Greely, *Journal of Neuroscience*, 2013, Vol. 33.

"Law and Neuroscience." O. Jones & M. Ginther, in *International Encyclopedia of Social and Behavioral Sciences*, 2nd Edition 2015.

"Law and Neuroscience in the United States," O. Jones & F. Shen, in *International Neurolaw: A Comparative Analysis*, 2012.

"Overview of the Issues," in O. Jones, J. Schall, & F. Shen, *Law and Neuroscience*, 2014.

For a fuller discussion of the challenges of applying neuroscience to the law

"Brain Imaging for Legal Thinkers: A Guide for the Perplexed," O. Jones, J. Buckholtz, J. Schall, & R. Marois, *Stanford Technology Law Review*, 2009, Vol. 5.

"Limits and Cautions," in O. Jones, J. Schall, & F. Shen, *Law and Neuroscience*, 2014.

For a look at neuroscientific technologies

"A Reference Guide on Neuroscience," H. Greely & A. Wagner, in *Reference Manual on Scientific Evidence*, 3rd ed., 2011.

Other online sources

[Keeping Up with Neurolaw](#), by F. Shen, at provides a short, practical overview of useful information outlets.

Blogs include both the [Research Network's](#) and [Professor Adam Kolber's](#).

Books

[Law and Neuroscience](#), serves as both desk reference and teaching tool.

[A Primer on Criminal Law and Neuroscience](#) is an introduction to neuroscience issues in the criminal domain. Information at.