

Do I contradict myself?
Very well then I contradict myself,
(I am large, I contain multitudes.)

Walt Whitman, Song of Myself
[<http://www.daypoems.net/plainpoems/1900.html>]

Intellectual property for the Neurocentric Age: Towards a neuropolitics of IP
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Intellectual Property law exerts a powerful influence over how people access, develop, and share expressions and inventions. However, recent advances in the brain sciences are calling into question many of the foundational assumptions upon which intellectual property law has been built, how it is practiced now, and how it might evolve in the future. The new disciplines of the brain and mind suggest that a fundamentally different type of relationship can exist between the individual, law, culture and power. Better understanding of the ways the mind works (and doesn't work) challenges notions of individual authorship, and the act of creation itself as emanating from the individual mind. Furthermore, the interaction of the brain within digital networks challenges existing concepts like tangibility in copyright and the likelihood of confusion in trademark law. Taken together, emerging insights from the brain sciences and the shifting dynamics of IP law point to a need for a new analytical framework—a neuropolitics of IP law.

In this paper we sketch out the concept of neuropolitics as it relates to creativity and innovation and in the process challenge the boundaries imposed by the law on creativity. A neuropolitics of IP law allows us to think about the changing contexts in which we structure intellectual property laws and how we ought to begin to think about structuring future intellectual property laws.

This future-oriented lens is critical if we are to address coming technological, scientific, political, and cultural challenges. While the contours of these changes are hard to see in sharp focus, and there are no "future facts," we can improve our understanding and prepare for a range of possible directions for change. It is better to be challenged by possibilities, even provocative ones, than blindsided by change when it is too late to act effectively. The dynamics, agents, and influences on how neuroscience develops in the coming decades, and its impact on law are difficult to explain with precision, but we can make sense of the broad outlines of change, and if we experience even a fraction of what is possible, then the effects on law and society would be significant.

If law can evolve to better reflect the underlying human condition, then bringing brain science research into conversation with intellectual property scholars is an important step towards an intellectual property law appropriate for the neurocentric age. This paper is intended primarily as a sketch of the legal challenges ahead as we come to understand

more about creativity and its location in the brain, as networks further blur the boundaries between individual actors, and as our ancient pre-digital property assumptions are challenged. It is also an invitation to other scholars to focus their attention on alternative futures ahead, and to prepare for potential technological and legal changes on the horizon.

What is the neurocentric age?

The brain sciences and their many applications have ushered in what science writer Carl Zimmer has called the neurocentric age.¹ This is a time when knowledge, identity, law, culture, and relationships are situated within and re-defined by a deeper understanding the brain, the way it functions, and how it can be altered and enhanced.² The neurocentric age is a way to describe the profound impacts the brain sciences are having on how we think about ourselves, our society, and the institutions we've created to manage civilization.

Neuroscience links most aspects of human subjectivity and sociability in neurobiology.³ Through the use of brain scanning technologies such as the fMRI (functional magnetic resonance imaging), which measures and highlights the sections of the brain engaged in the activity under study, scientists seek to explain human cognition and behavior. While we ought to consider the data from such experiments critically, this data is now used to make important claims about human cognition and social behavior.⁴ In fact, the popular and scientific literature are replete with claims about the explanatory power of brain imaging for understanding human behavior.⁵ Instead of seeing a person, what is studied is the electrical and chemical activity of the human brain.⁶

In the not too distant future neurochemical profiling will be possible, the ability to better predict motivations and actions based upon an assessment of a person's brain.⁷ Brain-based lie detectors are already in operation and the results have been admitted into American courts.⁸ Brain imaging has determined what specific parts of the brain are involved when problem solving is done with insight compared to when problems are solved using other strategies such as mathematical modeling.⁹ The implications for how

¹ Carl Zimmer, *Soul Made Flesh: The Discovery of the Brain-- and How It Changed the World* (New York: Free Press, 2004).

² Dunagan, "Politics for the Neurocentric Age."

³ Jake Dunagan, "Politics for the Neurocentric Age," *Journal of Futures Studies* 15, no. 2 (November 2010): 54–55; Nikolas Rose, "The Human Sciences in a Biological Age," *ICS Occasional Paper Se 3*, no. 1 (February 2012): 10.

⁴ Rose, "The Human Sciences in a Biological Age," 11.

⁵ Deena Skolnick Weisberg et al., "The Seductive Allure of Neuroscience Explanations," *Journal of Cognitive Neuroscience* 20, no. 3 (November 18, 2008): 470–77, doi:10.1162/jocn.2008.20040.

⁶ Steven Johnson, *Mind Wide Open: Your Brain and the Neuroscience of Everyday Life* (New York: Scribner, 2004), 4–5.

⁷ *Ibid.*, 155.

⁸ Martha J. Farah et al., "Functional MRI-Based Lie Detection: Scientific and Societal Challenges," *Nature Reviews Neuroscience* 15, no. 2 (February 2014): 123–31, doi:10.1038/nrn3665.

⁹ Edward M. Bowden et al., "New Approaches to Demystifying Insight," *TRENDS in Cognitive Sciences* 9, no. 7 (July 2005): 322–28, doi:0.1016/j.tics.2005.05.012.

we might educate with an understanding of different levels of brain cognition are already being discussed.¹⁰ There is also a growing literature on the legal applications of brain science for better understanding criminality and violence.¹¹ Where there are gaps in social scientific explanations, many are now going straight to the brain itself to explain human behavior.

From the point of view of the neuroscientist, brain chemistry is an essential aspect in understanding human cognition and behavior. To that end, as scientists develop more sophisticated methods of researching the brain, it is human genetic nature, not the environment that can be most easily altered to produce different behavioral results.¹² As neuroscientists Haier and Jung explain,

In the 21st century, we are beginning to have innovative techniques to alter the neurobiology of the brain; these include new drugs and targeted delivery into specific brain areas, electrical stimulation of deep brain structures with implanted electrodes, genetic engineering, and even surgical interventions including tissue transplantation in the brain.¹³

We can now understand how to alter brain chemistry to address human behavioral issues.

It is important to point out that despite the decades of research that have already been done and despite increased funding for future research, the central feature of the neurocentric age is not necessarily the *truth* of the experimental results, but rather the way the existence of these explanatory models are now shaping public policy and our understanding of what it means to be human.

For example, neuroscientists are still unclear on what is the actual role of the unconscious in decision-making. Some scholars argue that it is possible to demonstrate that human consciousness is not an a priori position but instead intervenes as a method of interpreting the massive data flows brought to the brain each second.¹⁴ Such a perspective has radical implications for everything from free will to everyday decision-making. However, a recent survey of the last twenty years of scholarship on the role of the conscious versus

¹⁰ Richard J. Haier and Rex E. Jung, "Brain Imaging Studies of Intelligence and Creativity: What Is the Picture for Education?," *Roeper Review* 30, no. 3 (2008): 171–80, doi:10.1080/02783190802199347.

¹¹ Owen D. Jones et al., *Brain Imaging for Legal Thinkers: A Guide for the Perplexed*, SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, December 20, 2009), <http://papers.ssrn.com/abstract=1563612>; Peter Becker, "The Coming of a Neurocentric Age? Neurosciences and the New Biology of Violence: A Historian's Comment," *Medicina & Storia X* (2010): 101–28.

¹² Becker cites to research on anti-social behavior and the combination of genetic predispositions and environmental factors that contribute to such behavior. The larger question can then be asked – is it possible to tweak the genetic aspects contributing to such behavior? Becker, "The Coming of a Neurocentric Age? Neurosciences and the New Biology of Violence: A Historian's Comment," 114.

¹³ Haier and Jung, "Brain Imaging Studies of Intelligence and Creativity," 172.

¹⁴ Andy Clark and David J. Chalmers, "The Extended Mind," *Analysis* 58 (1998): 10–23; David Eagleman, *Incognito: The Secret Lives of the Brain* (Edinburgh: Canongate, 2012); Johnson, *Mind Wide Open*; Tor Nørretranders, *The User Illusion: Cutting Consciousness down to Size* (New York: Viking Penguin, 1998), 288.

unconscious mind suggests that the literature cannot conclusively prove that the unconscious is relevant to decision making at all.¹⁵ However, while a systematic survey of the methodologies of the studies involved can help critique and undermine the individual conclusions of each, the larger public assessment of how any particular neuroscientific study is appropriated and used to justify new policy suggests that we are have already pivoted to a neurocentric explanatory model for human behavior.

Given the complexity of research, it isn't simply a neurocentric model that is relevant, but a neuropolitical model is required. The role of neuropolitics is "to re-conceptualize these functions in terms of their political effects and to explore the worlds that emerge out of brain-body-culture interactions."¹⁶ In this light, a neuropolitics (or a neurosociology) must bring a broader understanding of historical complexity to the use of brain science. Brain science can both provide new insights into human cognition and behavior but also must be contextualized critically. For example, Rose argues that the scholarship on the adolescent brain, which claims the lack of cognitive development should offset legal responsibility, must be critically examined. After all, the concept of adolescence itself is relatively modern and any discussion of the adolescent brain needs to be aware of the nature of the social construct of adolescence.¹⁷ Thus, a neuropolitics should help us re-examine and think through the complexity of brain research for politics and policy. It should help clarify that there are political and social ramifications for the study of the brain.

The neurocentric age brings with it the opportunity, and the responsibility, to examine some of our widespread assumptions about the autonomy of the individual. But while the neurocentric age implies a magnetic force of attention around gray matter, a broader view of mind is also critical to understanding the shifts ahead in all its complexity. Neurocentric also means brain-extending.

As Dunagan puts it, "part of being human is the ability to "offload" and recombine cognitive processes with technology and the environment—allowing the mind to have access to a much greater repository of personal and civilizational memory, and to take-on more complex puzzles and abstractions than would be possible if everything was kept in the head."¹⁸ As one recent brain expert has suggested, as we become more socialized and domesticated, our brains have gotten smaller – in other words as we extend our individual minds beyond ourselves, we rely more heavily upon a network of people and technologies.¹⁹ Thus, we need to more clearly understand what the concept of the extended mind means in the context of an emerging neuropolitics.

Developing the concept of the extended mind.

¹⁵ Ben R. Newell and David R. Shanks, "Unconscious Influences on Decision Making: A Critical Review," *Behavioral and Brain Sciences* 37, no. 01 (2014): 1–19, doi:10.1017/S0140525X12003214.

¹⁶ Dunagan, "Politics for the Neurocentric Age," 56.

¹⁷ Rose, "The Human Sciences in a Biological Age," 14.

¹⁸ Dunagan, "Politics for the Neurocentric Age," 57.

¹⁹ Bruce Hood, *The Domesticated Brain: A Pelican Introduction* (Penguin Books Ltd, 2014).

Understanding the individual as autonomous, separate and distinctly unique is a stalwart of Western political and social identity.²⁰ Yet, there have been compelling interventions to challenge the central location of the individual from a variety of fields. Groundbreaking work by feminists challenged the notion of the autonomous individual,²¹ and the individual is de-centered in Confucian and Buddhist philosophy.²² The philosophical efforts of Foucault to situate the self within regimes of power, social structures and biopolitics have opened up new possibilities for understanding identity.²³ Of course the communitarian anarchists have long argued for concepts such as mutual aid, collaborative democracy and the need to situate the individual subject within the larger social whole.²⁴ The field of cybernetics also introduces an avenue to bypass the dualism of mind/human and world/object. As Andrew Pickering notes, cybernetics is a non-dualist approach to the world where the divide between humans and the outside world is replaced with the adaptable mind and the cyborg.²⁵ Cross-cultural comparisons suggest that in fact the United States is an outlier in terms of its affinity for the autonomous individual and Americans are culturally the most self-aggrandizing and egotistical on the planet.²⁶ Thus, much of what we know and/or generalize about human behavior, because it is based upon research done on Americans (and more specifically American college students), should not necessarily be generalized as “truth” for explaining decisions made by people in virtually any other place on the globe.²⁷

Despite these numerous challenges, the Western and modern concept of the individual as an autonomous and discrete, rational subject has prevailed and retains the status of the “natural” state of human ontology. The ideology of the Chicago and earlier Austrian school of economics is premised upon assumptions about human behavior based exclusively in the autonomous and rational individual.²⁸ Americans, especially, have erected a social Darwinian scaffolding around a belief in the individual as the primary agent of action, to the point that social structures are virtually invisible in the ongoing

²⁰ Pickering refers to this approach as the “modernist” approach and argues that the birth of cybernetic took up a distinctly non-modern understanding of the brain. See: Andrew Pickering, *The Cybernetic Brain: Sketches of Another Future* (Chicago and London: University Of Chicago Press, 2010).

²¹ Carol Gilligan, *In a Different Voice* (Boston: Harvard University Press, 1982); Sara Ruddick, *Maternal Thinking: Toward a Politics of Peace* (Boston: Beacon Press, 1995).

²² Bregham Dalglish, “Perspectives from Japan on Privacy and the Supervised Society,” in *Cahier de Prospective: The Futures of Privacy*, ed. Carine Dartiguepeyrou (France: Foundation Telecom, Institut Mines-Telecom, 2014), 34–35, <http://cvpip.wp.mines-telecom.fr/files/2014/02/14-02-The-futur-of-privacy-cahier-de-prospective.pdf#page=16>.

²³ Michel Foucault, *Security, Territory, Population: Lectures at the Collège de France, 1977-78* (Basingstoke; New York: Palgrave Macmillan; République Française, 2007).

²⁴ Peter Kropotkin, *Mutual Aid: A Factor of Evolution* (London: Freedom Press, 1998); Mikhail Bakunin, *The Paris Commune and the Idea of the State* ([London]: CIRA, 1971); Richard J. F Day, *Gramsci Is Dead: Anarchist Currents in the Newest Social Movements* (London: Pluto Press, 2005).

²⁵ Pickering, *The Cybernetic Brain: Sketches of Another Future*, 18–19.

²⁶ Ethan Watters, “Why Americans Are the Weirdest People in the World,” *Pacific Standard*, February 25, 2013, <http://www.psmag.com/magazines/magazine-feature-story-magazines/joe-henrich-weird-ultimatum-game-shaking-up-psychology-economics-53135/>.

²⁷ Ibid.

²⁸ Friedrich A. Von Hayek, *The Road to Serfdom: With the Intellectuals and Socialism* (Institute of Economic Affairs, 2005); Milton Friedman, *Capitalism and Freedom: Fortieth Anniversary Edition*, 40 Anv edition (University of Chicago Press, 2009).

public debates on race, gender, crime, or poverty. Generations of philosophy, science, and religion may have failed to alter many of our most basic edifices of human identity and behaviors, or at the very least made relatively little mainstream social impact. It is our view that emerging brain science and deeper integration of mind and machine might prove a tipping point for a transformation of our understanding of what it means to be an individual and how we organize and manage our world.

The claim has been made that our minds function more like an orchestra than a soloist.²⁹ One of the roles our conscious mind plays is to construct a unitary narrative about identity from the massive amounts of information brought to the brain each second.³⁰ While the complexity of each individual brain suggests that we can see brains as unique, much like fingerprints,³¹ the notion of a singular “I” is decentered by our understanding of both the brain itself and the relationship of individual brains with the larger world.³²

Beyond the fact that the individual brain has no clear center, the philosophical concept of an extended ecology of mind, initially suggested by Gregory Bateson, and further developed by philosophers David Chalmers and Andy Clark, and others, posits that we have for some time now adapted technological extensions for the mind that undermine the location of cognition in the individual brain.³³ While the prevailing imagery for such a technologically driven future is that we all become cyborgs in the fully integrated sense, Chalmers and Clark suggest that in fact, technology (even that which is not integrated into the brain directly) has already begun taking over for the functions of the brain.³⁴ Smart phones, tablets, GPS systems, libraries, and much more have allowed us to store and retrieve data not in our individual brains, but in the devices that we carry with us in everyday life.

In the process of relying on external storage and of course social structures themselves, the human mind becomes part of a network and extended beyond the boundaries of the skull. The argument for the extended mind blurs the boundary of the skull by asserting its lack of relevance for cognition and creativity. As Katherine Hayles argues, the boundaries of the human subject are constructed, not given. Skin is often not the most relevant boundary.³⁵ The interaction across that boundary, as well as the ways we are already integrated into a network should be the relevant considerations to spark our interest.

²⁹ Johnson, *Mind Wide Open*, 6.

³⁰ Nørretranders, *The User Illusion*, 283.

³¹ Johnson, *Mind Wide Open*, 4.

³² Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago, Ill: University of Chicago Press, 1999), 6.

³³ *TEDxSydney - David Chalmers - The Extended Mind*, 2011, http://www.youtube.com/watch?v=ksasPjrYFTg&feature=youtube_gdata_player.

³⁴ Clark and Chalmers, “The Extended Mind”; *TEDxSydney - David Chalmers - The Extended Mind*.

³⁵ Hayles, *How We Became Posthuman*, 84.

Beyond the idea that we already use cognitive aids to extend our mind and connect to others creatively, lies the notion of augmented intelligence.³⁶ Sean Gourley, co-founder of the company Quid, used the example of augmented human/machine chess teams to demonstrate that a combination of human and machine was far more powerful and competitive than either human or machine alone.³⁷ Mirroring the words of Einstein, Gourley commented that machine augmentation of human intelligence, really seeking to use the machine to supply the hours of time necessary to become an expert, can allow humans to solve the problems we face today that simply cannot be solved by the individual consciousness alone.³⁸ To quote Einstein directly, “the problems that exist in the world today cannot be solved by the level of thinking that created them,”³⁹ and of course one way to “level up” is to more clearly understand the powers of the collaborative and extended mind.

Yet another layer of the extended mind can be found in the existence of the ever more integrated human brain into the network of technological enhancements that have been and are now being developed. The brain is itself understood as a layered network, and thus human individuality as already networked into a larger technological infrastructure. The extended mind thus follows the cyborg turn. Proxy servers, robots, sensors, AIs, and much more construct the distributed network into which what we understand as the contemporary brain can tap. The individual within this globally distributed network is already difficult to locate, and perhaps not entirely relevant. Bratton explains:

Some plural User subject that is conjoined by a proxy link or other means could be composed of different types of addressable subjects: two humans in different countries, or a human and a sensor, a sensor and a bot, a human and a robot and a sensor, a whatever and a whatever. In principle, any one of these subcomponents could not only be part of multiple conjoined positions, but might not even know or need to know which meta-User they contribute to, any more than the microbial biome in your gut needs to know your name. Spoofing with honeypot identities, between humans and nonhumans, is measured against the theoretical address space of IPv6 (roughly 1023 addresses per person) or some other massive universal addressing scheme. The abyssal quantity and range of ‘things’ that could, in principle, participate in these vast pluralities includes real and fictional addressable persons, objects, and locations, and even addressable mass-less relations between things, any of which could be a sub-User in this Internet of Haeccities.⁴⁰

The Internet of everyday things will only further integrate the world into a larger neural net of human-machine connectivity.

³⁶ *Big Data and the Rise of Augmented Intelligence: Sean Gourley at TEDxAuckland*, 2012, http://www.youtube.com/watch?v=mKZCa_ejbf&feature=youtu_gdata_player.

³⁷ Ibid.

³⁸ Ibid.

³⁹ “Albert Einstein Quotes,” accessed June 4, 2014,

http://thinkexist.com/quotation/the_problems_that_exist_in_the_world_today_cannot/10140.html.

⁴⁰ Benjamin Bratton, “The Black Stack,” *E-Flux Journal* 53 (March 2014): 7.

Yet additional layers of the extended mind can be inserted here. Technological extensions of human capacity can take many forms from pharmaceuticals to enhance cognitive power to human/computer neural networks and brain/computer interfaces. Scientists have now achieved some limited direct brain-to-brain communication and control,⁴¹ indicating that collaborative cognition is one possible future trajectory of the extended mind.⁴² What types of enhanced cognition pharmaceuticals/software should be/will be allowable remains to be seen. If we prohibit the use of chemical augmentation for competitive sports, what ought we do in terms of cognitive augmentation? At what point do we transcend human consciousness or physical ability? Conversely, at what point do we extend humanity to what we now call ‘artificial intelligences?’ These questions emerge from posing the notion of the extended mind.

This discussion of the extended mind and the location of the individual within larger neural and technological networks lay the groundwork for the remainder of the paper. The destabilization of the individual in terms of creativity and originality should be apparent from the trajectories described here. The stability of the original author is required for the law to function and for authorship to be allocated and assigned. Despite our growing understanding of social and collaborative innovation and the location of the individual within larger networks of creativity, Western law remains aligned with the imaginary of the bounded, autonomous individual. Such a legal fiction will have serious consequences for the continued emergence of innovation, creativity, ownership and control in the landscapes of future intellectual property laws and the technologies of the information age. Without a serious re-evaluation of the role of the individual within spheres of creativity and a more collaborative approach to authorship and ownership, within the law itself, the consequences could be significant.

What positioning our analysis in the neurocentric age makes clear is that creativity is both something that can be assessed at a far more granular level (the level of the brain itself) and it also can, and will, be assessed within the larger context of the extended mind. The relationship between the individual and the collective, long a challenge for IP law, is directly affected by our growing knowledge of the brain and its further integration into technologically driven networks. These emerging technologies create zones of transformative potential where we can construct thought experiments from the future. What has become clear from the ongoing and increasingly profound research into the brain and the continued evolution of our technological interfaces is that legal regimes will ultimately be impacted, either beneficially or negatively. Criminal law is already grappling with the implications of brain-related technologies and what they tell us about human culpability. We would like to be clear upfront that we understand the primary goal of modern intellectual property law is to provide an economic incentive for creation and a limited monopoly for the owners of intellectual property so that they are able to be

⁴¹ “Welcome to the Mind-Meld: Our Future of Brain-to-Brain Communication,” *Discover Magazine.com The Crux*, accessed May 14, 2014, <http://blogs.discovermagazine.com/crux/2013/10/25/mind-meld-future-of-brain-to-brain-communication/>.

⁴² For a science fiction possibly to turn science fact version of this technological possibility read the wonderfully written books by Ramez Naam who has also written about the possibilities from the technical perspective as well. See: Ramez Naam, *Nexus* (Angry Robot, 2012); Ramez Naam, *Crux* (Angry Robot, 2013); Ramez Naam, *More Than Human: Embracing the Promise of Biological Enhancement*, n.d.

rewarded economically for their creative work. However, much like the underlying assumptions of criminal law are now being challenged by the brain sciences and what they have to say about the autonomous individual, intellectual property law and its economic assumptions are also challenged by new understandings of how creativity and innovation function. Thus, the futures of intellectual property law can ignore the knowledge being generated about the collaborative nature of creativity and continue to make increasingly inaccurate claims about how individuals (or corporations) ought to own things. It might also be the case that multiple other possibilities become opened up once we understand creativity both at the level of the individual brain, but also that individual brain within the network of the extended mind.

We offer the following scenarios, some more fully developed than others, to highlight how the neurocentric age may begin to frame questions of originality, ownership, authorship, and much more. Our goal is to focus on thorny IP issues where the new tools of brain science may provide new challenges, new opportunities, and the possibility for new layers of control and surveillance. We wish to make clear that these are possible scenarios and thought projects, designed to spark a discussion about the role of law as it relates to creativity. The goal here is to posit multiple different possibilities for the nexus between what we know about the brain, the possibilities of extending mind theory, and IP.

Policing originality – cryptoamnesia or deliberate plagiarism: using brain scans to unearth appropriation

In 1981 after several years of litigation, former Beatle George Harrison was found guilty of “subconscious plagiarism” for the substantial similarity between his solo hit “My Sweet Lord” and the 1962 song “He’s so Fine” by the Chiffon’s.⁴³ The court did not believe Harrison had intentionally plagiarized the song, but in the end he was still required to pay Bright Tunes Music Corporation (who owned the copyright, but had not participated in the recording of the original song) \$587,000.⁴⁴ Harrison was held legally responsible for his subconscious appropriation.

Helen Keller, perhaps one of America’s best-known examples of overcoming personal odds to achieve great success, was also charged quite early in life with plagiarism. As an 11-year old, she wrote “The Frost King,” which because of her unique disabilities/abilities reached fairly wide distribution and attention. Upon broader examination the story turned out to have appropriated verbatim the words from a children’s book entitled “The Frost Fairies” by Margaret Canby. At some point years prior to writing her own story, Canby’s book had been read to Keller using the special sign language developed for her and thus it had become part of her memory and subconsciously reproduced as her own.⁴⁵ Such subconscious plagiarism, when a person

⁴³ “Famous Copyright Infringement Plagiarism Cases in Music.,” accessed May 15, 2014, <http://www.fairwagelawyers.com/most-famous-music-copyright-infringement.html>.

⁴⁴ Ibid.

⁴⁵ Cynthia Ozick, “What Helen Keller Saw,” *The New Yorker*, June 16, 2003, http://www.newyorker.com/archive/2003/06/16/030616crat_atlarge?currentPage=all.

believes mistakenly that an idea derived from someone else is actually their own, is defined as cryptoamnesia.⁴⁶ It turns out to be quite common and is increasingly common (or at least easier to identify) in the age of instant access to information in vast quantities.⁴⁷

There are numerous instances of substantial similarity without attribution that continue to mark the complexities of the idea/expression dichotomy and the quickness with which some are willing to establish rigid boundaries around what they claim to be their own. The annotated *Star Wars* movie illustrating the appropriation and some would say copyright violating “inspiration” central to the movies that has recently been produced helps to suggest how creativity works.⁴⁸ As the author of this time-consuming project notes about his intent:

The creative process that brought forth *Star Wars* is nothing short of amazing, and despite that fact that some people always seem to misunderstand the intent behind projects like *Kitbashed*, it is *not* my intent to 'reveal how *Star Wars* is in reality completely unoriginal'. If you believe that's what it does, you do not understand creativity.⁴⁹

However, given the extended mind implications of the work, it does imply that perhaps the Lucas franchise should not police the boundaries of their own work so closely. While not suggesting cryptoamnesia, it shows the fluidity of the creative process and the very real fact that originality is not the standard that to measure creative works.

The recent furor over the possibility that *Lolita* was not original to Nabokov but instead was based upon an obscure German short story published several decades earlier is yet another example of using our conscious and subconscious links to the ideas of others to somehow disparage the creative work of an author.⁵⁰ Nabokov perhaps engaged in a cryptoamnesian act, it could be that he read the original German short story but never consciously understood its role in his own inspiration.⁵¹ Given that he is dead, we cannot challenge his memory of creativity, either manufactured or true.

What emerges most obviously from such stories is that creativity and inspiration are part of the extended mind at work. The brain itself becomes a culprit and villain as it betrays

⁴⁶ Alan S. Brown and Dana R. Murphy, “Cryptomnesia: Delineating Inadvertent Plagiarism,” *Journal of Experimental Psychology: Learning, Memory, and Cognition* 15, no. 3 (1989): 432–42; Narinder Kapur, *The Paradoxical Brain* (Oxford: Cambridge University Press, 2011), 169.

⁴⁷ Rosemary Black, “Cryptomnesia, or Subconscious Plagiarism, Is a Side Effect of Information Overload,” *NY Daily News*, July 14, 2009, <http://www.nydailynews.com/life-style/health/cryptomnesia-subconscious-plagiarism-side-effect-information-overload-article-1.426677>.

⁴⁸ Josh Jones, “2 Hour Annotated Star Wars Film Reveals the Cinematic Influences Behind George Lucas’ Classic Film,” *Open Culture*, June 2, 2014, <http://www.openculture.com/2014/06/2-hour-annotated-star-wars-film-reveals-the-cinematic-influences-behind-george-lucas-classic-film.html>.

⁴⁹ Michael Heilemann, “Kitbashed,” *Kitbashed*, accessed June 4, 2014, <http://kitbashed.com/about/>.

⁵⁰ Nick Paton Walsh, “Novel Twist Nabokov Family Rejects Lolita Plagiarism Claim,” *The Guardian*, April 2, 2004, sec. World news, <http://www.theguardian.com/world/2004/apr/02/books.booksnews>.

⁵¹ Ron Rosenbaum, “New Lolita Scandal! Did Nabokov Suffer From Cryptomnesia?,” *New York Observer*, April 19, 2004, <http://observer.com/2004/04/new-lolita-scandal-did-nabokov-suffer-from-cryptomnesia/>.

us by demonstrating the fiction of original authorship. If indeed we are to more adequately reflect the creative methods central to how the brain and thus creativity functions, then we should relax the rigid boundaries defined by original ownership of a text. As science journalist Matthew Hutson notes, "It's easy to absorb an idea and then believe honestly that it was generated by yourself. (Or, more subtly, to remember where one first heard an idea but later find it no longer surprising and in fact so obvious and intuitive that it doesn't deserve explicit attribution--a type of hindsight bias.)."⁵² In fact, one of the most common narratives of originality is that it seems to come from nowhere or to emerge through the individual from a higher place. So, why do we cling to the idea that the individual is at the center of the creative act instead of cultivating the promise of the creative and connected extended mind?

Researchers looking into the phenomenon of cryptoamnesia suggest that in fact, the very essence of human learning is premised upon copying others.⁵³ Furthermore, research on college students has found that such subconscious plagiarism happens in everyday life and is not simply a function of laboratory experiments.⁵⁴ Cryptoamnesia is of interest to neuroscientists at the University of Georgia who are looking to better understand the role of the brain in the process of appropriation of ideas.⁵⁵ Currently, the narrative of the scholarship on cryptoamnesia finds that part of the "blame" for the failure to identify a source can be attributed to something scientists call 'source memory' glitches, or source amnesia -- that the brain does not feel the source is as relevant as the information it has received and thus forgets the source.⁵⁶

What is fascinating about how these scientific and journalistic accounts situate the notion of subconscious plagiarism is that there is an underlying assumption that individual and original thought is the standard by which we should measure the function of the brain and our connection to others. Even in the face of evidence that the brain functions in a manner based upon copying and misallocation of source information because *such information is not perceived as important*, at least to the brain, the conclusion reached by brain researchers is that such behavior is "sloppy psychology" on the part of the individual and that we ought to work harder to assure that we do not engage in any sort of unintentional copying.⁵⁷

The question is why? If we change the frame of our examination, the problem is not cryptoamnesia but rather the concept of originality and possibly even the requirement for attribution. It is simply not true that originality exists absent the work of others and it is often not even possible to extend attribution for ideas when one doesn't even remember where they came from. If we begin from the logic of the extended mind and displace the

⁵² Matthew Hutson, "Inception Is Easier than Extraction," December 20, 2010, <http://www.psychologytoday.com/blog/psyched/201012/inception-is-easier-extraction>.

⁵³ Russ Juskalian, "Is Unconscious Plagiarism a Real Phenomenon?," *Newsweek*, July 6, 2009, <http://www.newsweek.com/unconscious-plagiarism-real-phenomenon-81861>.

⁵⁴ Anne-Catherine Defeldre, "Inadvertent Plagiarism in Everyday Life," *Applied Cognitive Psychology* 19 (2005): 1-8.

⁵⁵ Black, "Cryptomnesia, or Subconscious Plagiarism, Is a Side Effect of Information Overload."

⁵⁶ Ibid.; Brown and Murphy, "Cryptomnesia: Delineating Inadvertent Plagiarism," 432.

⁵⁷ Juskalian, "Is Unconscious Plagiarism a Real Phenomenon?"

notions of originality that come with fixing text in a tangible form (written language) and the assertions of some that they own not only the individual expressions but the much broader world of ideas, we begin from a different set of assumptions, assumptions now substantiated by a better understanding of the brain. Studies have shown that creativity is related to a reduction in the neurotransmitter norepinephrine, which is associated with long-term memory retrieval. When this neurotransmitter is lowered new connections can be made thus enhancing creative leaps.⁵⁸ Turning off long-term memory to enhance creativity most likely opens up the mind to cryptoamnesia.

If we indeed seek new innovative things then we can set the bar of “creativity” far more broadly to recognize that no creative act is original and that even attribution is not relevant to how the brain works. Nabokov’s work remains important no matter where the ideas came from, his written expression is fixed in time as something that cannot be copied without permission, but nothing else should be his to own. Fashion designers work along the model of “inspiration” as copying more so than other creative industries—instead of shifting fashion design towards the larger and tightly limited world now forced upon other creative medias from songs to literature, we should instead broaden out all other forms of creativity – in part because that is how the brain works.

If, however, we retain the claim that there ought to be rigid boundaries between the thoughts of one person and another, then the use of brain science, especially brain imagery can be used quite differently. It may be, at some point soon, quite possible to use fMRI, EEG, or other scanning techniques to determine if a previous work can be “seen” on the brain—to determine if the plagiarism was coincidental, unintentional or intentional. Already, lie detectors can determine if one is intentionally lying with some degree of accuracy.⁵⁹ However, better access to the internal thoughts and memories of a person and the ability to now see what they are thinking, mean that we could possibly locate the origins of an idea and more clearly identify its source within a pattern of neuronal activity.

Fractal Ownership – The Extended Mind at Work

In conventional copyright, the lines between authors, inspiration, appropriation, and how one might own a collaborative work can cause profound difficulties. Even if the law is clear about what joint ownership is, this legal approach is a simplification of creative processes that rarely reflects the true nuances of creativity, innovation and inspiration. The fact that assigning sole or even joint authorship does not begin to recognize the collective contributions of the many involved more about consolidating ownership and wealth than it is about accurately understanding the way creativity works. Movies, for example, are intrinsically collaborative and involve the time, energy, talents, and work of a multitude, yet the final copyright owners may not reflect this diversity of input given that most people work for hire. The law keeps ownership easy by establishing clear lines around a creative product and policing the reproduction of unauthorized copies.

⁵⁸ Marjorie S. Schiering, “Creative Cognition,” *Brain World*, August 7, 2012, <http://brainworldmagazine.com/creative-cognition/>.

⁵⁹ Farah et al., “Functional MRI-Based Lie Detection.”

A work of scholarship serves as an example of fractal debts. Typically, attribution is assigned to the sole author or a group of authors. Each book or journal article contains the references to the hundreds of works that came before, which in turn contain the references of even more connections and so on. When an individual stakes out a line and claims ownership of the expressions on one side of that line, they are as intellectually dishonest as the film industry mogul who claims to own the intellectual property associated with a film and reap the majority of the financial benefits (or losses) without disseminating these to all contributors both present and past. In each case, though the law exists to remunerate a copyright owner and is primarily concerned with economic incentives for creativity, the myriad challenges under copyright law when attribution is withheld or those that create the works are not paid, suggests that copyright law should think less about assigning ownership to a sole or joint set of authors and instead if indeed we take seriously the notion of the extended mind, and wish to construct an economic model that remunerates all contributions to creative work, then we ought to think about fractal ownership.

The recent success of crowdsourced gamers solving complex scientific problems using the gaming process Fold.it is an example of fractal innovation where collaborative problem solving where the whole transcends the sum of its parts. As the scientists who published the results in *Nature* (with authorship attributed to the thousands of players as well) note, the success in solving a complex problem related to the biochemistry of the AIDS virus, “indicate the potential for integrating video games into the real-world scientific process: the ingenuity of game players is a formidable force that, if properly directed, can be used to solve a wide range of scientific problems.”⁶⁰ Such scientific success helps support the notion of the ‘wisdom of the crowds’ thesis.⁶¹

However, given the fixation on the notion of sole ownership, we have constructed an attribution model that rewards a single contributor or at best a small group. If we seek to truly compensate based upon attribution, then we should go all the way down this rabbit hole and create a system of fractional ownership and compulsory licensing that allows for a kind of granularity of ownership that recognizes everyone’s collective contributions to creative and innovative works.

The recent lawsuit over Led Zeppelin’s *Stairway to Heaven* is an example. More than 40 years after the song was first sung, the estate for the lesser-known band *Spirit*, who toured with Zeppelin prior to the creation of *Stairway to Heaven*, is suing for copyright infringement.⁶² Indeed, the two songs share a very similar (and simplistic) chord progression. Should there be credit assigned to now deceased guitarist Randy California? Perhaps. However, if credit is assigned to him, then it must also be assigned to every

⁶⁰ Firas Khatib et al., “Crystal Structure of a Monomeric Retroviral Protease Solved by Protein Folding Game Players,” *Nature Structural & Molecular Biology* 18, no. 10 (October 2011): 1175–77, doi:10.1038/nsmb.2119.

⁶¹ Clay Shirky, *Here Comes Everybody: The Power of Organizing without Organizations* (New York: Penguin Press, 2008).

⁶² Oliver Herzfeld, “Spirit v. Led Zeppelin: Analysis Of The ‘Stairway To Heaven’ Infringement Lawsuit,” *Forbes*, May 21, 2014, <http://www.forbes.com/sites/oliverherzfeld/2014/05/21/spirit-v-led-zeppelin-analysis-of-the-stairway-to-heaven-infringement-lawsuit/>.

influence direct and indirect on the style and sound of his music as well. And so on. Such fractal attribution and ownership is a logical and fair way to assess inspiration and contributions, even if it creates certain complexities and inefficiencies at first. But these issues are being addressed in other domains that IP law could leverage.

Open source creation in the Github fashion sets up the stage for such a process.⁶³ If all users become contributors and the commons becomes something we all contribute to then how ought we to divide attribution fairly? If creativity is monetized then the rewards should be divided accordingly. Instead of centralizing profits, the flow should go downstream and become fractal. This is the logic of the extended mind at work and a far more accurate assessment of creativity than the one upon which current copyright law or patent law is based. However, if artists believe they have difficulties surviving under the current system of reward, the giant pyramid scheme of creativity that results from a fractal understanding of inspiration is even more complex.

Cognitive Labor Farms

Our current paradigm of intellectual property protection allows for the creative output of workers to be owned by the corporations for whom they work or to be sold to the entertainment industries who control the rights in exchange for the potential of success. Corporations today require extensive and possibly invasive non-compete agreements for employees that restrict them from moving to other companies and taking what the company believes to be their intellectual property with them. While it may be that such agreements have problematic legal legitimacy, many who sign these agreements never test the limits. These agreements often include clauses that require an employee to assign rights to inventions that they create in their spare time to their company, even if they have nothing to do with the company's work.

In other words, the system is set up to ensure that creative work is filtered from those who do the work to those who own the work. One might already understand much of the global corporate structure to be a vast cognitive labor farm, one where individual creative autonomy is waived for a wage or the possibility of creative success.⁶⁴

Such a system within the context of extended mind technologies and human/machine hybrids raises new questions about the scope of ownership and individual autonomy in the future.

Brain science is finding that creativity and intelligence emerge from a distributed neural network with no attributable "center" creating original thought. Instead, hubs function as centers of communication with different parts of the brain playing a part in creative

⁶³ Mikeal Rogers, "The GitHub Revolution: Why We're All in Open Source Now | Opinion," *WIRED*, March 7, 2013, <http://www.wired.com/2013/03/github/>.

⁶⁴ Yann Moulier-Boutang, *Cognitive Capitalism*, 1 edition (Cambridge, UK; Malden, MA: Polity, 2012).

work.⁶⁵ Our growing understanding of creativity suggests that we can chemically and technologically augment the brain to enhance intelligence and creativity, or at the very least can begin to speculate about the possibility of doing so.⁶⁶ As mentioned earlier, creativity is related to a reduction in the neurotransmitter norepinephrine, which is associated with long-term memory retrieval.⁶⁷ Thus, it could be possible to enhance creativity and possibly intelligence with the appropriate cognitive therapy.

The implications for nuanced modulation of the individual through cognitive adjustments are important to consider. The neurocentric age may demand methods for adjusting the individual consciousness to adhere to larger social norms. Dunagan argues that,

In an age of neuropower, we will also begin to see a whole constellation of measurements, metrics, and knowledge form around cognitive and emotional states. Soon, we will come to know (and obsess) over our average dopamine levels, our brain fitness levels, our working memory score, and our optimal concentration range. Then, we will cognitively train or neuromodulate in order to do something about those scores to bring them into optimal states. As a population, we'll begin to measure our happiness or mental acuity and productivity. We'll design government policy and develop cognitive ergonomics to help raise our mental effectiveness and to track our progress over time.⁶⁸

However, under current political conditions, such modulations may not be under the control of the individual. Inadvertently, researchers have discovered a brain link in an individual that makes him only like the music of Johnny Cash.⁶⁹ Imagine the possibilities for cognitive manipulation by the entertainment industries with such knowledge.

How might cognitive enhancements be understood as ownership in the future? How might those who construct the technology that make people creative take credit for that creativity? Can we imagine a way to enhance human brains but harness them to do their intellectual work for others? In reality this is the corporate model we now embrace, but with better technology.

We do not need to go this far to wonder about the dividing lines of ownership made possible through new technologies. Who owns the music created on a digital keyboard programmed with hundreds of beats, sounds and possibilities? Does the creator of the software hold a claim over the music created? Who will own the outcome when humans

⁶⁵ Rex Eugene Jung et al., "The Structure of Creative Cognition in the Human Brain," *Frontiers in Human Neuroscience* 7 (2013): 330, doi:10.3389/fnhum.2013.00330; Haier and Jung, "Brain Imaging Studies of Intelligence and Creativity," 173.

⁶⁶ Haier and Jung, "Brain Imaging Studies of Intelligence and Creativity," 177.

⁶⁷ Schiering, "Creative Cognition."

⁶⁸ Dunagan, "Politics for the Neurocentric Age," 60.

⁶⁹ Rob Bricken, "Scientists Discover Area Of Brain Responsible For Loving Johnny Cash," *io9*, May 23, 2014, http://io9.com/scientists-discover-area-of-brain-responsible-for-lovin-1580839952?utm_campaign=socialflow_io9_facebook&utm_source=io9_facebook&utm_medium=socialflow.

are augmented technologically? While rudimentary, the technology now exists to tell what images you see and what words you are thinking.⁷⁰ When mind/machine hybrids are more common, how will ownership over creative work be assigned? What happens when the technologies for pinpointing the idea in the brain become more sophisticated – can you steal an idea from a brain scan? Or is the person scanning the brain the appropriate owner because they are the first to “fix” the idea in a tangible form? Can a brain scan itself become a copyrighted work? These are questions the neurocentric age raises for which we may want to rethink our boundaries of property rights.

Owning Posthuman Creativity

The line between the human and the posthuman blurs more each day. Not only are what we think of as conventional humans become more integrated into technologies that extend their capabilities and offset possible handicaps, but scientists are closer than ever to creating artificial intelligence. Already what we call computers are creating art, music, and written work indistinguishable from humans, they are also engaged in scientific research.⁷¹ Those predicting singularity remain optimistic that such a convergence will happen within the next few decades.⁷² What of the creative work of posthumans? Who will own their patentable ideas and their copyrightable expressions? The very notion of artificial intelligence that is indistinguishable from human intelligence already poses a significant challenge to the foundations upon which we rest our humanity – that as a problem solving, creative species, we somehow surpass all others on the planet. Establishing issues of ownership in the posthuman age will require us to think through not only the boundaries of the human but also the boundaries of how we own ideas as well.

Towards a neuropolitics of IP law

These thought experiments and near-future possibilities raise significant questions for what a neuropolitics of intellectual property law might look like. We are not primarily rational human beings, but deeply collaborative and connected to what can be called the extended mind. When the individual is part of a node in a far broader distributed network – a new sort of ontology recapitulates philology. How might the law reflect these central assumptions? What institutional designs should we build?

Our efforts to engage the bodies of law known as intellectual property – copyright, patents, trademarks, and other sui generis forms of protection can all be grounded in the underlying creativity of the individual within the context of not only the human community but the now enhanced potential offered by the connectivity of the extended

⁷⁰ Kerri Smith, “Brain Decoding: Reading Minds,” *Nature* 502, no. 7472 (October 23, 2013): 428–30, doi:10.1038/502428a.

⁷¹ Francie Diep, “Robot Reads Novels, Writes Songs About Them,” *Popular Science*, May 14, 2014, <http://www.popsci.com/article/technology/robot-reads-novels-writes-songs-about-them>; Robert W. Stevenson, Joseph F. Murphy, and Thomas J. Clare, “Robot Inventors: Patently Impossible?,” *Science* 324, no. 5930 (May 22, 2009): 1014–1014, doi:10.1126/science.324_1014a.

⁷² Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology* (Penguin Books, 2006).

mind. We see these potential policy choices as a form of hypo-testing – we seek to raise different potentials to generate debate and more clearly understand how brains might be used to make specific types of arguments about creativity and ownership. We have also not grounded our arguments here in the case law of intellectual property but instead try to draw out different possibilities, unmoored from traditional understandings at times, which may grate against those more doctrinally informed. Still, as provocations, we offer the following possibilities.

A neuropolitically informed IP law of the future would be far more limited in scope because originality outside of the extended mind is significantly circumscribed. Substantive work needs to be put into reconceptualizing collaborative projects and constraining the ownership of such projects or, through technology, assigning fractal ownership that accurately reflects the contributions of the multitude. It should begin from the beginning and ask what is the relevance of the individual in creativity? What should be awarded? Who should be awarded? How do we rethink IP within the framework of the extended mind?

* The Policy Problems of Fractal Ownership

The current trajectory of copyright, patent and other forms of intellectual property law point towards increasing fights over the ownership of fragments. Copyrights and patents exist to turn creative work into a commodity and monetize its use. However, by misunderstanding the extended nature of creativity, copyright ignores and defines away the possibility of fractal ownership. Fractioning ownership certainly better describes the act of creativity and disrupts the notion that any work is unitary and the creation of a solitary and individual mind. It may be technically feasible to implement some sort of fractal ownership scheme, though perhaps problematic as a matter of law. By following the path towards fractal ownership by accurately allocating rewards along the lines of contributions and attributions, one might be able to clarify the network of creativity that is the product of the extended mind. The disadvantage of such ownership is that how a work might be used may become far more complex because it risks the possibility of being frozen in a maze of licensing agreements and micropayments. Given the trajectory of current American copyright law, it would seem we are already on the pathway to fractal ownership and a more heightened effort to acquire some share of the profits for a work when one has contributed to it. As long as creative work is understood as maximizing profit for the owner, then we should of course extend this profit maximization opportunity to all the “owners” of a work. This is the logical conclusion of the current system, assuming that creativity is incentivized by monetary rewards. It does not make sense to only give to the current person asserting ownership over creative work a cut of the profits, we now have the technology to let such adaptations, inspirations, and other forms of appropriation ripple backwards towards the original sources. It could be that the future is one where every word/sentence/expression/nuance becomes owned by someone and microremuneration follows ownership. This is perhaps the libertarian dream – total propertization of everything, but it may not best benefit the larger sharing of information.

By contrast, it could be possible to reject the micropayments of fractal ownership and disassociate much of what is innovative from protection under copyright law. Dealing with the understanding that cultural creativity is collaborative and assigning ownership appropriately is one important policy challenge raised by the neurocentric age. Rather than moving towards fractal ownership, it could be that the law reduces dramatically what can be “owned” and locates the line between idea and expression much more closely with the specific expression. Thus, only direct copying remains unauthorized under the law but all other derivative uses are possible.

* The Policy Problems of the Crowd – Success because of, not despite the crowd.

Crowds make creative work popular but are nowhere reflected in the law as important. If a creative work is not adopted by the crowd, it will not make money for the artist. Becoming popular takes work and connection to an audience of people.⁷³

Copyright law does not address the importance of the audience at all, as most clearly demonstrated by the war on filesharing. Specifically, the fines enshrined in copyright law today were initially designed to keep commercial piracy from competing with the official commercial copyright owner. They were not meant to be leveled at individuals downloading songs from the Internet. That an individual user can be fined thousands, if not hundreds of thousands of dollars for digital downloads is a perversion of the law and disrespects the importance of the audience and the crowd in rendering a creative work intelligible and popular.

Much of what the many entertainment industries produce flops miserably. There are multiple types of failures, there are of course the failures that come when economic benchmarks are not met, which may have little to do with popularity and everything to do with expectations of economic growth. In this case, a creative product might actually have sold quite well, but not sufficiently to meet corporate expectations. Then there are the types of failures where despite the best advertising campaigns and all the possible benefits a creative product might be provided, the public simply doesn't consume it. In part this problem emerges because you cannot manufacture a connection between a person and a culture industry product – it has to grow through the crowd. Conversely, runaway hits have been created overnight through the popularity created by the people who viewed, listened, or participated in a work of art that resonated with them. In other words, the crowd matters to the economic model even though it is ignored by it.

The point of creative work is connectivity; it is to communicate with others. Without the audience, there is no possibility of success. Without the reader, the book fails. Without the listener, the music fails. Without the moviegoer, the movie fails. Fans connect with an artist through what the art says to them. Copyright law commodifies that connection

⁷³ In her wonderful Ted Talk, Palmer discusses the social relations that are born through music and the essential nature of human connectivity as the base upon which to profit from any creative work. Amanda Palmer, *The Art of Asking* (TED.com, 2013), http://www.ted.com/talks/amanda_palmer_the_art_of_asking.

but in doing so it disrupts and displaces the communicative aspect of art with consumption and the expectation of controlling each and every copy of a product. Instead, the act of art is in the reciprocity between artist and viewer – a different aspect of the extended mind at work.

A future copyright law that reflects upon the role of the audience in making creative work popular will provide room for the free flow of these works through filesharing. Instead of pursuing a criminalizing approach to copyright infringement, the law should reflect that without the crowd and the possibility of sharing creative works with others freely, the potential for creating the types of communities necessary for future creativity are lost. To adequately reflect that public interest, the law must more clearly allow for sharing to occur.

* Policy Problems of the Life of the Author in a Posthuman World

The extended mind does not die, but instead offers new permutations and possibilities. Additionally, new layers of artificial intelligence that can create art, music, literature, and more will not be subject to the same types of life as humans. Even humans, in the posthuman world may see their lives extended beyond current terms, rendering copyright perpetual from a very different cause. What do we do with a policy proposal that is contingent upon the death of the author when indeed, the author might not die? Conversely, sudden accidents can cut short the life of a human author well before their creative works have seen their economic potential maximized.

Either way, perhaps it is time to consider the period of ownership associated with creative work and limit this timeframe to more accurately reflect the rate of change and innovation in the world today. By disassociating terms for copyright from the life of the author, much like patents last for a limited time, we can establish different possibilities for how creative work supports the larger public domain.

One possibility is to limit copyright terms to a short period – like the American original design of 14 years. Assigning copyright based upon the “life” of an author will be increasingly meaningless when authors may not have ever have been alive.

There are more speculative issues that will emerge and need to be dealt with as we think through a neuropolitics of IP. For example, what will we do with the rights over AI creativity? Currently, it would seem that the people controlling the creative producers establish the rights for themselves, but ultimately will such an assignment of rights be just or fair? As humans and machines are more integrated how will it become possible to know how to assign ownership and who should reap the rewards.

In terms of speculative possibilities, how do we deal with ownership of the mind and theft of ideas directly from the mind? It is already possible to begin to see what the mind is visualizing and of course thinking. If fashion design is today based upon inspiration as viewing the work of others and then copying it, what possibilities exist when we can tap directly into the minds of others? Of course, their ideas and our own are already merged.

The keyboard example posed earlier is the rudimentary version of how the owners of technologies might assert ownership over the creative capacity of the brain integrated into that technology.

Conclusion

Social scientists and philosophers may cringe at the idea of reducing creativity to the function of the brain. A neuropolitical approach must be attuned to how one uses the brain to make political claims. However, the social sciences cannot theorize away the findings of brain scientists. As Nikolas Rose notes,

There are good historical reasons why many in the social and human sciences have been highly critical of attempts to build a positive relation with the life sciences. But their dread of determinism, reductionism, and the dire ethical and socio-political consequences of locating humans among the animals, is now misplaced.⁷⁴

This means that we need to consider the policy ramifications of the extended mind and neuroscience in our legal apparatus. Grounding the law in neuropolitics can serve as an opportunity to rethink the boundaries of creativity and originality. Instead of making some futures impossible, opening up the possibility for multiple ways of understanding creativity can create far different futures than the ones we shall have if conventional IP remains standard.

⁷⁴ Rose, "The Humana Sciences in a Biological Age," 16.