BRAIN IMAGING AND PRIVACY: HOW RECENT ADVANCES IN NEUROIMAGING IMPLICATE PRIVACY CONCERNS

By David Finn

"The ethical issues raised by... feats of human engineering are qualitatively no different from those we shall have to face in the future. The difference will be quantitative: in scale and rate. Even so, the individual steps may still go on being so small that none of them singly will bring those issues forcibly to light: but the sum total is likely to be tremendous. That is why we have to look for those issues now... " Aldous Huxley, *Brave New World* (1932).

One of the last frontiers for human exploration is so intimately connected to each and every individual on the planet that the majority of people fail to ponder its magnificence; it is the human brain. Questions about the workings of human brain have occupied thinkers for thousands of years.[1] One of the greatest accomplishments of the past hundred years has been the ability to use our brains to scientifically study, our brains.

Research into the human brain has yielded a number of benefits such as drugs for mental illness, surgical procedures to fix broken brains, and the most widely beneficial, a greater understanding of how people think and feel. This large area of science dealing with the human nervous system is generally referred to as neuroscience.

With these advances there have also been a number of concerns raised about the nature of our 'selves', and the limits that it is ethically acceptable to pursue concerning

[1] There was much discussion in Greek philosophy about the contents on one's mind. One of the most famous theories being that there was a "homunculus', or little person inside our skulls that controlled our bodies.

this technology. In response to these concerns a new field, neuroethics, which is the study of the ethical, legal and social implications of neuroscience, has developed.[2]

In addition to neuroethics there is a subfield of philosophy called neurophilosophy which deals with the relation between neuroscience and tradition philosophical issues such as free-will and the mind.[3] This subfield provides a valuable framework for a neuroethics discussion.

The objective of this paper is to examine the legal and ethical implications of using Brain Imaging Technologies (BIT) to detect deceit in human beings. In Part I of this paper I will examine the background philosophical debate in neuroscience and then examine the development of various BIT's. In Part II, I will discuss the various uses of BIT's with an emphasis on their use in deceit detection. In Part III, I will analysis various legal and ethical implications of using BIT's.

PART I.

The Philosophical Framework of Modern Neuroscience

Modern neuroscience has brought a number of important philosophical questions concerning human thought to the forefront of philosophical debate. These questions include; What are thoughts made of? Where does consciousness come from? How does it

[2] The Committee on Science and Law of the Bar Association of The City of New York, *Are Your Thoughts Your Own?: "Neuro-privacy" and the Legal Implications of Brain Imaging,* 60 CBA Record 407, 408 (2005). (hereinafter "Committee").
[3] *See* Patricia Churchland, Brain-Wise: Studies in Neurophilosophy. MIT Press (2002).

emerge? How does consciousness relate to our sense of self?[4] The answers to these questions have eluded both philosophers and scientist for centuries.

For centuries the answers to these questions were supported by a theory called dualism. Dualism is the term given by philosophers to the historic distinction between the mind and the body. Rene Descartes developed this theory in the 17 century. He based his theory on the belief that there was something in addition to physical body which constituted the mind. However, as it became clear that this "immaterial mind" was not going to withstand the rigors of scientific and philosophic inquiry, it became necessary to look elsewhere for an answer to the questions concerning the mind.[5]

One of the major *scientific* theories today is that what constitutes the mind is in fact nothing but the processes of the organic brain.[6] This belief is sometimes referred to as reductionism in order to distinguish it from dualism.[7] Reductionism does not attempt to explain how the mind works this way, cognitive science is necessary for that, however it does hypothesize that in the end the mind is simply the organic brain. Of course this theory has profound implications for the study of neuroscience because it means that when we look at the functioning brain through BIT, we are essentially looking into the mind of another person.

Brain Imaging Technology

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[4] *See, The Nature of Consciousness: Philosophical Debates, (* Neb Block, et al. eds., 1997).
[5] *See* Churchland, *supra* note 3.
[6] See Ari Schick, *Neuro Exceptionalism*, 5 Amer. J. of Bioethics. 36, 37 (2005). (While this may be the prevailing scientific attitude there are strong indications that the majority of society does not share them due to religious or otherwise commonsense beliefs).
[7] *See, Nature of Consciousness, supra* note 4. (This is currently a hot issue in modern philosophy with philosophers like Patricia and Paul Churchland at UCSD representing the reductionism model and philosophers like Robert Nagel at UC Berkeley representing a rejection of reductionism. Additionally there are a vast number of theories in between the two).

Brain Imagining Technologies usually consist of devices which measure certain signals in the brain and the necessary computer equipment and expertise necessary to correctly interpret those signals. There are a large number of different kinds of BIT's and three of the most common are described below.

Electroencephalography (EEG), which is not technically a neuro-imaging technique, uses electrodes placed on the scalp of the subject to measure electrical activity emanating from within the brain. Invented in 1929 by Hans Berger, EEG is the oldest instrument for measuring brain activity.[8] However, EEG is not really a BIT because it does not produce images of activities in the brain, but rather it measures the amount of this electrical activity emanating through the skull.

Positron emission tomography (PET) is a device which uses radioactively labeled chemicals that have been injected into the bloodstream in order to measure blood flow, oxygen and glucose metabolism or drug concentrations in brain tissues. These devices use control images taken while the subject is at rest and compares them to activity occurring during a targeted action to produce composite images showing where the activity occurred in the brain.

Magnetic resonance imaging (MRI) uses radio waves and very strong magnetic fields, without injecting radioactive chemicals, to produce two or three dimensional images of brain activity.

Functional MRI (fMRI) uses the same methods as MRI but allows brain states to be measured over time. This produces a "movie" of the changes in brain states that occur

[8] Judy Illes and Eric Racine, *Imaging or Imagining? A Neuroethics Challenge Informed by Genetics*, 5 Amer. J. of Bioethics 5, 6 (2005).

while the subject is performing a mental task or reacting to stimuli. fMRI is a very rapidly growing technique.[9] With its high resolution real time images, it is said that fMRI will have the greatest impact our society compared to the other BIT's.[10]

What Brain Imagining Technology can Detect

There have been a large number of studies aimed at determining what types of information BIT's can detect. The simplest kind of information is basic anatomical features of the brain. This information alone has lead to a number of surprising findings. For example, one study found that general intelligence and volume of frontal grey matter are correlated.[11] Another example is a study which suggests that people who lie more frequently have more white matter in the prefrontal cortex.[12]

Besides anatomical features, there is a large amount of information that can be gathered from BIT. BIT data can provide limited information about personality traits, mental illness, sexual preference or predisposition to drug addiction.[13] However there are important limits to the type and accuracy of information gathered by BIT.

The Accuracy of Brain Imaging Technology

While MRI and other BIT have been used in the medical field for nearly twenty years, there is still a great deal of research and controversy concerning the use of fMRI

[9] *Id*. Table 1, at 8 (number of published fMRI studies increases an average of 56% a year.)
[10] *Id*. at 7
[11] Jeremy Gray and Paul Thompson, *Neurobiology of Intelligence: Science and Ethics*, Nature Reviews Neuroscience **5**, 471-482 (2004).
[12] Charles Keckler, *Cross-Examining the Brain: A Legal Analysis of Neural Imaging for Credibility Impeachment*, 57 Hastings L.J. 509, 536 (2006).
[13] *See* Paul Wolpe, Kenneth Foster, and Daniel Langleben, *Emerging Neurotechnologies for Lie-Detection: Promises and Perils*, 5 Amer. J. of Bioethics, 39 46 (2005).

and other newer technologies.[14] One of the main concerns is relying on unproven fMRI interpretations for conducting brain surgery. [15] Additionally, while this technology is uncontroversial for determining such things as the location of stroke lesions, there is a great deal more care needed when interpreting fMRI scans in experimental investigations.[16].

These concerns about the experimental uses of fMRI include; the sensitivity of the measurements taken by BIT, how that sensitivity interacts with the emotional state of the subject, the way the experimental task is presented, and other various environmental conditions which could have an effect on the subject's state of mind.[17]

Another issue that affects the accuracy of BIT data is the sheer complexity involved in using highly sophisticated machinery requiring expert knowledge of complex algorithms to interpret.[18]

Perhaps the biggest obstacle for the accuracy of BIT is that scientists do not yet have a standard model of where certain thought types occur in the brain.[19] In addition there is significant data to suggest that each person uses slightly different areas of the

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[14] Committee, *supra* note 2, at 411.
[15] *See* Paul Ford and Cynthia Kubu, *Caution in Leaping from Functional Imaging to Functional Neurosurgery*, Amer. J. of Bioethics, 23, 24 (2005).

[16] Committee, *supra* note 2 at 412, citing Antonio Damasio's lecture at the conference "Neuroethics: Mapping the Field" sponsored by the Dana Foundation and held May 2002. *See* Illes and Racine, *supra* note 8 at 6.
[17] Donal Kennedy, *Neuroimaging: Revolutionary Research Tool or a Post Modern Phrenology?* 5 Amer. J. of Bioethics, 19 (2005).
[18] Illes and Racine, *supra* note 8, (it is worthwhile to not that the complex Fourier transformations necessary for interpreting fMRI data are done by the computer and a whole subspecialty has arisen concerning the programming and designing of these algorithms.)
[19] *See* Wolpe, et. al. supra note 13; *See* Jennifer Kulynch, *Psychiatric Neuroimaging Evidence: A High Tech Crystal Ball?* 49 Stan. L. Rev. 1249 (1997) (while scientist do have a rough sketch they are no where near pinpoint for example, where a person thinking rose would show brain activity)

brain to accomplish the same tasks.[20] Finally, the sheer complexity of human thought and memory make this an extremely daunting task.

PART II.

The Use of Brain Imaging Technology

There are a whole host of applications which can be utilized from accurate BIT. While some of these uses are still in the theoretical stages, there are others that have begun producing relevant data. The list of both current and future uses includes:

- BIT's are very useful in the diagnosis of various brain related abnormalities including Alzheimer's disease and fetal CNS abnormalities.[21]

- Studies have been conducted using BIT to measure the response in the amygdale (brain area associated with fear response) when subjects where shown pictures of people of different ethnic backgrounds.[22]

- Neuro-marketing is the emerging field of using BIT's to measure responses in the brain in reaction to certain advertising campaigns and product affiliations.[23]

[20] *See* Keckler, *supra* note 12 at 527-537.
[21] Illes and Racine*, supra* note 8 at 7.
[22] See Committee *supra* note 2 at 412.

- Neuro-economics is the developing study of how consumers and business partners make economic decisions by studying experimental BIT data.[24]

- BIT is being used to study the phenomenon of *unio* mystica, a joyous sense of union with God.[25]

- It is possible that use of BIT's would have been useful in determining Terry Shiavo's condition.[26]

Future uses might include:

- Using BIT, it might be possible one day to conduct brain scans of people waiting to enter the country without even asking them, in order to screen for terrorist.[27]

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[23] This research was begun at Emory University's Brighthouse Institute for Thought Sciences. (Not surprising there has been a large amount of outburst concerning these experiments and several consumer advocacy groups have called for a halt to these experiments on the grounds they violate federal testing on human's guidelines. *See*, http://www.commercialalert.org/issues/culture/neuromarketing (last visited April 10, 2005).

[24] *See* Terrence Chorvat, Kevin McCabe and Vernon Smith, *Law and Neuroeconomics*, 13 S.Ct.Econ.Rev. 35 (2005).

[25] Illes and Racine *supra* note 8 at 9.

[26] Joseph Fins, *The Orwellian Threat to Emerging Neurodiagnostic Technologies*, 5 Amer. J. of Bioethics, 56, (2005). (noting that it was unlikely, however they were beset with requests).

[27]See, www.brainwavescience.com/counterterrorism (last visited April 10, 2006). For a contrasting point of view about the possibility of accomplishing this, *See* Kathinka Evers, *Neuroethics: A Philosophical Challenge*, 5 Amer. J. of Bioethics 33, 34 (2005). (Noting that while it may be possible to screen for angry people, the most deadly kind of terrorist would be the one that showed no emotion at all and killed in cold bold): See Wolpe, et. al. *supra* note 13. (Noting that in the United States, defense agencies have begun significant funding of these technologies).

- There has been discussion of using BIT's to interrogate suspects for terrorist related information at Guantanamo Bay.[28]

- It might be possible to use BIT to both predict the likelihood that someone may be a sexually violent predator and also to determine whether or not that person has been effectively treated.[29]

Even considering all of those uses, the most controversial and widespread application of this technology will be its use as a deceit detection device.

The Beginning of Brain Imagining Technology Use in the Courtroom

In *Ake v. Okalhoma,* the Supreme Court ruled that when the issue of insanity is raised there is a due process requirement for states to provided psychiatric assistance to determine the validity of the claim.[30] Since then BIT's have been used in courts as evidence of brain abnormalities supporting insanity pleas. The most notable of these cases is the use of BIT to support John Hinckley's insanity defense.[31] However, the use of BIT's as a deceit detection tool have only recently become an issue for the courts.

Brain Imaging Technology for Deceit Detection

[28] *See* Sean Thompson, *The Legality of the Use of Psychiatric Neuroimaging in Intelligence Interrogation*, 90 Cornell L. Rev. 1601 (2005).
[29] Committee, *supra* note 2 at 417.
[30] *Ake v. Oklahoma*, 470 U.S. 68, 77 (1985).
[31] Kulynych, *supra* note 19 at 1252.

The first widely used deceit detection device was the polygraph machine. The polygraph is an instrument that measures several bodily responses of a subject answering questions and compares them to other answers the subject has given that were obviously true to see if there was an increase in bodily responses indicating aroused responses indicative of lying.[32] This technology thus does not really detect whether someone is lying because it does not measure any mental states, but rather tests other autonomic nervous system responses. As a consequence, these tests are beatable by employing countermeasures.[33]

Due to lack of accuracy of these devices, their use in the courtroom has almost unconditionally been barred.[34] Supporting this exclusion is a fundamental premise of our criminal jury system that "the jury is the lie detector"[35]

The next stage in the evolution of lie detection was the use of EEG machines. Using sophisticated algorithms at least one researcher has claimed to be able to detect lies by measuring EEG activity in the brain. Dr. Lawrence Farwell used basic research funds from the CIA to develop an algorithm that measures EEG results for a P300 wave which he claims in indicative of lying.[36] This method of measuring EEG results for lie detection is commonly called "brain fingerprinting"[37]

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[32] Keckler, *supra* note 12 at 512l
[33] Wolpe, et. al. supra note 13 at 40. (noting that currently evidence suggest that brain fingerprinting and fMRI deceit detectors can be beaten just as easily).
[34] Keckler, supra note 12 at 512.
[35] *United States* v. *Barnard*, 490 F.2d 907, 912 (CA9 1973) (emphasis added), cert. denied, 416 U.S. 959, (1974).
[36] Keckler , *supra* note 12 at 521; See Wolpe, et. al. *supra* note 13 at 41. (Noting the Farwell has claimed 100 percent accuracy). For more information See *infra* note 38.
[37] *See* note 36 and 38.

Dr. Farwell received national media attention after an Iowa court admitted brain fingerprinting as competent evidence in 2001.[38] However, the appellant court reversed the conviction on different grounds without even mentioning the brain fingerprinting evidence.[39] Since then Dr. Farwell has patented his method and gone private, preventing scientific review.[40] Further, there have been no further uses of this technology in the courts.[41]

Modern Brain Imaging Technologies as Deceit Detectors

There have recently been a number of studies using fMRI's for deceit detection.[42] These studies proceed on the assumption that there is some form of cognitive conflict in telling a lie as opposed to the truth and that there is some cognitive function which must suppress the truth and these activities can be measured.[43] Some of these tests have claimed 90% or greater accuracy in detecting deceitful behavior.[44]

The main difficulty that these tests seem to present is that different people lie differently and when people lie about different things different areas of the brain are activated in different people.[45] These problems represent an external validity problem. In

[38] Brain Fingerprinting Laboratories website, www.brainwavescience.com (last visited May 8, 2006) (claiming that the use of brain fingerprinting showed defendants alibi to be true)
[39] *Harrington v. Iowa*, 659 N.W.2d 509 (Iowa 2003).
[40] Keckler, *supra* note 12 at 522. (There was also an additional unsuccessful attempt by Dr. Farwell to introduce his method in Iowa, *Slaugheter v. State*, 105 P.3d 832, 834 (Okla. Crim. App. 2005) (Court found that there was not sufficient evidence that Brain Fingerprinting was an accepted science).
[41] Wolpe, et. al *supra* note 13 at 43.
[42] *See* Keckler, *supra* note 12 at 527-534.
[43] Keckler at 535
[44] *Id*; *See*, Paul Wolpe, et. al. *supr*a note 13 at 42 (Noting that these successes are at best highly controlled simple experiments and there is a concern of External Validity in applying them to real world situations).
[45] *Id.*

addition, there is also a internal validity concern that some people may lie differently about the same question when asked twice.[46]

PART III.

Implications of Brain Imaging Technology for the Legal Profession

There are profound implications for the use of BIT's as deceit detection devices in the legal field. For example, one of the most controversial implications would be the use of accurate deceit detection devices to determine whether or not a criminal defendant committed the crime. This would save courts immeasurable resources as well as ensuring that the guilty are punished and the innocent go free. However, before even determining whether or not this is a real possibility it is worthwhile to determine whether or not the use of BIT's in the courtroom would be constitutional.

The First Amendment to the Constitution of the United States protects the freedom of speech.[47] The Supreme Court has said that freedom of thought is covered by the first amendment.[48] In *Palko v. Connecticut,* Justice Benjamin Cardoza said, "freedom of thought…is the matrix, the indispensable condition, of nearly every other form of

[46] *Id.*
[47] U.S. Const. amend. I.
[48] *Lawrence v. Texas*, 539 U.S. 558 (2003). ("Liberty presumes an autonomy of self that includes freedom of thought, belief, expression, and certain intimate conduct.")

freedom. With rare aberrations a pervasive recognition of that truth can be traced in our history, political and legal."[49]

However the first amendment is not absolute. For example, when in court there is no right to lie on the witness stand.[50] Additionally, limitations on the first amendment include shouting fire in a crowded movie theater, inciting a riot, verbal abuse, and many others.

What usually leads to these limitations is a balancing between the good of society and the individual's freedoms. This is relevant because the potential for accurate deceit detection could provide a great benefit to society in exchange for some personal liberty.

The Fourth Amendment protects against unreasonable searches and seizures performed by government agents.[51] In *Katz v United States,* the Supreme Court held that it was a search requiring a warrant when there was a subjective expectation of privacy and the privacy was one that society was willing to accept.[52] It would seem clear that privacy in one's thoughts is an expectation of privacy that society is willing to accept, so it seems clear that the use of BIT's would be a search.

The Supreme Court ruling in *Kyllo v. United States* is also illuminating on this issue. *Kyllo* involved a high tech infrared device that was used to detect heat inside someone's home. The Supreme Court, in a 5-4 decision, held that it was a search where the device which was not in common use and was used to gain otherwise unknowable information.[53] One of the key facts in that case was that there was no physical intrusion into the sphere of privacy. This is relevant because brain fingerprinting does not actually

[49] *Palko v. Connecticut*, 302 U.S. 319 fn.4 (1937).
[50] *Nix v. Whiteside*, 475 U.S. 157, 173 (1986).
[51] U.S. Const. amend. IV.
[52] *Katz v. United States*, 389 U.S. 347 (1967).
[53] *Kyllo v. United States,* 533 U.S. 27 (2001).

intrude but measures the electricity coming off of the skull and future imaging devices may be remote.[54]

The Fifth Amendment protects against self incrimination in criminal trials.[55] There seems to be little controversy that this right would protect against submitting a defendant in a criminal case to BIT's to detect deceit. However, the Fifth Amendment does not apply to civil trials and witnesses.[56]

Ethical Implications of Brain Imaging Technology Use

The use of BIT raises a whole host of important ethical considerations. While it is unlikely that any ethical questions will be answered definitively in the near future, it is important to frame these questions. These ethical considerations range from philosophical in nature to everyday practicality.

Philosophically, there is an important issue concerning the interpretation of the BIT data and how it relates to concepts such as free will and responsibility.[57] These concepts provide a basic framework for BIT interpretation yet are notoriously difficult to define. For example, issues such as free will and responsibility have plagued philosophers for centuries. Since BIT mostly proceeds on the assumption that mental states are brain states, it is important to consider how this reductionism approach will square up with other moral or religious philosophies?[58]

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[54] Richard G. Boire, *Searching the Brain: The Fourth Amendment Implications of Brain Based Deception Detection Devices*, 5 Amer. J of Bioethics. 62 (2005).
[55] U.S. Const. amend. V.
[56] *Id.*
[57] Illes and Racine, supra note 8 at 14.
[58] *Id.*

In addition to tradition philosophical concerns, there are a whole host of bioethics issues that BIT implicates. Confidentiality is an issue with some BIT research because people may not want the results of there brain scans shared with others without their permission.[59]

There is an issue concerning incidental findings.[60] In which hypothetically someone is having a brain scan performed for research purposes and the research finds a tumor. Is there a duty to inform the research subject? Does the research subject have a right to know or to not know?

There are also a concerns relating to informed consent. There are a number of minor physical risks that can result from fMRI and other BIT's.[61] While these risks are quite minimal, bioethics has questioned the point where it is necessary to inform the patient.

In additional there are some fascinating ethical questions about whether there is some neuro-imagining research that should not be done?[62] For example, studies examining differences in the races or economic status and how they correlate with such factors such as overall intelligence or creativity. Additionally, there is a concern about whether it possible that some forms will lead to thought control or unduly effective advertising? However the greatest ethical concern in this field is that having to due with privacy.

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[59] *Id.* at 12 (noting that some federal research requires the sharing of BIT data with others.)
[60] *Id*. at 12 (for example finding evidence of a tumor while conducting research. Is there a burden to disclose?)
[61] *See* Jocelyn Downie and Michael Hadskis, *Finding the Right Compass for Issue-Mapping in Neuroimaging*, Amer. J. of Bioethics, 27, 28 (2005).
[62] Illes and Racine, *supra* note 8 at 14.

Privacy and Brain Imaging Technology

The central question concerning the privacy implications relating to BIT is; does a person have a fundamental right to keep his or her subjective thoughts private? A good place to begin a discussion of this issue is with genetics. Genetic privacy is the term given to the concern that information obtained from a persons DNA can be used to determine confidential information about that person, such as health conditions and physical capabilities and traits.[63] This concern has lead to a number of important privacy protections for DNA.[64]

However, the link between the human brain and identity is far greater than that between genetics and personal identity.[65] Further it can be argued that our cognitive ability has a much greater affect on human life than genetic makeup.[66]

The concern in the privacy of neuro-ethics is that others should not be able to read our thoughts without our permission.[67] This is because of the popular belief that "our thoughts, our reasoning, our motivations, our attitudes, beliefs, and values are our selves and our personal identity"[68]

The Right to Deception

While it may be relatively uncontroversial to protect the privacy of one's thoughts, the issue becomes murkier when we consider whether there should be privacy

[63] Lynette Reid and Francoise Baylis*, Brains, Genes, and the Making of the Self*, 5 Amer. J. of Bioethics 21 (2005); *See* Hubert Doucet*, Imagining a Neuroethics Which Would go Further Than Genetics*, 5 Amer. J. of Bioethics, 29 (2005).
[64] For example the UN passed resolutions protecting genetic privacy in 2001.
[65] Illes and Racine*, supra* note 8 at 14.
[66] Reid and Baylis, *supra* note 63 at 21.
[67] *Id.*
[68] *Id.*

in one's deceitful or hateful thoughts. There are important ethical considerations on both sides of that question.

One argument against a right to deception stems from the societal harm caused by deceit. There is no question that society is harmed when murders and rapist are allowed to 'lie their way to freedom' or even more destructive, when terrorist are allowed to lie their way unto planes.

Additionally, moral commandments against lying are found throughout moral and religious traditions. For example, one of the Ten Commandments in the Christian Bible is that 'they shall not lie'. It can also be argued that lying has a detrimental effect on personal relationship and families.

On the other side of the argument, there are some lies that can be morally justified, such as; lying to protect another, lying out of politeness to protect someone's feelings, lying to beat a corrupt system.[69] For example, consider this hypothetical;

A nuclear scientist intends to deceive his country and sell top secret information concerning the exact scope and workings of his countries nuclear program and arsenal.

In the United States this person would be considered a spy and subjected to the worst punishments available. But here's the kicker, what if this scientist is in Iran and his spying tips the United States off about a potential nuclear strike. The point being that deceit sometimes serves very useful purposes.

Regardless of the practical benefits that sometimes derive from deceit, there is and should be a fundamental desire to keep the contents of one's mind free from invasion

[69] Ruth Fschbach and Gerald Fishbach, *The Brain Doesn't Lie*, 5 Amer. J. of Bioethics. 54, 55 (2005).

by others.[70] It is not sufficient that others have a legitimate reason to want to invade your liberty. As Benjamin Franklin famously said, "Those that would exchange liberty for security deserve neither"

Conclusion

True to what Aldous Huxley said in the opening quote of this paper, it is important to examine the ethical implications of new technology prior to the time that they overwhelm us. It appears that the use of BIT for deceit detection is still in its infancy. However, the potential application of this technology warrants careful ethical consideration. At this time it appears wise to let the technology develop without restriction while keeping a close eye on how it is used and tested.

[70] There is a small group of people already advocating for cognitive liberty, or the freedom to keep one's thoughts private. See http://www.cognitiveliberty.org/ (last visited April 10, 2006).