# The Future of the Courtroom According to *The Future of the Mind*

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Within *The Future of the Mind,* Michio Kaku discusses several fields that are currently advancing and will continue to advance as a result of neuroscience. Of these fields, there are three which can significantly increase the efficiency of the courtroom: telepathy, cognitive enhancers, and robotics; however, these neurological advancements have the potential to undermine the court system, and in the case of robotics, potentially replace it.

The first field Kaku highlights is telepathy. Through several techniques, scientists are now able to get a glimpse of what is going on inside our heads. Using Magnetic Resonance Imaging (MRI) technology, Dr. Jack Gallant of the University of California, Berkeley can construct a computer model that can understand and record a human's visual experience. The computer model is currently at the stage where a participant thinks of the *Mona Lisa* and the computer can generate an image of Selma Hayek (Kaku, 2014, p. 65). Similarly, researchers at the University of Utah have developed a computer program with the ability to identify ten command words thought by volunteers (Kaku, 2014, p. 67). Though all current neurological advances in telepathy are at their primitive stages, they are already being used in court. In *Roper v. Simmons* (2005) the Supreme Court ruled that it is unconstitutional to execute minors. This decision is influenced by several lines of evidence, including MRI technology, which describes describe the adolescent brain as being different and underdeveloped in comparison to the adult brain, especially in areas concerning judgement (Gazzaniga, 2011). Further use of brain imaging in the court has the potential to provide more humane treatment to criminals. For example, established research into what the brain of a psychopath might look like can confine the psychopath to a medical facility instead of the standard form of incarceration. In the future, as telepathic technology develops further, it might be possible to communicate not only direct images and entire conversations with the mind, but experiences that include the full range of emotions and qualia are perceiving. Such an advance in telepathy might enable the courtroom to decide the guilt or innocence of a defendant more accurately. to more accurately decide the guilt or innocence of a defendant.

A future with telepathy will also likely include more problems with privacy, however. The ability to transmit our thoughts over radio waves or electrical signals could create the possibility of other individuals peeping into our thoughts without our consent. It would be tempting to peep into the thoughts of those taking a stand in a courtroom, as this might be the only way to ensure truthfulness. Given that it is illegal to record a person without their consent, it should also be illegal to record the thought processes of others without their consent. Furthermore, per Gazzaniga (2011) "People, not brains, commit crimes;" Kaku further elaborates on this idea when he writes "we sometimes imagine scenarios that wade into immoral or illegal territory, but whether we act on these plans, we prefer to keep them private" (Kaku, 2014, p. 75). Using telepathy in a court might confuse a judge or a jury into believing that thought is equivalent to a crime; if this were the case, then a majority, if not all the population, would be considered guilty of committing several crimes.

Advancements in memory research have also provided insights into potential cognitive enhancers. Scientists have found, through experiments with mice, that, by creating a strain of mice that have more of the NR2B gene, they can create a strain of mice with superior memories (Kaku, 2014, p. 117). They have also found that an extra CREB activator gene makes it easier for fruit flies to learn a task while flies with an extra CREB repressor gene could not form lasting memories (Kaku, 2014, p. 119). If these cognitive advancements can be applied to humans in the form of medication or genetic modification, then "the rote memorization necessary to become a professional doctor, lawyer, or scientist could also be drastically reduced through this method" (Kaku, 2014, p. 125). The public benefit of cognitively advancing an entire civilization is also beneficial, as this civilization would be able to make more informed and intelligent decisions when it comes to electing public officials and voting as part of a jury.

Propranolol, a beta blocker, and a protein kinase called Mzeta, have been linked to the erasing of memories. While this is comforting news for people living with post-traumatic disorder(PTSD), it has also stimulated debate among ethicists who believe that all memories serve a purpose, and that learning from painful experiences can make us better people (Kaku, 2014, p. 123). Dr. Roger Pitman of Harvard University, however, compares depriving PTSD victims from memory erasing medication to depriving victims of accidents from morphine: "should we deprive them of morphine because we think we are taking away the full emotional experience?" In the same vein, scientists at Wake Forest University and the University of Southern California have successfully recorded and implanted memories into mice. This new technology opens the door to recording and implanting memories into those who have dysfunctions in memory (Kaku, 2014, p. 108). Criminals, however, have the potential to exploit this new technology by implanting fake memories into innocent people and eyewitnesses, as well as making individuals incapable of trusting legal documents (Kaku, 2014, p. 128). Though there are many beneficial applications of current and future memory research, limits and regulations need to be discussed by scientists, ethicists, and lawmakers alike to make sure we can receive all the benefits of the advances in memory research without any of the potential ramifications.

Robots, which are capable of having the memories of computers, might reduce the need for cognitive enhancers. Kaku (2014) hypothesizes that "eventually we might have robot lawyers that can answer all common legal questions" (p. 215). He counters, however, that we "would still need to see a real doctor, lawyer, etc., but for common everyday advice, these programs would suffice" (p.215). Scientists from the University College London and the University of Sheffield have already created an AI computer capable of predicting the judicial verdicts of the European Court of Human Rights with a 79% accuracy (Aletras, N., Tsarapatsanis, D., Preoţiuc-Pietro, D., & Lampos, V.,2016). Because there are not many universally agreed upon laws in the arena of International Human Rights, this feat is especially impressive given that the computer can predict verdicts based mostly on physical evidence and moral considerations as opposed to legal evidence. If AI technology continues to improve in the future, robots might be able to replace lawyers and judges in the courtroom.

Perhaps, however, robots will never be fully capable of replacing lawyers and judges. When interviewed by the American Bar Association, Fred Rivera of Perkins Coie LLP says that "'large law firm clients frequently demand more than just legal services—they also demand trusted counselors and business advisers.' "(2016) Kaku (2014) supports Rivera's statement with his introduction of the Caveman Principle: "given a choice between high-tech or high-touch, we opt for high-touch every time" (p. 276). He writes that the "paperless office" and the "people-less city" predicted with the rise of computers did not come about because of this principle. He argues that perhaps we need "proof of the kill" which, currently, are physical documents and human contact (Kaku, 2014, p. 276). Robot-lawyers could never fully replace the tangibility and trustworthiness we need from the court of law.

The future applications of research in telepathy, memory, and robotics have both beneficial and dangerous potentials, and could potentially change the operation of the courtroom. Perhaps the best way for the court to evolve as neuroscience technology increases is to follow Dr. Brooks advice on avoiding a robot revolution: it is in our best interest to coexist with new technology by merging with it (Kaku p. 249). Judge Herbert Dixon of the District of Columbia Superior Court could successfully create courtrooms that have merged with technology within his 30 years as judge (Carter, 2017). The advances are small, but he has succeeded in adopting electronic filing and using flat screen displays to make evidence easier to look at. The best way to keep up with the courtroom of the future and to ensure that humans are still working in them is to use the new advances to our advantage. Instead of memorizing laws in law school that robots have already learned, we can spend more time developing skills that are more difficult to learn to be more effective lawyers. Furthermore, a new role for law might be to determine the regulations of neuroscience. The Atomic Bomb, because it is tightly regulated by a huge government program, has not decimated humanity, though it has the power to do so. (Kaku, p.318). Kaku writes that "Social systems—in the form of governments, the courts…shape, moderate, and redirect the raw power of technologies" (Kaku, p.322) and "with enough warning, we can take a variety of countermeasures" (Kaku, p. 319).

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