

# The Future of Brain-Based Lie Detection: Beyond the Courtroom

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University of Minnesota MacArthur Foundation Research Network on Law & Neuroscience

May 21, 2013

1. The Past and Present: Law and Neuroscience 1.0

2. Brain-Based Lie Detection: Beyond the Courtroom

3. The Future: Law and Neuroscience 2.0

# Why law and neuroscience?

## Law & Neuroscience Bibliography







# Student Interest is Growing

### Law and Neuroscience

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The implications for law of new neuroscientific techniques and findings are now among the hottest topics in legal, scientific, academic, and media venues.

Neurolaw has been featured in The New York Times, Science, Scientific American, The Charlie Rose Show, NPR, and many other outlets.

An Emerging Field

Forthcoming from Aspen Publishers

Law School Courses in Neurolaw

**Contact For Access to Materials** 





The *Research Network on Law and Neuroscience*, supported by the John D. and Catherine T. MacArthur Foundation, addresses a focused set of closely-related problems at the intersection of neuroscience and criminal justice: 1) determining the law-relevant mental states of defendants and witnesses; 2) assessing a defendant's capacity for self-regulating his behavior; and 3) assessing whether, and if so how, neuroscientific evidence should be admitted and evaluated in

SEARCH GO
News
The Network Press Release
International Neuroethics Society to hold 2011 Annual Meeting in Washington, D.C.
Supreme Court dissent cites neuroscience research
9th Cir. Conference includes Neurolaw Expert Panel
Law & Neuroscience Blog Neurolaw Listserv
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# www.lawneuro.org

2. Brain-Based Lie Detection: Beyond the Courtroom

# High Demand (Despite many barriers)



The National Academies' National Research Council says: don't use the polygraph.



#### **Read Full Report**

Date: Oct. 8, 2002 Contacts: Vanee Vines, Media Relations Officer Andrea Durham, Media Relations Assistant (202) 334-2138; e-mail <news@nas.edu>

#### FOR IMMEDIATE RELEASE

#### Polygraph Testing Too Flawed for Security Screening

WASHINGTON – The federal government should not rely on polygraph examinations for screening prospective or current employees to identify spies or other national-security risks because the test results are too inaccurate when used this way, says a new report from the National Academies' National Research Council.

### Employee Polygraph Protection Act (EPPA)

#### **TITLE 29 UNITED STATES CODE CHAPTER 22**

#### **COMPREHENSIVE EMPLOYEE POLYGRAPH PROTECTION ACT**

- § 2001. Definitions.
- § 2002. Prohibitions on lie detector use.
- § 2003. Notice of protection.
- § 2004. Authority of Secretary.
  - o (a) In general.
  - o (b) Subpoena authority.
- § 2005. Enforcement provisions.
  - o (a) Civil penalties.
  - o (b) Injunctive actions by Secretary.
  - o (c) Private civil actions.
  - o (d) Waiver of rights prohibited.
- § 2006. Exemptions.
  - o (a) No application to governmental employers.
  - o (b) National defense and security exemption.
  - o (c) FBI contractors exemption.
  - o (d) Limited exemption for ongoing investigations.
  - o (e) Exemption for security services.
  - o (f) Exemption for drug security, drug theft, or drug diversion investigations.
- § 2007. Restrictions on use of exemptions.
  - o (a) Test as basis for adverse employment action.
  - o (b) Rights of examinee.
  - o (c) Qualifications and requirements of examiners.
- § 2008. Disclosure of information.
  - o (a) In general.
  - o (b) Permitted disclosures.
  - o (c) Disclosure by employer.
- § 2009. Effect on other law and agreements.

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- § 2008. Disclosure of information.
  - (a) In general.
  - o (b) Permitted disclosures.
  - o (c) Disclosure by employer.
- § 2009. Effect on other law and agreements.

### Polygraph tests for city jail leaders begin

#### Tests administered to three officials; more could be coming

April 28, 2013 | By Carrie Wells, The Baltimore Sun

Polygraph tests for three top officials at the Baltimore City Detention Center began Sunday, in an effort to determine the extent of the corruption federal investigators allege plagued the jail.

Rick Binetti, a spokesman for the Maryland Department of Public Safety and Correctional Services, declined to comment Sunday on the outcome of the polygraph tests for interim jail administrator Ricky Foxwell and two deputy administrators. The corrections department's internal affairs unit and Maryland State Police investigators administered the polygraphs, and the information gleaned from them could factor into potential disciplinary actions or the decision to prosecute.

### Big-money outdoor sports contests and the polygraph

Story Comments (2)



Mark Nale

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Posted: Saturday, April 2, 2011 10:44 am

By Mark Nale | @ 2 comments

During my writing career, I have covered many hunting and fishing contests. The events are certainly exciting and draw large crowds. However, without fail, grumblings and accusations about some type of foul play are heard at every contest. The organizers must attempt to prevent and deal with suspected cheating. It is not an easy job.

Take something as traditional and sporting as hunting or fishing: Create a contest, add sizable prize money, attract participants, and the equation changes. In recent years, the biggest-money fishing tournaments have required winners to take a polygraph -- a lie detector test -- in an attempt to keep their events fair.

### New Hampshire derby using polygraph to cut down on lie-fishing



AP file photo

Anglers in this year's Winni Derby on Lake Winnipesaukee in New Hampshire will have to pass a lie-detector test before claiming any prizes.

#### By Tracy Connor, Staff Writer, NBC News

There will be no fish stories at this year's Winni Derby in New Hampshire.

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					Staten Island (732) 991-2541		Delaware (302) 887-9489	
WHAT IS POLYGRAPH TESTING?	CHEATING & INFIDELITY	PRE-EMPLOYMENT SCREENING	THEFT ISSUES	FAMILY ISSUES	FAQs	TESTIMONIALS	ABOUT APS	CONTACT APS

### Is Your Spouse or Significant Other Cheating? Are there questions in your relationship that remain unanswered?

When the trust is lost or in question in a relationship, it could take years to recover, if ever. In most cases, the evidence of INFIDELITY is not definitive.

The only way to find out the truth is through a **polygraph/lie detector test**. Polygraph tests have been used extensively in relationship issues. This is one area of testing where experience makes a big difference. The wording of test questions is critical to achieve a successful exam; different people interpret words differently.

This format is used to determine whether one partner has been intimately/sexually involved with



Since 1971, Accredited Polygraph Service's goal has been to provide its clients with accurate information they can rely on. All polygraph examinations are confidential and conducted professionally. Accredited Polygraph Services specializes in helping individuals and businesses find the answers to questions that are on their minds. This investigative tool, traditionally only utilized by police and government, is now available to individuals and private companies.







#### ACCREDITED POLYGRAPH SERVICES IN THE NEWS

Natalie Wood's Death: 10 Developments During Week 2 of the Reinvestigation The Hollywood Reporter - November 28, 2011

Natalie Wood Case: Captain Who Claims Robert Wagner Silenced Him Passed Polygraph Test The Huffington Post - November 24, 2011

Natalie Wood Witness Polygraph, Exclusive Canyon News - October 10, 2011



When trust is lost in a relationship, it could takes years to recover, if ever. In many cases the evidence of adultery is not definitive, so the only way to find out the truth is through polygraph testing.

Polygraph exams are used extensively for relationship issues. This is one area of testing where experience makes a big difference. The wording of test questions is critical to a successful exam, since many words can be interpreted differently by different people. See below for examples of acceptable and unacceptable exam questions.

All of the examiners in the Global Polygraph Network<sup>TM</sup> are experienced and qualified to provide these types of exams.

Types of Exams Available for Relationship Issues

**Cheating/Fidelity** - This format is used to determine whether one partner has had sexual contact with anyone else besides his/her partner. Other related items may include questions about dating, kissing, contact with "exes," etc.



6 November 2012 Last updated at 21:46 ET

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### Taiwan military lie detectors 'test loyalty'

Officials in Taiwan have told the BBC that lie detector tests for military personnel based abroad are a useful way to evaluate whether they are spying for other countries.

On Monday Defence Minister Kao Hua-chu told parliament the "test of loyalty" had been operating since last year.

The move follows a string of espionage cases, sometimes involving high-ranking officers spying for China.

Despite recent warmer relations, China regards Taiwan as a renegade province.

The BBC's Cindy Sui in Taipei says that while the two countries are closer diplomatically than they have been for decades, Taiwanese officials suspect that Beijing is using the relaxed atmosphere to step up its recruitment of spies.



More than 50 senior military personnel assigned abroad have done lie detector tests since last year

#### **Related Stories**

#### Taiwan arrests suspected spies

Taiwan jails spy general for life

Taiwan general 'spied for China'

# Wait, the U.S. is making Mexican security officials take polygraph tests?

Posted By Colin Daileda = Wednesday, May 1, 2013 - 7:30 PM = 🕂 Share



Fraying cooperation in the drug war will surely be **top of mind** as President Obama meets with his counterpart Enrique Peña Nieto in Mexico this week. And perhaps nothing encapsulates Mexico's growing impatience with America's heavy-handed approach to combating drug trafficking than this nugget from a *New York Times* report on Tuesday. Apparently, the United States has been subjecting Mexican security officials to regular polygraph tests in an effort to identify rotten apples. But that could soon change:



#### Local Sheriff's Department Adds Polygraph To Its Arsenal

🛃 Local Sheriff's Department Adds Polygraph Machine to Upgraded Arsenal

BELTON (May 9, 2013)--For the past month, the Bell County Sheriff's department has been fighting to join the 21st century.

Decisions from past administrations have left Bell County Sheriff Deputies with outdated equipment.

Newly elected Sheriff Eddy Lange told News 10 last April that only 6 patrol cars have been purchased for the department in



Enter: Brain Science

# Memory Recognition with EEG





# Lie Detection with fMRI



Anterior

Home	Product	Customers	Investors	Test Centers	Publicat	ions About	Us
New Truth V	erification Te	chnology	_				-
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	Infe Gyn	rior Frontal us		Corporate Customers		Government Customers	
	28	Truth	俞	Prospective Test Centers	\$	Prospective Investors	

## Lie Detection with fMRI

Lie Detection



The Science Behind The Truth

Forensic DNA Investigations News & Info Contact Us

Lie Detection Services

Using state-of-the-art functional magnetic resonance imaging (fMRI) technology, Cephos provides independent, peer-reviewed, published scientific validation for a range of situations. If your word, reputation or freedom is in dispute, contact the Cephos team today.

About Us

#### Cephos business is the truth

Our scientists, investigators and employees are committed to offering forensic and investigative tools to aid in uncovering the truth. We use the latest advances in DNA analysis, private investigations and brain-based lie detection to obtain the science behind the truth. Cephos employs experienced professionals who are recognized as experts in their respective fields and are available to testify in court. We have developed the latest, most scientifically advanced, brain imaging techniques for scientifically accurate lie detection. The methods have been featured in international print, national television shows and we have been awarded U.S. patents based on our technology. The array of services we offer



#### Criminal Behavior, July 25, 2010

Deception is not different among people with and without schizophrenia and among delusional people.



Click to view Dateline NBC video featuring Dr. Steven Laken discussing fMRI for lie detection and the testing results.





Between 1999 and 2005, did Dr. Semrau "knowingly devise a scheme or artifice to defraud a health care benefit program in connection with the delivery of or payment for health care benefits, items, or services"?



In my professional opinion, I, Dr. Steven Laken, conclude that ...

... Dr. Semrau's brain indicates he is telling the truth in regards to not cheating or defrauding the government.

# On-going challenges

Real World Stakes (Ecological Validity)

Time (Rehearsed Lie; Lying to oneself; Reconsolidation of memories over time? Retention interval?)

Subject populations (Individual Differences; External validity)

**Counter Measures** 

Ground Truth and Conceptual Clarity: When do we know when someone is "lying"?

# The Future Law and Neuroscience 2.0

### Francis X. Shen, *Neuroscience, Mental Privacy, and the Law*, 36 Harvard Journal of Law and Public Policy 653-713 (2013).

Abstract: Will brain science be used by the government to access the most private of spaces—our minds against our wills? Such scientific tools would have tremendous privacy implications if the government suddenly used brain science to more effectively read minds during police interrogations, criminal trials, and even routine traffic stops. Pundits and scholars alike have thus explored the constitutional protections that citizens, defendants, and witnesses would require to be safe from such mind searching. Future-oriented thinking about where brain science may lead us can make for great entertainment and can also be useful for forward-thinking policy development. But only to a point. In this Article, I reconsider these concerns about the use of brain science to infer mental functioning. The primary message of this Article is straightforward: "Don't panic!" Current constitutional protections are sufficiently nimble to allow for protection against involuntary government machine-aided neuroimaging mind reading. The chief challenge emerging from advances in brain science is not the insidious collection of brain data, but how brain data is (mis)used and (mis)interpreted in legal and policy settings by the government and private actors alike. The Article proceeds in five parts. Part I reviews the use of neuroscientific information in legal settings generally, discussing both the recent rise of neurolaw as well as an often overlooked history of brain science and law that stretches back decades. Part II evaluates concerns about mental privacy and argues for distinguishing between the inferences to be drawn from the data and the methods by which the data is collected. Part III assesses current neuroscience techniques for lie detection and mind reading. Part IV then evaluates the relevant legal protections available in the criminal justice system. I argue that the weight of scholarly opinion is correct: The Fourth Amendment and Fifth Amendment likely both provide protections against involuntary use of machine-aided neuroimaging mind reading evidence. Part V explores other possible machine-aided neuroimaging mind reading contexts where these protections might not apply in the same way. The Article then briefly concludes.

#### Francis X. Shen, Owen D. Jones, *Brain Scans As Evidence: Truths, Proofs, Lies, And Lessons*, 62 Mercer L. Rev. 861 (2011).

Abstract: This Article proceeds in three parts. Part I explores a particular context of law and neuroscience: the use of brain scans as evidence of lying or truth-telling. Part II illustrates the use of those scans by discussing the landmark 2010 federal criminal trial United States v. Semrau. That case involved the first federal hearing-which one of us (Jones) attended-regarding the admissibility of testimony about brain scans proffered as evidence of whether a person was lying or telling the truth. Part III identifies five issues relevant to future encounters between courts and brain scanning evidence. Sufficient scientific progress in addressing issues of experimental design, ecological and external validity, ensuring subject compliance with researcher instructions, false memories, and making individual inferences from group data may one day make brain scan evidence admissible in new legal contexts. But, in the illustrative case of lie detection, not yet.

### Francis X. Shen, *Law and Neuroscience Bibliography: Comments On An Emerging Field*, 38 INTERNATIONAL JOURNAL OF LEGAL INFORMATION 352 (2010).

**Abstract:** Recent years have seen extraordinary growth in the amount of legal scholarship, legal practice, and public policy at the intersection of law and neuroscience. In order to help the legal community navigate this emerging field of neurolaw, the accompanying Law and Neuroscience Bibliography has been created. The published bibliography presented here contains nearly 600 entries, and the updated online version now contains over 700 entries. The brief introductory comments to the published piece discuss the creation and contents of the bibliography, and provide suggestions for where one should begin their research in the area. The comments focus on (1) identification of law and neuroscience scholarship; (2) historical growth pattern of the scholarship; (3) nature of interdisciplinary authorship in the field, and patterns of publication outlets;

and (4) closing thoughts on the future of law and neuroscience scholarship. Appendix A provides a list of recommended starting places, including the first Law and Neuroscience casebook (forthcoming from Aspen Publishers), for those who wish to further their understanding of the field.

#### Owen D. Jones & Francis X. Shen, *Law and Neuroscience In The United States, in* International Neurolaw (Springer, Tade Spranger, Ed., 2011).

**Abstract:** Neuroscientific evidence is increasingly reaching United States courtrooms in a number of legal contexts. And the emerging field of Law and Neuroscience is being built on a foundation that joins: a) rapidly developing technologies and techniques of neuroscience; b) quickly expanding legal scholarship on the implications of neuroscience; and c) neuroscientific research designed specifically to explore legally relevant topics. Despite the sharply increasing interest in neuroscientific evidence, it remains unclear how the legal system – at the courtroom, regulatory, and policy levels – will resolve the many challenges that new neuroscience applications raise. This chapter – part of an edited volume surveying neurolaw in 18 countries – provides an overview of notable neurolaw developments in the United States through 2011. The chapter proceeds in six parts. Section 1 introduces the development of law and neuroscience in the U.S. Section 2 then considers several of the evidentiary contexts in which neuroscientific evidence has been, and likely will be, introduced. Sections 3 and 4 discuss the implications of neuroscience for the criminal and civil systems, respectively. Section 5 reviews three special topics: lie detection, memory, and legal decision making. Section 6 concludes with brief thoughts about the future of law and neuroscience in the United States.