

Brain Scanning in the Courts: The Story So Far

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Types of Brain Scanning Cases in the Courts to Date

- Criminal Responsibility
- Mitigation
- Competency
- Adolescent Neural Development
- Access to Brain Scanning
- “Brain Fingerprinting”
- Tort Injuries
- Miscellaneous Applications

Criminal Responsibility

State v. Zimmerman

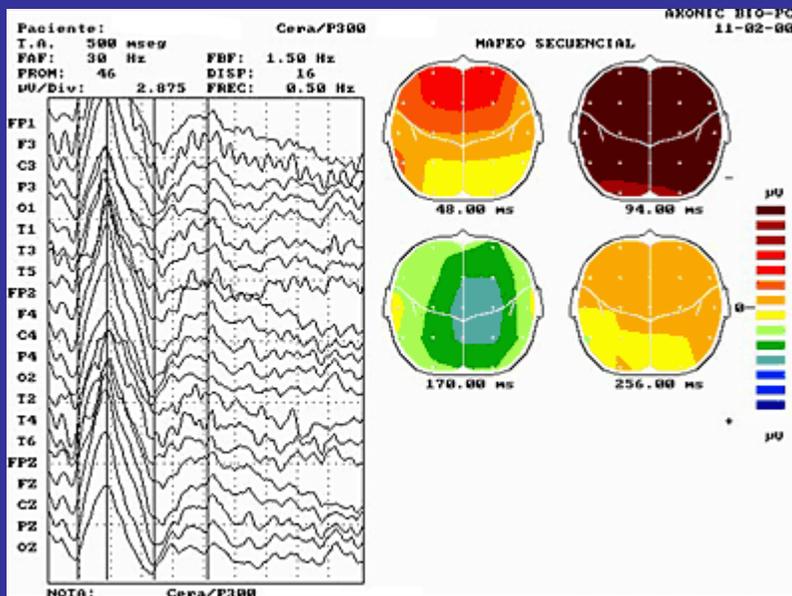
166 Ariz. 325 (1990)

- John Patrick Zimmerman convicted of first-degree murder
- Unsuccessful defense= insanity
- Trial court excluded expert testimony based on Brain Electrical Activity Mapping (BEAM) method
- Exclusion of BEAM analysis was primary claim in appeal to Arizona Supreme Court

Brain Electrical Activity Mapping (BEAM)



- BEAM is a computerized method of displaying and interpreting electroencephalogram (EEG) data that produces color-coded topographical map of brain electrical activity
- BEAM analysis allegedly showed an abnormality in Zimmerman's temporal lobe



State v. Zimmerman: Arizona Supreme Court Decision

- Upholds exclusion of BEAM evidence
- “Despite evidence of BEAM’s attributes, there was substantial evidence from which the court could conclude that BEAM is not generally accepted in the neurological community.”
 - cited approvingly State expert Dr. Tamm (BNI) that most neurologists accept BEAM as “an interesting research tool” but “I don’t think we know enough about that technique” to apply it to “a very specific clinical situation.”

Stephen Stanko



- Stephen Stanko is an author who was charged in S. Carolina with brutal murder of his girlfriend and raping and attempting to murder her daughter
- Defense: insanity based on PET scan allegedly showing brain abnormalities; three days of expert testimony on brain scan results
- Aug. 2006: Jury convicted Stanko and sentenced him to death
- Juror: "Well, I'll be honest with you when we went in deliberation with that PET scan and all that computerized stuff they did, I said 'I felt like I'd been dazzled by brilliance and baffled with b.s. That's how I felt.'"

Contrast with:

- “Here was this nice color image we could enlarge, that the medical expert could point to,” Christopher Plourd, a San Diego criminal defense lawyer, told The Los Angeles Times in the early 1990s. “It documented that this guy had a rotten spot in his brain. The jury glommed onto that.”
 - Jeffrey Rosen, The Brain on the Stand, NYT Magazine, March 11, 2007

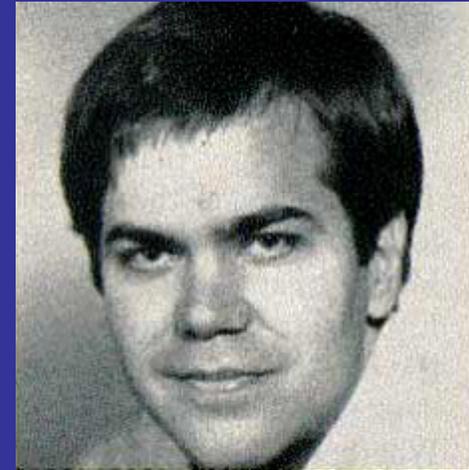
United States v. Erskine

588 F.2d 721 (9th Cir. 1978)

- Defendant convicted of making false statement appealed trial court's refusal to allow him to introduce "brain scan" evidence of mental defect
 - Brain scan evidence in combination with other psychological evidence would allegedly demonstrate that he was unable to form requisite intent
- **Ninth Circuit reverses and orders new trial**
 - "the defendant was entitled to introduce competent evidence pertaining to the defense of lack of specific intent. While the competence and persuasiveness of the offered testimony can be questioned, the relevance of the subject matter cannot be."

John Hinckley

- John Hinckley, Jr. attempted to assassinate President Reagan
- In his criminal trial, defense introduced computerized topography (CT) scan of Hinckley's brain allegedly suggesting schizophrenia
- Closing argument: "we offered [this CT scan] to you because it evidenced an abnormal brain."
- Jury found Hinckley not guilty by reason of insanity; reports that brain scan image was central to jury's decision



People v. Weinstein, 156 Misc. 2d 34 (N.Y. 1992)

- Executive Herbert Weinstein charged with 2nd degree murder for killing his wife and then throwing her from a 12th floor window to give the appearance of suicide
- Defense: Weinstein not criminally responsible due to mental disease or defect
 - Based on PET scan showing a cyst in his arachnoid membrane and metabolic imbalances near cyst
- Prosecution: PET scans have “not been shown to be sufficiently reliable as diagnostic devices for brain abnormalities so as to warrant the admission of such evidence at the trial of a criminal case.”



People v. Weinstein: Outcome

- At evidentiary hearing, court concluded that PET scan “showed that Weinstein's brain is abnormal” and expert’s reliance on such test results “is, a fortiori, reasonable”
- The court admitted the PET scan results “despite evidence that such pathology has no known link to criminal behavior” but prohibited testimony as to whether an arachnoid cyst or metabolic disturbances “in the frontal lobes of the brain directly cause violence.”
- Following this evidentiary ruling, prosecution accepted manslaughter plea

Mitigation

Mitigation Evidence

- There are numerous reported capital appellate decisions where brain scanning data allegedly showing brain abnormalities was introduced as mitigating evidence but defendant was nevertheless sentenced to death
 - e.g., *People v. Crittenden*, 885 P.2d 887 (Cal. 1994) (en banc)
 - e.g., *People v. Danks*, 82 P.3d 1249 (Cal. 2004)
 - e.g., *People v. Steele*, 47 P.3d 225 (Cal. 2002)
- Cases where evidence successfully resulted in mitigated penalty (i.e., non death penalty) less likely to be appealed

Some Noteworthy Decisions

- **People v. Sapp, 73 P.3d 433 (Cal. 2003)**
 - Defense introduced brain scan of defendant's son to argue that similar brain abnormalities suggested a genetic problem
 - Prosecution introduced rebuttal evidence from victim's wife that defendant had bragged about "mass" in his head which would help defend him against any criminal charges
- **People v. Musselwhite, 954 P.2d 475 (Cal. 1998)**
 - Cal. Supreme Court rejected criminal defendant's argument that prosecution's reference to brain scanning technologies used to evaluate him as a "Marvel Machine" was prejudicial
- **Trapp v. Spencer, 479 F.3d 53 (1st cir. 2007)**
 - rejecting habeas petition based on new PET scan results in part because brain scan conducted 20 years after murder may not be representative of defendant's brain at time of crime

Competency

Coe v. State, 17 S.W.3d 193 (Tenn. 2000)

- Convicted murderer's expert argued that he was not competent to be executed based on brain scanning results (MRI, PET) combined with psychiatric and cognitive evidence
- Tennessee Supreme Court agreed that defendant suffered from "some sort of personality disorder" but was still competent to be executed
- U.S. District Court also denied habeas petition based on same evidence (Coe v. Bell, 89 F.Supp.2d 922 (M.D. Tenn. 2000))

State v. Marshall

27 P.3d 192 (Wash. 2001)

- Defendant entered guilty plea for first degree murder; sentenced to death
- Defendant subsequently sought to withdraw plea based on brain scanning data (MRI, PET, SPECT) showing organic brain damage and brain atrophy
- Washington Supreme Court overturned trial's court denial of motion to withdraw plea given undisputed evidence of brain damage

Adolescent Brain Development

Roper v. Simmons, 543 U.S. 551 (2005)

- Supreme Court holds that executing juveniles under age 18 unconstitutional
- American Psychological Association, American Medical Association, and American Bar Association file amicus briefs presenting brain scanning data showing adolescent brains not fully developed
- Although Supreme Court does not directly rely on this evidence, may have influenced decision



Criminal Defendant's Access to Brain Scanning

People v. Jones, 210 A.D.2d 904 (N.Y. App. Div. 1994)

- NY appellate court overturned murder conviction and ordered new trial to a defendant denied authorization for brain scans
- Over 30 cognitive tests introduced by defendant's psychiatric experts, who claimed neurological brain scans were also needed to prove brain injury
- Trial court had denied application on ground that "there was an insufficient showing of injury"
- Appellate court: "testing was crucial to defendant's asserted defense of justification," thus denial of brain scans was abuse of discretion

Hoskins v. State, 702 So.2d 202 (Fla. 1997)

- Johnny Hoskins convicted of 1st degree murder and sentenced to death
- Florida Supreme Court overturned trial court's rejection of request for PET scan
- Based on results of PET scan showing a brain abnormality, Supreme Court vacated death penalty in subsequent decision and ordered new sentencing proceeding
- Hoskins ultimately resentenced to death; currently on death row



Cases Upholding Denial of Authorization for Brain Scans

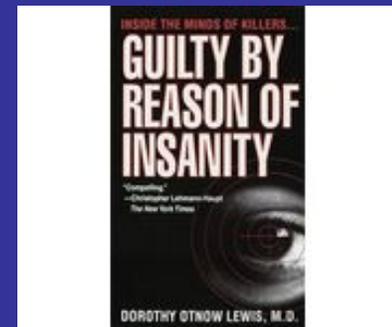
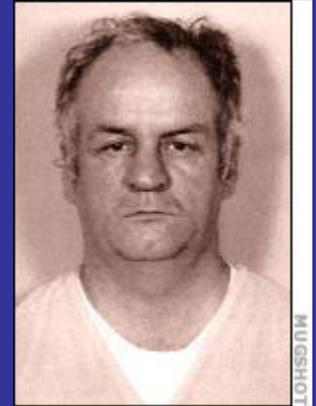
- **United States v. Phillips, 907 F.2d 151 (6th Cir. 1990)**
 - Affirming denial of criminal defendant's request for a BEAM scan, on the grounds that the test would nothing new to the existing psychological evaluation of defendant
- **Allen v. Hickman, 407 F.Supp.2d 1098 (N.D. Cal. 2005)**
 - Convicted murderer on death row claimed that State's refusal to administer MRI or SPECT scan was a violation of due process
 - U.S. District Court denied claim; prisoner had challenged his death sentence for >20 years and evidence had shown no evidence of organic brain trauma
- **Rogers v. State, 783 So.2d 980 (Fla. 2001)**
 - refusing to overturn lower court's denial of a motion for a PET scan where defendant has not shown a "particularized need for the test," and court had already found statutory mitigating circumstance pertaining to defendant's mental condition without scan (although still applying death penalty)

Ineffective Assistance of Counsel

- **State v. Johnston, 957 S.W.2d 734 (Mo. 1997)**
 - Missouri Supreme Court rejected ineffective assistance of counsel claim for lawyer's failure to obtain and present MRI test as evidence of convicted murder defendant's alleged brain damage
 - Court held that because lawyer had obtained an EEG of defendant which was normal, "counsel was not ineffective for failing to obtain further, more detailed testing."

People v. Shawcross, 192 A.D.2d 1128 (N.Y.App.Div.1993)

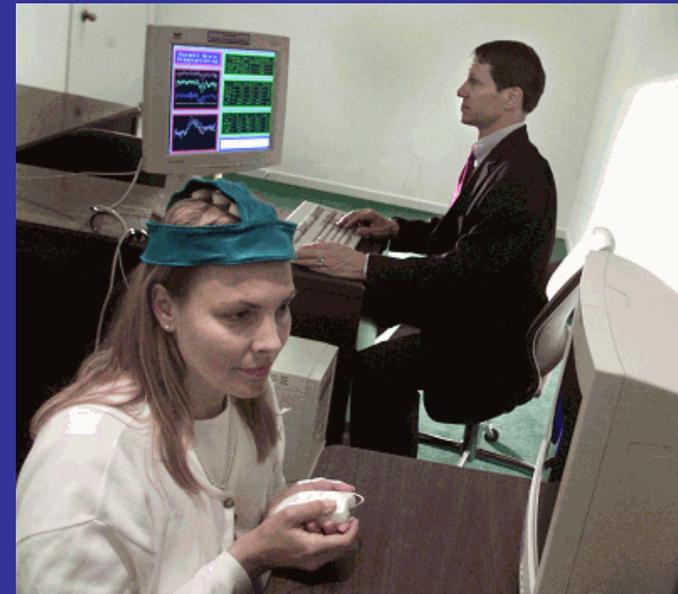
- Arthur Shawcross charged with killing ten women in Rochester, NY, and cannibalizing several of them
- MRI detected a cyst and lesions at base of Shawcross's right temporal lobe
- Defense expert Dorothy Lewis wrote letter to court assailing defense lawyers for failing to introduce and follow-up brain scanning results
- On appeal, Shawcross argued he was deprived of competent assistance by his lawyers' failure to introduce evidence
- Arguments rejected by court; Shawcross sentenced to 250 years in prison



Brain Fingerprinting

Brain Fingerprinting

- An EEG-based system developed by Dr. Lawrence Farwell that allegedly can be used to determine whether or not specific information is stored in a person's memory
- Test measures individual brain-wave responses to relevant images presented by a computer



Terry Harrington Case

- 1978- Terry Harrington (age 17) convicted of killing a night watchman and sentenced to life in prison based primarily on testimony of an accomplice
- After 25 years of unsuccessful appeals and prison, Dr. Farwell brain fingerprinted Harrington and concluded he was innocent
- Farwell allegedly confronted accomplice with brain fingerprinting evidence and he recanted
- In new post-conviction relief action, court found brain fingerprinting method admissible, but refused to grant new trial



Harrington v. Iowa, 659 N.W.2d 509 (Iowa 2003)

- Iowa Supreme Court cited brain fingerprinting evidence in overturning murder conviction on other grounds (due process violation):
 - “Dr. Farwell measures certain patterns of brain activity (the P300 wave) to determine whether the person being tested recognizes or does not recognize offered information.... According to Dr. Farwell, his testing of Harrington established that Harrington’s brain did not contain information about Schweer’s murder. On the other hand, Dr. Farwell testified, testing did confirm that Harrington’s brain contained information consistent with his alibi.”
- State dropped case and Harrington released from prison

Jimmie Ray Slaughter Case

- Slaughter sentenced to death in 1994 for murder of his mistress and their one-year old daughter
 - Slaughter maintained his innocence
- Dr. Farwell administered brain fingerprinting test, claimed to show he was innocent
 - Full report never submitted to court



Slaughter v. State

105 P.3d 832, 108 P.3d 1052 (Okla. App. 2005)

- Oklahoma Court of Appeals rejects brain fingerprinting evidence as unreliable
 - “[B]eyond Dr. Falwell’s affidavit, we have no real evidence that Brain Fingerprinting has been extensively tested, has been presented and analyzed in numerous peer-review articles in recognized scientific publications, has a very low rate of error, has objective standards to control its operation, and/or is generally accepted within the ‘relevant scientific community.’ The failure to provide such evidence to support the claims raised can lead to no other conclusion, for post-conviction purposes, that such evidence does not exist.”
- Slaughter was executed on March 15, 2005

India: Noida Killers

- Indian Businessman Moninder Singh Pandher and his servant Surendra Koli accused of raping, murdering, and dismembering more than 20 children in Noida, India
- Police have subjected them to involuntary brain fingerprinting and truth serum in January 2007
- Based on results, Koli is alone being tried for all the murders



Tort Injury

Tran v. Hillburn, 948 P.2d 52 (Col. Ct. App. 1997)

- Plaintiff allegedly suffered closed head injury in car crash
- At trial, plaintiff relied on quantitative electroencephalogram (QEEG) to show injury
 - QEEG is a computer enhanced EEG that compares the brain activity of the patient with a database of the brain activity of normally functioning brains
- Ct. of App: “QEEG is apparently used quite extensively as a research instrument but is not widely used by clinicians as a diagnostic tool.... QEEG is not considered reliable in the professional organizations which count in their membership the majority of the clinicians who would use the instrument for diagnostic purposes.”
- Held: QEEG not generally accepted; case overturned

Toxic Solvent Encephalopathy (TCE)

- **Rhilinger v. Janciscs, 1998 WL 1182958 (Mass. Super. 1998)**
 - Court rejects motion to exclude plaintiff's expert testimony relying on SPECT scan to show abnormalities in brain function used to diagnose TCE
 - “the court finds that the SPECT scan is scientifically reliable” and useful in diagnosis of TCE
- **Hose v. Chicago & N.W. Transp. Co., 70 F.3d 968 (8th Cir. 1995)**
 - upholding use of PET scan to exclude other potential causes of plaintiff's injuries and to support that manganese caused his encephalopathy

Miscellaneous Applications

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- **Jackson v. Calderon, 211 F.3d 1148 (9th Cir. 2000)**
 - PET scan introduced in habeas petition allegedly demonstrating that defendant suffered from chronic PCP intoxication was not generally accepted
- **Van Middlesworth v. Century Bank & Trust Co., 2000 WL 33421451 (Mich.App. 2000)**
 - rejecting contract performance and damages based in part on brain scanning evidence (MRI) suggesting one of the parties was mentally incompetent to enter agreement
- **Entertainment Software Ass'n v. Blagojevich, 404 F.Supp.2d 1051 (N.D. Ill. 2005)**
 - Illinois used brain scanning data to allegedly show the harmful effects of violent video games on the brain in unsuccessful attempt to defend constitutionality of its ban on violent video games

Conclusion: The Current Lay of the Land

