

## MIND-MOVIES: ORIGINAL AUTHORSHIP AS APPLIED TO WORKS FROM “MIND-READING” NEUROTECHNOLOGY

THEO AUSTIN BRUTON

### *Abstract*

*U.S. courts frequently analyze new technology under copyright law. Over the years, the courts have applied copyright law to photographic cameras, computer programs, digital video recorders, and much more. However, a recent breakthrough in the neuroscience community may force judges to apply copyright standards in an unorthodox fashion.*

*A group of researchers at UC Berkeley devised a process that reconstructs video sequences from the human brain, essentially creating a movie from the person’s mind. As this neurotechnology develops, it is uncertain how judges will apply copyright law to content taken directly from the brain. Nevertheless, this Article argues that such content meets the originality standard under U.S. copyright law. Specifically, videos taken from the brain are original to the author based on the author’s unique visual experiences and unique mental processes.*

### TABLE OF CONTENTS

#### I. INTRODUCTION

#### II. AUTHORSHIP AND COPYRIGHT LAW

##### A. History of Authorship

##### B. The Standard of Original Authorship in Copyright Law

#### III. MIND-MOVIES: THE NEUROTECHNOLOGY

##### A. Defining “Mind-Movie”

##### B. The Mind vs. The Brain

##### C. Dr. Gallant’s Current Mind-Movie Neurotechnology

#### IV. ORIGINAL AUTHORSHIP IN MIND-MOVIES

##### A. Unique Visual Experiences

##### B. Unique Mental Processes

#### V. CONCLUSION

## INTRODUCTION

A recurrent theme in science fiction films is the connection between a human brain and a computer. Movies like *The Matrix*<sup>1</sup> and *Minority Report*<sup>2</sup> introduced what may be possible for the future of neurotechnology. However, today's science is quickly approaching what was labeled "fiction" just 10 years ago. A professor at UC Berkeley developed neurotechnology that reads and records the electronic signals of the human brain, and reconstructs the signals to form a video sequence. Thus, the final product is essentially a movie copied from a person's mind—i.e., a "mind-movie."

Although researchers have only scratched the surface of this technology, the potential of mind-movies is immeasurable. One day, people may have the ability to store memories on a computer for timeless remembrance; record details of dreams for analysis or interpretation; or explore the inner recesses of the human psyche. Moreover, people may share subjective mental experiences with others.

These scenarios may seem fabricated or farfetched, but they are real possibilities. People already capture memories and share visual experiences with the use of videography or photography,<sup>3</sup> which at one time seemed impossible,<sup>4</sup> the mind-movie just provides a more probing and unprecedented way of capturing similar content. Furthermore, researchers currently think about these types of applications while developing the neurotechnology for mind-movies.<sup>5</sup>

1. *The Matrix* is a 1999 American-Australian science fiction action film written and directed by the Wachowski siblings, and starring Keanu Reeves. It depicts a dystopian future in which reality, as perceived by most humans, is actually a simulated reality, called "the Matrix", created by sentient machines. *The Matrix*, WIKIPEDIA, [http://en.wikipedia.org/wiki/The\\_Matrix](http://en.wikipedia.org/wiki/The_Matrix) (last visited Nov. 13, 2014).

2. *Minority Report* is a 2002 American science fiction film directed by Steven Spielberg, and starring Tom Cruise. The film is set in the year 2054, and is known for presenting many different future technologies, including several instances of mind-reading technologies. Interestingly, the future technologies depicted in the film have been labeled prescient. This is likely due to Spielberg consulting with a group of experts including urbanists, futurists, and journalists. Spielberg held a three-day "think tank" with the experts to create plausible technology for the year 2054. *Minority Report*, WIKIPEDIA, [http://en.wikipedia.org/wiki/Minority\\_Report\\_\(film\)](http://en.wikipedia.org/wiki/Minority_Report_(film)) (last visited Nov. 13, 2014).

3. See Lance Ulanoff, *Google Glass: I'm Not Winking at You, Just Taking Your Picture*, MASHABLE, (Dec. 18, 2013), <http://mashable.com/2013/12/18/google-glass-wink-photo-hands-on/>; see also Luke Westaway, *Sony Lifelog Wearable Camera Concept Could Track Your Life*, CNET, (Feb. 25, 2014, 4:00 AM PST) [http://reviews.cnet.com/8301-13970\\_7-57619471-78/sony-lifelog-wearable-camera-concept-could-track-your-life/](http://reviews.cnet.com/8301-13970_7-57619471-78/sony-lifelog-wearable-camera-concept-could-track-your-life/); Cooper Smith, *Facebook Users Are Uploading 350 Million New Photos Each Day*, BUSINESS INSIDER, (Sept. 18, 2013, 8:00 AM), <http://www.businessinsider.com/facebook-350-million-photos-each-day-2013-9> ("Facebook revealed in a white paper that its users have uploaded more than 250 billion photos, and are uploading 350 million new photos each day").

4. A nineteenth century newspaper report stated: "To try to capture fleeting mirror images is not just an impossible undertaking. . .; the very wish to do such a thing is blasphemous." WALTER BENJAMIN, *ONE-WAY STREET AND OTHER WRITINGS* 240–241 (1979).

5. See *The Gallant Lab at UC Berkeley*, GALLANTLAB.ORG, <http://gallantlab.org/question.html> (follow "Questions" hyperlink) (last visited Nov. 13, 2014) [hereinafter *The Gallant Lab*] ("practical

The progression of mind-movies is sure to spawn new legal implications spanning many different areas of the law.<sup>6</sup> Nevertheless, the copyright issues in recording a person's thoughts, memories, and dreams are especially intriguing. Specifically, issues of original authorship will likely emerge alongside the neurotechnology to "enter" someone's mind.

This Article identifies the authorship issues of recording the human brain, and argues why mind-movies meet the original authorship requirement for copyrightability. Part I presents a brief history of authorship and examines the standards and contours of original authorship in copyright law. Part II explains the current neurotechnology developed at UC Berkeley. Part III uncovers the authorship issues associated with the emerging neurotechnology, and argues original authorship in mind-movies.

## I. AUTHORSHIP AND COPYRIGHT LAW

### A. History of Authorship

Individualistic and creative authorship is a relatively modern concept.<sup>7</sup> Prior to the 18<sup>th</sup> century, the author was not singled out or distinguished from all others involved in the manufacturing of works.<sup>8</sup> For example, a book was deemed the final result of equal contributions from the scholar, the writer, the papermaker, the type founder, the typesetter, the printer, the proofreader, the publisher, the book-binder, the gilder, and the brass-worker.<sup>9</sup> Thus, authorship was simply considered a single step in the overall production process. In fact, authors were not viewed as creators, but producers; skilled craftsmen capable of cumulating and organizing traditional materials or received ideas.<sup>10</sup> If the author produced a work with traces

brain reading devices would have wide applicability in many other fields, including in communication, medical diagnosis and entertainment. . . it could be used to aid in diagnosis of diseases (e.g., stroke, dementia); [or] to assess the effects of therapeutic interventions (drug therapy, stem cell therapy)"; *infra* note 69.

6. Several people have already begun discussing the legal implications of neurotechnology as applied to criminal law. See Francis X. Shen, *Neuroscience, Mental Privacy, and the Law*, 36 HARV. J.L. & PUB. POL'Y 653, 691 (2013); Nita A. Farahany, *Incriminating Thoughts*, 64 STAN. L. REV. 351, 373 (2012).

7. Martha Woodmansee, *The Genius and the Copyright: Economic and Legal Conditions of the Emergence of the "Author"*, 17 EIGHTEENTH-CENTURY STUDIES 425, 426 (1984), .

8. Oren Bracha, *The Ideology of Authorship Revisited: Authors, Markets, and Liberal Values in Early American Copyright*, 118 YALE L.J. 186, 192–93 (2008).

9. Woodmansee, *supra* note 7, at 425.

10. *Id.* at 426 ("He was first and foremost a craftsman; that is, he was master of a body of rules, preserved and handed down to him in rhetoric and poetics, for manipulating traditional materials in order to achieve the effects prescribed by the cultivated audience of the court to which he owed both his livelihood and social status").

of originality or creativity, such work was not considered inspiration from within, but inspiration from above; that is, divine inspiration.<sup>11</sup>

In the 18<sup>th</sup> century, a cultural movement known as Romanticism began to blossom in Europe, primarily as a reaction to the Enlightenment.<sup>12</sup> Romanticism focused on the individual, the imaginative, and transcendental.<sup>13</sup> These concepts lead to the idea of originality in the arts—the artist, himself, as the creator of works.<sup>14</sup> An author was no longer considered a producer or a cog in a publication machine.<sup>15</sup> Instead, Romanticism transformed the author into an “original genius,” whose work emanated from his own mind under the impulse of feeling.<sup>16</sup> Accordingly, society considered the Romantic author distinctly and personally responsible for his creation,<sup>17</sup> and expected him to bring unique works into the world.<sup>18</sup>

Romanticism soon collided with notions of ownership to form the “modern view” of authorship in copyright law.<sup>19</sup> In England, authorship was incorporated into the first copyright statute—the 1710 Statute of Anne—that recognized the exclusive right of authors to control the publication of certain works.<sup>20</sup> This statute

11. See *Id.* at 427 (“When a writer managed to rise above the requirements of the occasion to achieve something higher, much more than craftsmanship seemed to be involved. To explain such moments a new concept was introduced: the writer was said to be inspired—by some muse, or even by God”).

12. See Christopher Casey, “*Grecian Grandeurs and the Rude Wasting of Old Time*”: Britain, the Elgin Marbles, and Post-Revolutionary Hellenism, 3 FOUNDATIONS 31, 33 (2008) (“Romanticism as a movement is often considered to have emerged in the mid-eighteenth century as a counterforce to the Rationalism of the Enlightenment era.”). There are many ideas and theories regarding the beginnings of Romanticism, but such a discussion is outside the scope of this Article. See MICHAEL LOWY & ROBERT SAYRE, ROMANTICISM AGAINST THE TIDE OF MODERNITY 17 (2001) (speaking on the French Revolution: “A transformation of the political order thus became the catalyst for Romanticism.”); ISAIAH BERLIN, THE ROOTS OF ROMANTICISM xiii (2d ed. 2013) (“Romanticism, then, is not simply a reaction against Enlightenment, but ‘the greatest transformation of Western consciousness, certainly in our time’”); EDWARD J. DENT, THE RISE OF ROMANTIC OPERA 1 (1976) (“The historical phenomenon known as the Romantic Movement is one which is it very difficult to define. Even if we were to limit its scope to literature alone, we should find no clear understanding of when it began or when it ended. . .”).

13. *Romanticism*, ENCYCLOPEDIA BRITANNICA ONLINE, <http://www.britannica.com/EBchecked/topic/508675/Romanticism> (last updated Apr. 28, 2014).

14. See ISAIAH BERLIN, THE ROOTS OF ROMANTICISM xiii (2d ed. 2013) (“it was the Romantics who introduced ideas of originality into the arts. The very idea of the artist as a creator. . . is a Romantic inheritance.”).

15. Jacqueline Rhodes, *Copyright, Authorship, and the Professional Writer: The Case of William Wordsworth*, CARDIFF UNIVERSITY, available at [http://www.cardiff.ac.uk/encap/journals/corvey/articles/cc08\\_n01.html](http://www.cardiff.ac.uk/encap/journals/corvey/articles/cc08_n01.html) (last visited Nov. 13, 2014).

16. Susanna L. Blumenthal, *Law and the Creative Mind*, 74 CHI.-KENT L. REV. 151, 165 (1998).

17. *Id.*

18. See ISAIAH BERLIN, THE ROOTS OF ROMANTICISM xiii (2d ed. 2013) (“we come to believe the task of the artist was to bring something new into the world.”).

19. Oren Bracha, *The Ideology of Authorship Revisited: Authors, Markets, and Liberal Values in Early American Copyright*, 118 YALE L.J. 186, 193 (2008).

20. 8 Ann., c. 19 (1710) available at <http://www.copyrighthistory.com/anne.html>; Doris Estelle Long, *Dissonant Harmonization: Limitations on “Cash N’ Carry” Creativity*, 70 ALB. L. REV. 1163, 1167 (2007).

presented authors as owners, whose mental labor created intellectual works, and the intellectual works were presented as objects of property.<sup>21</sup> Thus, Romanticism was combined with natural-rights theories in order to justify copyrights as property owned by the author.<sup>22</sup>

When Great Britain began establishing colonies in North America, the modern view of authorship “crossed the pond” and became a central part of American copyright law. The original thirteen colonies enacted their own copyright laws based on the Statute of Anne.<sup>23</sup> After America gained independence from Great Britain, copyright law remained a priority amongst the Framers. Therefore, at the Constitutional Convention of 1787, Charles C. Pinckney and James Madison both submitted proposals to give Congress the power to grant copyrights to authors.<sup>24</sup>

The Framers of the Constitution subsequently drafted the Intellectual Property Clause: “The Congress shall have Power. . . [t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors. . . the exclusive Right to their respective Writings.”<sup>25</sup> Three years later, the Framers legislated the first United States copyright statute—the Copyright Act of 1790.<sup>26</sup> The Copyright Act has been revised and amended several times over the years, but it still remains the primary statute for U.S. copyright law.

### *B. The Standard of Original Authorship in Copyright Law*

The Copyright Act states, “Copyright protection subsists. . . in *original works of authorship* fixed in any tangible medium of expression.”<sup>27</sup> However, the Copyright Act does not indicate exactly what Congress meant by “original works of authorship.” According to the legislative history, the phrase “original works of authorship” was purposely left undefined for courts to interpret the standard and scope of original authorship.<sup>28</sup>

21. Oren Bracha, *The Ideology of Authorship Revisited: Authors, Markets, and Liberal Values in Early American Copyright*, 118 *YALE L.J.* 186, 194 (2008)

22. *Id.*

23. See *Fred Fisher Music Co. v. M. Witmark & Sons*, 318 U.S. 643, 648 (1943) (“In this country the copyright laws enacted by the original thirteen states prior to 1789 were based largely upon the Statute of Anne.”).

24. See Karl Fenning, *The Origin of the Patent and Copyright Clause of the Constitution*, 17 *GEO. L.J.* 109, 109 (1929).

25. U.S. CONST., ART. I, § 8, cl. 8.

26. See Craig W. Dallon, *The Problem with Congress and Copyright Law: Forgetting the Past and Ignoring the Public Interest*, 44 *SANTA CLARA L. REV.* 365, 427 (2004).

27. 17 U.S.C.A. § 102 (West) (emphasis added).

28. See JULIE E. COHEN ET AL., *COPYRIGHT IN A GLOBAL INFORMATION ECONOMY* 58 (Vicki Been et al. eds. 3d ed. 2010) (“According to the legislative history, ‘[t]he phrase “original works of authorship,” which is purposely left undefined, was intended to incorporate without change the standard of originality established by the courts. . .”).

As a result, original authorship has been molded over several cases. A seminal case for original authorship is *Feist Publications, Inc. v. Rural Telephone Service Company, Inc.*,<sup>29</sup> where the U.S. Supreme Court said that originality is a constitutional requirement for authorship.<sup>30</sup> The Court stated, “[o]riginal, as the term is used in copyright, means only that the work was independently created by the author (as opposed to copied from other works), and that it possess at least some minimal degree of creativity.”<sup>31</sup> The standard of creativity is an extremely low bar; even a slight amount will suffice.<sup>32</sup> Thus, originality requires independent creation and a low level of creativity.<sup>33</sup>

Although *Feist* provides a succinct standard, concepts of original authorship arose in much earlier cases. In *Bleistein, v. Donaldson Lithographing Co.*,<sup>34</sup> the U.S. Supreme Court considered the copyrightability of posters drawn from real-life circus performers.<sup>35</sup> The Court found original authorship in the posters:

[E]ven if [the posters] had been drawn from the life, that fact would not deprive them of protection. . . Others are free to copy the original [and natural scene]. They are not free to copy the [work]. . . The [work] is the personal reaction of an individual upon nature. Personality always contains something unique. . . which is one man’s alone. That [is] something he may copyright. . .<sup>36</sup>

The Court seemingly posits that the mere subjectivity of the author is enough for original authorship. A “personally unique” work is copyrightable because the author’s personal reaction to a natural scene is unique, or original, to the author.<sup>37</sup> This may seem like a low standard for original authorship,<sup>38</sup> but the standard was

29. *Feist Publ’ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340 (U.S. 1991).

30. *Id.* at 346.

31. *Id.* at 345.

32. *Id.*; see “Interestingly, Congress avoided making “creativity” an express element of copyright when writing the 1976 statute; thus, the *Feist* creativity standard may be read as some variation that rises above the level of the trivial.” Russ VerSteege, *Intent, Originality, Creativity and Joint Authorship*, 68 BROOK. L. REV. 123, 134 (2002).

33. “The U.S. Supreme Court has also made statements about what is not required for originality: artistic merit, novelty, or any appreciable effort.” Eva E. Subotnik, *Originality Proxies: Toward A Theory of Copyright and Creativity*, 76 BROOK. L. REV. 1487, 1512 (2011).

34. *Bleistein v. Donaldson Lithographing Co.*, 188 U.S. 239(1903).

35. *Id.* at 248.

36. *Id.* at 250.

37. *See id.*

38. The Court also established the non-discrimination principle, which warns judges to stay clear of evaluating the artistic merit of works: “It would be a dangerous undertaking for persons trained only to the law to constitute themselves final judges of the worth of pictorial illustrations, outside of the narrowest and most obvious limits. At the one extreme, some works of genius would be sure to miss appreciation. Their very novelty would make them repulsive until the public had learned the new language in which their author spoke. It may be more than doubted, for instance, whether the etchings of Goya or the paintings of Manet would have been sure of protection when seen for the first time. At the other end, copyright would be denied to pictures which appealed to a public less educated than the judge.” *Id.* at 251–52. One could argue this principle further lowers the standard of originality because it discourages judges from evaluating the artistic merit of works.

upheld and perpetuated (and maybe even lowered) in *Alfred Bell & Co. v. Catalda Fine Arts*.<sup>39</sup>

In *Catalda Fine Arts*, the Second Circuit considered whether mezzotint engravings<sup>40</sup> of oil paintings were copyrightable.<sup>41</sup> The court held that even bad eyesight or unintentional mistakes provoke original authorship:

But even if their substantial departures from the paintings were inadvertent, the copyrights would be valid. A copyist's bad eyesight or defective musculature, or a shock caused by a clap of thunder, may yield sufficiently distinguishable variations. Having hit upon such a variation unintentionally, the "author" may adopt it as his and copyright it.<sup>42</sup>

Arguably, *Catalda Fine Arts* proposes that the creative requirement for originality is not creative at all. There is no conscience creativity in poor eyesight or mistakes, but the court in *Catalda Fine Arts* says such unintentional variations contribute to original authorship and are thus copyrightable.<sup>43</sup>

This low standard embraces almost any work as original; whether the work is a trivial doodle on a bar napkin, a small child's finger-painting, or a picture spontaneously snapped on a smartphone—all are likely deemed original under U.S. copyright law. The U.S. Supreme Court said in *Feist* that "[t]he vast majority of

39. *Alfred Bell & Co. v. Catalda Fine Arts*, 191 F.2d 99 (2d Cir. 1951).

40. "The mezzotint engraving process is performed by first rocking a copper plate, that is, drawing across the plate under pressure a hand tool having many fine and closely spaced teeth. The tool is drawn across the plate many times in various directions so that the plate is roughened by the process. The outlines of the engraving are then placed upon the plate either by tracing with carbon paper from a photograph of the original work which it is desired to reproduce in this medium or by a tracing taken from such a photograph on gelatine sheets transferred to the copper plate by rubbing carbon black or some similar substance in the lines of the tracing on the gelatine sheet and transferring of them by pressing the sheet upon the copper plate. With the image on the roughened plate the engraver then scrapes with a hand tool the picture upon the plate, obtaining light and shade effects by the depth of the scraping of the roughened plate or ground. When the plate is completed, trial prints are taken from it and it may be altered to make the final result to the satisfaction of the engraver. When it is completed and a satisfactory proof drawn from the plate, a thin steel coating is applied to it to preserve it during the printing of the final article, of which several hundred may be drawn from such a steel-faced plate before noticeable wearing of the plate. The final product is a print in color called in the trade a proof. The color is applied to the plate by hand before each print or proof is drawn from the plate. The color may be applied to the plate by the artist, but usually is done by one or more printers who follow a sample print or color guide in applying the colored ink in the depressions made by the engraver on the plate. It is possible by this process to make quite a satisfactory reproduction of the original painting in whatever size desired (the size of the photograph governing the size of the engraving), preserving the softness of line which is characteristic of the oil painting. It is not, however, possible to make a photographic copy of the painting by this method exact in all its details.

*Alfred Bell & Co. v. Catalda Fine Arts*, 74 F. Supp. 973, 975 (S.D.N.Y. 1947).

41. *Catalda Fine Arts*, 191 F.2d at 104.

42. *Id.* at 105.

43. *Id.*

works make the grade [of original authorship] quite easily, as they possess some creative spark, ‘no matter how crude, humble or obvious’ it might be.”<sup>44</sup>

Even so, there exists a threshold of when a work is unoriginal. In *Meshwerks, Inc. v. Toyota Motor Sales U.S.A., Inc.*,<sup>45</sup> the Tenth Circuit held that unadorned digital models of actual cars were unoriginal.<sup>46</sup> The court reasoned the digital models had no creative attributes—they were simply unadorned digital replicas of real cars.<sup>47</sup> Therefore, despite the extremely low standard for originality, there still remains a point at which an author’s work can be deemed unoriginal.

*Meshwerks* also delved into the authorial intent of unoriginality, stating, “If an artist affirmatively sets out to be unoriginal—to make a copy of someone else’s creation, rather than to create an original work—it is far more likely that the resultant product will, in fact, be unoriginal. . .”<sup>48</sup> Nevertheless, *Meshwerks*’s analysis still recognizes the low bar for originality:

*Of course, this is not to say that the accidental or spontaneous artist will be denied copyright protection for not intending to produce art; it is only to say that authorial intent sometimes can shed light on the question of whether a particular work qualifies as an independent creation or only a copy.*<sup>49</sup>

Thus, *Meshwerks* seems to follow the same low standard of originality—the “accidental or spontaneous” artist has grounds for copyrightability, despite not intending to produce art; that is, unintentional works satisfy the originality requirement for copyrights.

Comparably, cases involving the copyrights of photographs focused on the issue of original authorship. In *Burrow-Giles Lithographic Co. v. Sarony*,<sup>50</sup> the U.S. Supreme Court decided whether a photograph was an original work of the author or the exact reproduction of a natural scene.<sup>51</sup> The Court held the “photograph to be an original work of art, the product of plaintiff’s intellectual invention, which plaintiff is the author.”<sup>52</sup> The Court found originality in the photographer’s posing of the model, selecting and arranging of the costumes and accessories,

44. *Feist Publ’ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 345 (U.S. 1991); *see also Catalda Fine Arts*, 191 F.2d at 103 (“No matter how poor artistically the ‘author’s’ addition, it is enough if it be his own.”).

45. *Meshwerks, Inc. v. Toyota Motor Sales U.S.A., Inc.*, 528 F.3d 1258 (10th Cir. 2008).

46. *Id.* at 1269 (“[W]e hold that *Meshwerks*’ digital, wire-frame models are insufficiently original to warrant copyright protection. . .”).

47. *Id.* at 1266 (“To the extent that *Meshwerks*’ digital wire-frame models depict only those unadorned vehicles, having stripped away all lighting, angle, perspective, and “other ingredients” associated with an original expression, we conclude that they have left no copyrightable matter.”).

48. *Id.* at 1268.

49. *Id.* (emphasis added).

50. *Burrow-Giles Lithographic Co. v. Sarony*, 111 U.S. 53 (1884).

51. *Id.* at 56.

52. *Id.* at 60.



arranging the light and shadows, and suggesting and evoking desired expressions.<sup>53</sup> Thus, the photograph is an original work of authorship because the photographer “directed” the natural scene.

But is there original authorship in undirected photographs, or photographs where the photographer is passively snapping shots of the natural scene? Recently, *Mannion v. Coors Brewing Co.*,<sup>54</sup> determined there is more than one way a photograph can be original.<sup>55</sup> The district court of New York stated, “Almost any photograph ‘may claim the necessary originality to support a copyright.’”<sup>56</sup> The court then set forth three aspects of originality in photographs: (1) rendition, (2) timing, and (3) creation of the subject matter.<sup>57</sup>

Originality by rendition refers to “such specialties as angle of shot, light and shade, exposure, effects achieved by means of filters, developing techniques etc.”<sup>58</sup> Originality through timing occurs when the photographer snaps the photograph “in the right place at the right time.”<sup>59</sup> Lastly, “a photograph may be original to the extent that the photographer created ‘the scene or subject to be photographed.’”<sup>60</sup> These three points of originality for photographs are not mutually exclusive, and *Mannion* provides broad grounds for photographs to be original.<sup>61</sup> Consequently, almost any photograph is an original work of authorship.<sup>62</sup>

The cases mentioned above set a simple standard for originality: authors cannot copy other works, and authors must input a modicum of creativity into their works<sup>63</sup> (even if the creative input is unintentional<sup>64</sup>). Unsurprisingly, this standard reflects principles of Romanticism, including the Romantic author’s task to bring unique works into the world (independent creation) that emanate from the author’s mind (creativity).<sup>65</sup> Moreover, the originality standard is low enough to include

53. *Id.*

54. *Mannion v. Coors Brewing Co.*, 377 F. Supp. 2d 444 (S.D.N.Y. 2005).

55. *Id.* at 452–54.

56. *Id.* at 450.

57. *Id.* at 452–54.

58. *Id.* at 452.

59. *Id.*

60. *Id.*

61. *Id.* at 450.

62. *Id.*

63. *Feist Publ’ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 345 (U.S. 1991)..

64. *Alfred Bell & Co. v. Catalda Fine Arts*, 191 F.2d 99, 105 (2d Cir. 1951). (“Having hit upon such a variation unintentionally, the ‘author’ may adopt it as his and copyright it.”); *Meshwerks, Inc. v. Toyota Motor Sales U.S.A., Inc.*, 528 F.3d 1258, 1268 (10th Cir. 2008). (“Of course, this is not to say that the accidental or spontaneous artist will be denied copyright protection for not intending to produce art. . .”).

65. *See Blumenthal, supra* note 16, at 165.

almost any work.<sup>66</sup> Thus, U.S. copyright law allows anyone the potential to bear the illustrious title of “author.”

## II. MIND-MOVIES: THE NEUROTECHNOLOGY

### A. Defining “Mind-Movie”

“Mind-movie” is a term coined in this Article to describe any dynamic visual images read from, or extracted out of, the human brain; that is, visual stimuli, memories, or any other mental impressions of the natural world. This Article uses the term “mind-movie” broadly to incorporate current neurotechnology and any potential neurotechnology of the future<sup>67</sup>—including neurotechnology that measures more than the brain’s primary visual cortex.<sup>68</sup> Obviously, it is impossible for anyone to predict how mind-movies will progress, but one can draw reasonable inferences based on the researchers’ goals and discussions.<sup>69</sup>

66. See *Feist*, 499 U.S. at 345; see also *Catalda Fine Arts*, 191 F.2d at 103 (“No matter how poor artistically the ‘author’s’ addition, it is enough if it be his own.”).

67. This Article’s “mind-movie” definition incorporates potential neurotechnology of the future because the analysis assumes researchers will make great advancements in the coming years, including better measurement procedures of the brain and clearer production of images. This assumption is loosely based on “Moore’s Law,” which considers the rapid advancement of technology. See Ann C. Hodges & Porcher L. Taylor, III, *The Business Fallout from the Rapid Obsolescence and Planned Obsolescence of High-Tech Products: Downsizing of Noncompetition Agreements*, 6 COLUM. SCI. & TECH. L. REV. 3, 27 (2005) (stating “[Moore’s Law] remains valid today, with the widely accepted understanding that computing power doubles on average “every eighteen months at the same price point.”). The assumption of neurotechnology advancement may push this Article into highly abstract areas. Nonetheless, remember Justice Story’s quote: “[C]opyrights approach, nearer than any other class of cases belonging to forensic discussions, to what may be called the metaphysics of the law, where the distinctions are, or at least may be, very subtle and refined, and, sometimes, almost evanescent.” *Folsom v. Marsh*, 6 Hunt Mer. Mag. 175, 175 (C.C.D. Mass. 1841).

68. See *infra* notes 88–89, 153–157 and accompanying text.

69. There are limitations to the current neurotechnology, including the reconstruction technology that is explained in this Article. Nevertheless, “[r]econstruction is the most ambitious form of brain reading.” *The Gallant Lab*, *supra* note 5. When the technology is further developed, it may be possible to decode dreams, memory, and subjective mental imagery. “Neuroscientists generally assume that all mental processes have a concrete neurobiological basis. Under this assumption, as long as we have good measurements of brain activity and good computational models of the brain, it should be possible, in principle, to decode the visual content of mental processes like dreams, memory, and imagery. However, current computational models of visual processing have been developed to account for visual perception of natural scenes. The accuracy of these models for decoding subjective states such as dreaming and imagination will depend on how similar those processes are to normal visual perception. This is an active topic of research in our lab and in many other labs.” *Id.*; see Kendrick N. Kay et al., *Identifying Natural Images From Human Brain Activity*, 452 NATURE 352, 352 (2008) available at <http://gallantlab.org/publications/2008a.Kay.etal.pdf> (“For example, we could use the decoder to investigate differences in perception across people, to study covert mental processes such as attention, and perhaps even to access the visual content of purely mental phenomena such as dreams and imagery.”); Farahany, *supra* note 6, at 392 (“But this research, together with the emerging research in the neuroscience of memories, demonstrates a convergence between neuroimaging and pattern recognition technology. If pattern recognition and ‘reading’ from the visual cortex is possible, it may also be possible to do pattern reconstruction from the regions of the brain actively involved in memory recall.”).

### B. *The Mind vs. The Brain*

The neurotechnology for mind-movies is often referred to as “mind-reading” technology. Accordingly, a definition of “mind-reading” is required before a discussion about the neurotechnology. There is a distinction between the mind (consciousness and thoughts) and the brain (the physical organ), known as the “mind-body problem.”<sup>70</sup> This distinction is important because if the mind equals the brain, then reading the actual physical brain is the same as mind-reading.<sup>71</sup>

There is much debate over the mind-body problem in the philosophical community.<sup>72</sup> Rene Descartes, the famous philosopher who coined the phrase “I think, therefore I am,” forwarded the position of “dualism,” which holds that the non-material mind is completely different from the material brain.<sup>73</sup> Conversely, other philosophers posit “materialism,” which holds there is nothing beyond the physical material of our brains—the mind *is* the brain.<sup>74</sup>

Whichever position is taken can drastically change a discussion of mind-reading technology. Therefore, this Article follows the computational theory of mind (“CToM”).<sup>75</sup> CToM solves the mind-body problem by comparing the brain to a computer, and asserting that the mind is not the brain, but what the brain does.<sup>76</sup> Steven Pinker describes CToM:

[CToM] says that beliefs and desires are *information*, incarnated as configurations of symbols. The symbols are the physical states of bits of matter, like chips in a computer or neurons in the brain. They symbolize things in the world because they are triggered by those things via our sense organs, and because of what they do once they are triggered. . . The computational theory of mind thus allows us to keep beliefs and desires in our explanations of behavior while planting them squarely in the physical universe.<sup>77</sup>

In other words, the mind “runs” on the brain like a program runs on a computer. Thus, one can determine the program being run (the mind and thoughts) through the processes of the machine (the brain).

CToM aligns nicely with the neurotechnology described in this Article, because researchers at UC Berkeley have been able to reconstruct the mind “program” by measuring the activity of the “computer” brain. Professor Jack Gallant at UC Berkeley gave insight into how the current neurotechnology works: “We’re not

70. Shen, *supra* note 6, at 672.

71. *Id.*

72. *Id.*

73. René Descartes, THE STANFORD ENCYCLOPEDIA OF PHILOSOPHY (Dec. 8, 2011), <http://plato.stanford.edu/archives/sum2011/entries/descartes/>.

74. Shen, *supra* note 6, at 672.

75. *Id.* at 673.

76. STEVEN PINKER, HOW THE MIND WORKS 24–25 (1997).

77. *Id.* at 25.

really peering into your brain and reconstructing pictures in your head. We're reading your brain activity and using that brain activity to reconstruct what you saw."<sup>78</sup> Thus, for purposes of this Article, "mind-reading" is capturing the brain's visual experience by measuring the processes of the physical brain.

### C. Dr. Gallant's Current Mind-Movie Neurotechnology

Mind-reading has become a reality.<sup>79</sup> Scientists all over the world are devising various methods to decode the human brain.<sup>80</sup> However, one of the more impressive methods came from Professor Jack Gallant and his colleagues at UC Berkeley who developed a process to discover mind-movies.<sup>81</sup>

Dr. Gallant is striving towards a general mind-reading device that reconstructs a movie of a person's visual experience at any moment in time, and accesses the visual content of purely mental phenomena such as dreams and imagery.<sup>82</sup> Dr. Gallant already broke unprecedented grounds in neuroscience by reconstructing a person's brain activity to create a rough "movie" of the person's visual experiences.<sup>83</sup> Dr. Gallant said, "You walk around the world,. . . [and] in some sense, you're really just watching a movie of the world going by."<sup>84</sup>

78. PBS News Hour, *It's Not Mind-Reading, but Scientists Exploring How Brains Perceive the World*, YOUTUBE (Jan. 2, 2012), [https://www.youtube.com/watch?v=mmD0gMxokDo&feature=player\\_embedded](https://www.youtube.com/watch?v=mmD0gMxokDo&feature=player_embedded) [hereinafter PBS].

79. *Mind-goggling*, THE ECONOMIST (Oct. 29, 2011), <http://www.economist.com/node/21534748/> [hereinafter THE ECONOMIST]. Interestingly, Nikola Tesla tried to develop his own mind-reading technology in 1893. In Tesla's words: "I expect to photograph thoughts. . . In 1893, while engaged in certain investigations, I became convinced that a definite image formed in thought, must by reflex action, produce a corresponding image on the retina, which might be read by a suitable apparatus. This brought me to my system of television which I announced at that time. . ." Bill Smallwood, *Fun Fact Friday: Nikola Tesla*, DISCOVERYEDUCATION.COM (Sept. 27, 2013), <https://blog.discoveryeducation.com/blog/2013/09/27/fun-fact-friday-nikola-tesla/>.

80. Many other brain-reading methods exist but are not discussed in this article. For example, Francisco Pereira and his colleagues at Princeton University determined what topics people were pondering. THE ECONOMIST, *supra* note 79. Dr. Pereira measured people's brain activity as they thought about certain objects. Dr. Pereira then used an algorithm to determine what type of object the person was thinking; for example, Dr. Pereira could say a person was thinking about a vegetable, but could not distinguish a carrot from a stick of celery. *Id.* Additionally, Martin Dresler, of the Max Planck Institute of Psychiatry in Munich, and his colleagues were able to identify actions performed in dreams. *Id.* Dr. Dresler recruited several lucid dreamers (people who can control their actions within a dream as if they were awake). *Id.* Dr. Dresler instructed the lucid dreamers to perform several actions within dream state. Once the lucid dreamers were asleep, Dr. Dresler recorded their brain activity. Dr. Dresler was able to distinguish the actions of people in dreams by their brain activity, which matched the same activity as if it were performed in reality. *Id.* This study was the first time science proved that the brain, when dreaming, behaves like the brain when awake. *Id.*

81. Kay, *supra* note 69.

82. *See id.*

83. A video of the fMRI reconstruction is on YouTube. Jack Gallant, *Movie Reconstruction From Human Brain Activity*, YOUTUBE (Sept. 21, 2011), <https://www.youtube.com/watch?v=nsjDnYxJ0bo>.

84. PBS, *supra* note 78.

Dr. Gallant devised a process that treats the brain like a camera—automatically absorbing information through the retina and registering the imagery in the brain.<sup>85</sup> First, Dr. Gallant placed an observer in a functional magnetic resonance imaging (“fMRI”) machine.<sup>86</sup> An fMRI machine is a large device that “measures brain activity by detecting the associated changes of blood flow” in the brain.<sup>87</sup> Dr. Gallant focused the fMRI machine on the observer’s primary visual cortex—the part of the brain used to process general shapes, textures, and movement.<sup>88</sup> The brain activity in the primary visual cortex is assumedly related to the particular visual stimulus that is being viewed at any point in time.<sup>89</sup>

Accordingly, Dr. Gallant showed the observer scenes from film trailers while the computer recorded the fMRI brain activity from the observer’s primary visual cortex.<sup>90</sup> Dr. Gallant and his colleagues compared the film trailers frame by frame with the fMRI brain activity, and looked for correlations between the two.<sup>91</sup> Thus, the researchers matched each visual scene with the corresponding fMRI brain activity pattern.

The researchers then fed the computer 5,000 hours of clips from YouTube,<sup>92</sup> and asked the computer to predict what the matching fMRI pattern would look like based on the correlations.<sup>93</sup> Dr. Gallant said, “We want to essentially build a dictionary that translates between things that happen in the world.”<sup>94</sup> Therefore, the footage from YouTube would act as a “dictionary” to decode the brain activity and allow the computer to reconstruct the images.<sup>95</sup>

Next, the observer re-entered the fMRI machine and watched a new set of film trailers,<sup>96</sup> which the observer had never seen before.<sup>97</sup> The computer looked at

85. Lisa Katayama, *The Quest to Read the Human Mind*, POPULAR SCIENCE (Feb. 9, 2010), <http://www.popsoci.com/science/article/2010-01/mind-readers>.

86. Kay, *supra* note 69.

87. Ming Song & Tianzi Jiang, *A Review of Functional Magnetic Resonance Imaging for Brain-netome*, NEUROSCIENCE BULLETIN (June 2012), <http://www.nlpr.ia.ac.cn/2012papers/gjkw/gk75.pdf>.

88. PBS, *supra* note 78.

89. *The Gallant Lab*, *supra* note 5.

90. Kay, *supra* note 69, at 353.

91. THE ECONOMIST, *supra* note 79.

92. YouTube is a video-sharing website, on which users can upload, view and share videos. YouTube displays a wide variety of user-generated video content, including movie clips, TV clips, and music videos, as well as amateur content such as video blogging, short original videos, and educational videos. *YouTube*, WIKIPEDIA, <http://en.wikipedia.org/wiki/YouTube> (last visited Nov. 13, 2013).

93. THE ECONOMIST, *supra* note 79.

94. PBS, *supra* note 78.

95. Dr. Gallant’s use of YouTube brings about a whole set of copyright issues on its own. A couple of issues are addressed in the footnotes of this Article, but most are outside the scope of the Article.

96. THE ECONOMIST, *supra* note 79.

97. *The Gallant Lab*, *supra* note 5 (“we try to reconstruct the stimulus that a person saw while they were being scanned, even if the stimulus is completely novel and has never been seen before. For

the observer's new fMRI patterns and picked the YouTube clips whose corresponding hypothetical fMRI pattern best matched the real one.<sup>98</sup> The computer then "melded these clips together to produce an estimate of what the real clip looked like."<sup>99</sup> Thus, the computer reconstructed the fMRI brain activity to generate a rough movie of the observer's visual experience.<sup>100</sup>

Dr. Gallant's process yields staggering results. The reconstructed fMRI activity produces recognizable images from the film trailers.<sup>101</sup> Additionally, the reconstructed images move in the same way as the film trailer, and contain similar colors.<sup>102</sup> Such a breakthrough is novel in the neuroscience community. Dr. Gallant said, "Everyone always thought it was impossible to recover dynamic brain activity with fMRI."<sup>103</sup> Benjamin Singer, an fMRI researcher at Princeton University, said "Usually you only get that kind of accuracy in physics, not neuroscience. . . . It's a tour de force that brings together decades of work."<sup>104</sup>

Reconstructing the brain activity is a major step toward the ultimate goal of picturing subjective mental processes.<sup>105</sup> Future advances in brain signal measurement, development of more sophisticated encoding models, and better understanding of the structure of natural images will eventually make this goal a reality.<sup>106</sup> Thus, one day, it should be possible to decode the visual content of mental processes like dreams, memory, and imagery.<sup>107</sup>

example, if someone watched a movie while in the scanner, we could try to recreate the movie that they were watching").

98. THE ECONOMIST, *supra* note 79.

99. *Id.*

100. Here is a brief hypothetical to summarize and illustrate Dr. Gallant's process: Mr. Beck watches a single video of a blooming flower ("Video A") while connected to an fMRI machine. The computer records Mr. Beck's fMRI brain activity while he watches Video A, and associates Mr. Beck's fMRI pattern with a blooming flower. The computer takes several other YouTube videos of blooming flowers and predicts the future fMRI patterns of Mr. Beck when he watches other blooming flowers. Thus, when Mr. Beck watches a completely new video containing a blooming flower ("Video B"), the computer recognizes Mr. Beck's fMRI pattern, and knows the pattern is correlated to a blooming flower. Accordingly, the computer pulls all the YouTube clips of blooming flowers and melds them together to predict Mr. Beck's visual experience of Video B. The final product is a mind-movie from Mr. Beck's brain that presents the image of a blooming flower.

101. THE ECONOMIST, *supra* note 79.

102. *Id.*

103. Erica Westly, *Brain Imaging Reveals What You're Watching*, MIT TECHNOLOGY REVIEW (Sept. 22, 2011), <http://www.technologyreview.com/news/425520/brain-imaging-reveals-what-youre-watching/>.

104. *Id.*

105. *The Gallant Lab*, *supra* note 5.

106. *Id.*

107. *Id.*; Interestingly, mind-movies fit nicely within the theory of Romantic authorship—content recorded or extracted directly from the author's brain is the most personal and unique work the author can offer to society.

## III. ORIGINAL AUTHORSHIP IN MIND-MOVIES

It is uncertain how courts will rule on cases involving mind-movies. Assuming mind-movies progress into clear depictions of visual experiences,<sup>108</sup> federal judges may find difficulty in applying the doctrine of original authorship to works taken directly from the brain. Nevertheless, this Article argues that under case law precedent, mind-movies are original works of authorship in at least two ways: unique visual experiences and unique mental processes.

A. *Unique Visual Experiences*

This Article refers to “unique visual experiences” for the vantage point of a person viewing a natural scene, i.e., where a person stands, the angle at which they tilt their head, their visual eyesight, etc. These unique visual experiences likely produce originality for copyright purposes because the visual information conveyed to the primary visual cortex is unique and specific to each person.

For example, a mind-movie will vary for each person due to differences in eyesight. The eyes are the brain’s “window to the world” and how the brain gathers any visual information.<sup>109</sup> Thus, a difference in eyesight automatically changes the visual information entering the primary visual cortex, ergo variations in mind-movies.

Originality for copyright purposes may lie in varied eyesight alone. In *Catalda Fine Arts*, the court explicitly pointed to “bad eyesight” as a variation worth original authorship: “A copyist’s bad eyesightFalse may yield sufficiently distinguishable variationsFalse [that] the ‘author’ may adopt it as his and copyright it.”<sup>110</sup> Noticeably, the court was not referring to eyesight in terms of mind-movie neurotechnology.<sup>111</sup>

However, the analysis of *Catalda Fine Arts* still applies. The court reasons that bad eyesight changes how the author produces the work; thus, providing a unique variation upon the work.<sup>112</sup> Similarly, a person with poor vision will produce a completely different mind-movie than a person with 20/20 vision. The

108. See *supra* notes 67, 69 and accompanying text.

109. Light enters the eye through an opening the center of the iris called the pupil. It is focused by the lens and cornea and projected onto the retina, the rear or the surface of the eye, which is lined with visual receptors. The receptors send their messages to bipolar cells, neurons located closed to the center of the eye. The bipolar cells send their messages to ganglion cells, located still closer to the center of the eye. The ganglion cells loop together and exit the eye to form the optic nerve. Visual stimuli travel through the optic nerve to the brain to be processed by the primary visual cortex. JAMES W. KALAT, *BIOLOGICAL PSYCHOLOGY* 153–168 (9th ed. 2007).

110. *Alfred Bell & Co. v. Catalda Fine Arts*, 191 F.2d 99, 105 (2d Cir. 1951)..

111. See *supra* notes 40–41 and accompanying text.

112. See *Catalda Fine Arts*, 191 F.2d at 105.

person with 20/20 vision has the ability to capture more details of a natural scene for the brain to process, and provide explicit details in a mind-movie. Conversely, a person with poor vision cannot see certain details of the same natural scene. Thus, a person with poor vision will process completely different visual information and produce distinguishable variations in his or her mind-movie.

Under *Catalda Fine Arts*, the variations in mind-movies, produced from bad eyesight, are original to the author and can be copyrighted.<sup>113</sup> Still, courts might be reluctant to look solely at the results of eye examinations or ocular proscriptions to determine the originality of mind-movies. Moreover, the argument is severely weakened if two people have 20/20 vision (or the same proscriptions)—objective evidence that the visual information entering the primary visual cortex is similar.

Accordingly, courts can look to the photography cases to determine the originality of mind-movies. Dr. Gallant's mind-movie process already considers the brain a biological camera;<sup>114</sup> thus, original authorship as it applies to a mechanical camera is likely comparable. *Burrow-Giles* determined that a photograph flowed entirely from the photographer's original mental conception, despite it capturing information from the natural world.<sup>115</sup> Therefore, a mind-movie seems original because it captures the visual experiences of the brain—similar to a photograph.

However, *Burrow-Giles* based originality on the photographer "directing" the captured scene. The photographer posed the model, arranged the lighting, and evoked the desired expressions in the photograph.<sup>116</sup> This is different from a person who is merely living life, observing natural scenes, and passively gathering visual information to the primary visual cortex. When a person visually experiences a sporting event, a sunrise, or a shooting star, he or she is not directing, posing, arranging, or evoking anything in the scene. The person is merely "capturing" what is present, and not "directing" the scene.

This "passive observer" arguably creates an unoriginal mind-movie. In *Meshwerks*, the designers created unadorned and accurate digital models of real cars, without adding any original expression.<sup>117</sup> Thus, the court found the digital models to be unoriginal.<sup>118</sup> Likewise, the passive observer is merely gathering visual information with accuracy, and he is not adding any creative attributes. Thus, the passive observer's mind-movie is unoriginal.

113. *Id.*

114. Katayama, *supra* note 85 ("The visual cortex works like a camera, automatically absorbing information through the retina and registering the imagery in the brain.")

115. *Burrow-Giles Lithographic Co. v. Sarony*, 111 U.S. 53, 60 (1884).

116. *Id.*

117. *Meshwerks, Inc. v. Toyota Motor Sales U.S.A., Inc.*, 528 F.3d 1258, 1269–70 (10th Cir. 2008).

118. *Id.* at 1269.



Still, this argument fails on two grounds. First, a person cannot actually observe a natural scene with complete accuracy and produce an unoriginal mind-movie. Such a feat is likely improbable, and maybe even impossible, given various studies on how people's visual stimuli and memories can often be inaccurate.<sup>119</sup> These inaccuracies themselves make mind-movies original under *Catalda Fine Arts's* reasoning for unintentional variations.<sup>120</sup> Moreover, as will be discussed later in this Article, an observer's subconscious mental processes automatically impose originality on visual information, despite the passive observer's intent to create unoriginal mind-movies.<sup>121</sup>

Second, the passive observer is probably more akin to *Meshwerks's* "accidental or spontaneous artist." For example, an accidental or spontaneous artist may throw buckets of paint onto a canvas without any intention of creating a work. Nevertheless, *Meshwerks* holds the artist can still receive copyright protection in such a work, despite the artist not intending to produce art.<sup>122</sup>

Similarly, the passive observer may not intend to produce art, but this does not prevent him from claiming the mind-movie as an original work of authorship. When the passive observer is viewing natural scenes, he essentially "throws" the paint of the world onto the canvas of his brain and creates an original work without any intention of creating art. The mind-movie is an extraction of that original work from the observer's brain and is copyrightable whether the observer intends to create the work or not.

Nonetheless, positing unique visual experiences as the basis for originality in mind-movies probably finds the strongest support from *Mannion*. In *Mannion*, the court forwarded rendition (angle of the shot) and timing (right place at the right time) as two ways photographs can be original to the author.<sup>123</sup> Similarly, mind-movies are original in terms of rendition and timing.

A person observing a natural scene from various angles creates a unique visual experience in a mind-movie that satisfies originality by rendition. Where a person is standing, how a person holds their head, and even a person's height, all

119. See Jennifer L. Overbeck, *Beyond Admissibility: A Practical Look at the Use of Eyewitness Expert Testimony in the Federal Courts*, 80 N.Y.U. L. REV. 1895, 1895 (2005) ("However, thirty years of psychological research into the workings of human memory have revealed that eyewitness accounts are frequently flawed, either because the witness's original perception of the event was flawed, or because the memory was subconsciously altered prior to testifying at trial."); see Fredric D. Woocher, *Did Your Eyes Deceive You? Expert Psychological Testimony on the Unreliability of Eyewitness Identification*, 29 STAN. L. REV. 969, 976 (1977) ("The inherent limitations of the human brain are the major source of inaccuracy in perception. People can perceive only a limited number of the simultaneous stimuli in the environment at any time. . .").

120. *Alfred Bell & Co. v. Catalda Fine Arts*, 191 F.2d 99, 105 (2d Cir. 1951).

121. See discussion *infra* Part III.B.

122. *Meshwerks*, 528 F.3d at 1268.

123. *Mannion v. Coors Brewing Co.*, 377 F. Supp. 2d 444, 452–54 (S.D.N.Y. 2005).

contribute to a unique visual perspective when gathering visual stimuli. For example, Person-A watching a waterfall from the North will have a completely different visual experience from Person-B, who is watching the same waterfall from the West. The visual experiences vary further if Person-A is two feet taller than Person-B.

These differences in visual experiences are specifically attributable to Person-A and Person-B, and thus original to each person. *Mannion* provides that such renditions, or angles, of visual experiences are original and copyrightable.<sup>124</sup> Therefore, mind-movies are original works of authorship based on rendition.

Additionally, mind-movies are original in terms of timing. *Mannion* illustrates originality through timing by referencing Thomas Mangelsen's photograph, *Catch of the Day*.<sup>125</sup> *Catch of the Day* depicts a salmon jumping into the gaping mouth of a brown bear.<sup>126</sup> Mr. Mangelsen is the only person who captured the photograph at that moment in time because nobody else was "standing in his shoes" and snapping the shutter at the exact time.<sup>127</sup> Thus, the photograph is original to Mr. Mangelsen in terms of timing.<sup>128</sup>

Likewise, a mind-movie continually captures precise moments of a visual experience that is original to the individual who "captures" the visual stimuli. If a mind-movie were paused at any second, the image presented would be just as original in timing as *Catch of the Day*. No one else can be in the observer's head and capture the observer's visual experience at that moment in time. Consequently, mind-movies are original in terms of timing because the precise moments are personally unique to the individual gathering the visual stimuli.<sup>129</sup>

Using the language of *Bleistein* and *Catalda Fine Arts*, a unique visual experience is a "personal reaction of [the] individual upon nature,"<sup>130</sup> which creates

124. *Id.* at 452.

125. *Id.* at 453 (a digital image of the photograph *Catch of the Day*, MANGELSEN, available at <http://mangelsen.com/out-of-print-images/catch-of-the-day-1698.html> (last visited Feb. 15, 2014).

126. *Id.*

127. See *Mannion*, 377 F. Supp. at 452 ("in the right place at the right time").

128. *Mannion* also notes that "[c]opyright based on originality in timing is limited by the principle that copyright in a photograph ordinarily confers no rights over the subject matter. Thus, the copyright in *Catch of the Day* does not protect against subsequent photographs of bears feasting on salmon in the same location. Furthermore, if another photographer were sufficiently skilled and fortunate to capture a salmon at the precise moment that it appeared to enter a hungry bear's mouth-and others have tried, with varying degrees of success - that photographer, even if inspired by Mangelsen, would not necessarily have infringed his work because Mangelsen's copyright does not extend to the natural world he captured." *Id.*

129. This does not prevent another person from standing in the same spot, watching the same scene, and claiming copyright in their own mind-movie. See *Bleistein v. Donaldson Lithographing Co.*, 188 U.S. 239, 250 (1903) ("Others are free to copy the original [and natural scene]. They are not free to copy the [work]. . .").

130. *Bleistein*, 188 U.S. at 250.

“sufficiently distinguishable variations.”<sup>131</sup> *Bleistein* stated such personal reactions were copyrightable,<sup>132</sup> and *Catalda Fine Arts* similarly determined distinguishable variations (whether intentional or unintentional) are copyrightable.<sup>133</sup> Thus, unique visual experiences give mind-movies at least a scintilla of originality.

### B. Unique Mental Processes

This Article uses the phrase “unique mental processes” to encapsulate the variations of mental perception, brain activity, and brain physiology. The unique mental processes of visual stimuli generate originality in mind-movies. Mental processes are different for each person; whether it is perception models based on personal experience or physical differences in the way each brain processes information. Therefore, the human brain acts as a subjective “filter” for the visual information gathered and ultimately presented in mind-movies.<sup>134</sup>

First, human perception likely generates originality in mind-movies.<sup>135</sup> Perception is an aspect of human behavior where each individual’s experience combine in a complex fashion to determine his or her reaction to a given stimulus situation.<sup>136</sup> Perception is based on internal “models” or representations of experiences in the world.<sup>137</sup> Robert V. Wells explains how these internal models apply to our everyday lives:

131. *Alfred Bell & Co. v. Catalda Fine Arts*, 191 F.2d 99, 105 (2d Cir. 1951).

132. *Bleistein*, 188 U.S. at 250.

133. *Catalda Fine Arts*, 191 F.2d at 105.

134. Of course the current use of YouTube in Dr. Gallant’s process may conform some of the subjective differences in brains. Dr. Gallant’s process is limited by using a finite number of YouTube videos to reconstruct brain activity. Therefore, the same YouTube videos can be used to reconstruct brain activity from different people and lead to similar results. For example, Person-A and Person-B might watch the same blooming flower but pay attention to different aspects of the flower, or mentally perceive the flower in completely different ways; i.e., Person-A thinks the flower is blue and Person-B thinks the flower is purple. However, YouTube only has a video of a yellow flower blooming, and uses that video to reconstruct the different brain activity of Person-A and Person-B. Consequently, both mind-movies reach similar results despite specific differences in the subjective perceptions of Person-A and Person-B. Nevertheless, this Article defined “mind-movies” to incorporate future neurotechnology. Accordingly, this Article assumes the neurotechnology will inevitably reach the point of accuracy to convey the purely subjective differences of brain processes in mind-movies.

135. Human perception happens beyond the primary visual cortex. *See I KNOW WHAT YOU’RE THINKING: BRAIN IMAGING AND MENTAL PRIVACY* 61 (Sarah Richmond et al. eds., 2012) [hereinafter *BRAIN IMAGING*] (“The relationship between brain structure and visual perception extend outside sensory cortex in the occipital lobe of the human brain to encompass other areas.”). Still, this Article’s definition of “mind movie” incorporates future neurotechnology that measures the brain beyond the primary visual cortex. *See Id.*

136. Marshall H. Segall et al., *The Influence of Culture on Visual Perception*, in *SOCIAL PERCEPTION* 5 (Hans Toch & Clay Smith eds., 1968), <http://bin.sc/Collection/Net/allanmc/web/socialperception14.pdf>.

137. Robert V. Wells, *The Nature of Meaning: The Role of the Trial Lawyer in Creating and Shaping Meaning*, 32 AM. J. TRIAL ADVOC. 297, 300 (2008).

As we go through life, we develop models based on our unique backgrounds, and these meaning models mediate our perception and interpretation of new experiences. Each person's meaning models will necessarily differ from the meaning models of others, due to their unique backgrounds and experiences. Thus, we all perceive reality in a different way. In this respect, we all live in relatively different worlds.<sup>138</sup>

Consequently, internal models cause people to perceive different details when observing the same natural scene.<sup>139</sup> Going back to the hypothetical of Person-A and Person-B watching the same waterfall,<sup>140</sup> the mind-movies of each person can differ in terms of perception. Assuming Person-A has personal experience in bird-watching,<sup>141</sup> Person-A's mind-movie might incorporate the species of birds flying over the waterfall because Person-A is more prone to perceiving birds in the natural scene (even if done subconsciously).

On the other hand, Person-B may not be prone to gathering the information about the birds because he does not bird-watch or have any experience with birds. Instead, Person-B could be a botanist<sup>142</sup> and subconsciously notice the vegetation around the waterfall. Thus, Person-B's mind-movie might incorporate details about the surrounding vegetation. Accordingly, the visual experiences differ between Person-A and Person-B, despite both observing the same natural scene.

Although this example is simplistic, it illustrates how perception varies from person to person. Other examples of perceptual differences are when people see conflicting images in optical illusions,<sup>143</sup> or variances in eyewitness testimony for criminal cases.<sup>144</sup> Each person's perception skews the objective natural scene to become a subjective and unique visual experience.<sup>145</sup>

138. *Id.* at 315.

139. "Of all the stimuli striking your retina at any moment, you attend to only a few. A stimulus can grab your attention by its size, brightness, or movement, but you can also voluntarily direct your attention to one stimulus or another in what is called a 'top-down' process." KALAT, *supra* note 109, at 181. "People can perceive only a limited number of the simultaneous stimuli in the environment at any time. . . In order to cope with these innate limitations, an observer develops unconscious strategies to aid in the selectivity of perceptual processes and ultimately to concentrate attention on the most necessary and useful details." Woocher, *supra* note 119.

140. See discussion *supra* Part III.A.

141. "Bird-watching" is the observation of birds as a recreational activity. *Birdwatching*, WIKIPEDIA, <http://en.wikipedia.org/wiki/Birdwatching> (last visited Nov. 13, 2014).

142. A botanist is a person who studies plants and other vegetation. See *Botanist*, WIKIPEDIA, <http://en.wikipedia.org/wiki/Botanist> (last visited Nov. 13, 2014).

143. See BRAIN IMAGING, *supra* note 135 ("Vision scientists have long been fascinated by visual stimuli whose perceptual interpretation is ambiguous (for example, the Necker cube is a picture of a wire frame cube whose perspective interpretation is ambiguous between a cube who front face point down and to the left and one that points up and to the right). In such situations, perception alternates spontaneously between different possible interpretations. . .").

144. See Woocher, *supra* note 119.

145. "Our ability to accurately perceive reality and to create accurate representational models is limited by our unique personal history, which affects how we perceive reality." Wells, *supra* note 137, at 314.

As a result, perception yields originality in mind-movies. *Bleistein* found an author's drawing as a personal reaction upon nature that was unique, or original, to the author and copyrightable.<sup>146</sup> Similarly, a person's perception of visual information is a personal reaction upon a natural scene that is original. No two people have the exact same internal models or past experiences to perceive a natural scene in the same way.<sup>147</sup> Moreover, perception adds sufficiently distinguishable variations to the visual information that a person may adopt as his or her own (even if the observer unintentionally creates the variations).<sup>148</sup> Thus, perceptual variations lead to originality in mind-movies.

Another unique mental process that gives mind-movies sufficient originality is the physiological differences in human brains. "Everyone's brain is a little bit different," says Jim Haxby, a neuroscientist who led the first brain decoding study in 2001.<sup>149</sup> These physical differences in brains can actually cause distinguishable variations in visual information.

Geraint Rees and Ryota Kanai give examples of how differences in brain physiology cause variances in visual information:

One consequence of variability in human visual cortex anatomy is that individuals who have a larger surface area of primary visual cortex also have a greater ability to discriminate fine visual detail. But variability in surface area of primary visual cortex also has consequences for the appearance of objects. For example, the perceived size of objects is correlated with the surface area of the primary visual cortex. As primary visual cortex increases in surface area, the perceived size of visual objects decreases. . . [T]hese studies establish not only that there is considerable inter-individual variability in how we perceive key attributes of the visual environment, but that such variability in perception can in principle be predicted from measurements of the surface area of primary visual cortex.<sup>150</sup>

This variability of the visual environment fosters originality in mind-movies. Similar to perception, a person's brain physiology skews the objective natural scene to create a subjective and unique visual experience. The visual experience presented in mind-movies is unique to each person because everyone's brains are physiologically different and process visual information differently.<sup>151</sup> A person's

146. *Bleistein v. Donaldson Lithographing Co.*, 188 U.S. 239, 250 (1903).

147. Wells, *supra* note 137, at 315.

148. See *supra* note 42 and accompanying text.

149. Kerry Smith, *Reading Minds*, 502 NATURE 428, 430 (2013), [http://www.nature.com/polopoly\\_fs/1.13989!/menu/main/topColumns/topLeftColumn/pdf/502428a.pdf](http://www.nature.com/polopoly_fs/1.13989!/menu/main/topColumns/topLeftColumn/pdf/502428a.pdf). "Devising a decoding model that can generalize across brains, and even for the same brain across time, is a complex problem. Decoders are generally built on individual brains, unless they're computing something relatively simple. . ." *Id.*

150. BRAIN IMAGING, *supra* note 135, at 60.

151. See NAOMI GOLDBLUM, *THE BRAIN-SHAPED MIND: WHAT THE BRAIN CAN TELL US ABOUT THE MIND* 18 (2001) ("[P]eople's brains [are] different, just as everyone has different fingerprints from

unique skew on a natural scene creates sufficiently distinguishable variations<sup>152</sup> that the person may adopt as his own in mind-movies. Thus, mind-movies pass the low bar of originality due to unique mental processes.

Setting aside this Article's forward-looking definition for mind-movies,<sup>153</sup> Dr. Gallant's current process presents a specific issue, which may challenge the creative requirement of originality for future neurotechnology.<sup>154</sup> Originality requires a modicum of creativity,<sup>155</sup> but creativity must be present nonetheless. Dr. Gallant's process measures the fMRI brain activity from the brain's primary visual cortex.<sup>156</sup> The primary visual cortex is in the occipital lobe; where visual information is initially gathered and processed before reaching other parts of the brain.<sup>157</sup> However, creative thought is largely associated with the frontal lobes of the brain.<sup>158</sup> Therefore, can a mind-movie be original if it is taken only from the primary visual cortex; i.e., the "non-creative" part of the brain?<sup>159</sup>

The answer is likely found in *Catalda Fine Arts* and *Meshwerks*. In *Catalda Fine Arts*, the court determined an author's bad eyesight or defective musculature

everyone else"); see THE PRAEGER HANDBOOK OF LEARNING AND THE BRAIN 149 (Sheryl Feinstein ed., 2006) ("Individual. . . differences contribute to the fact that everyone's brain is different"); see THE DANA GUIDE TO BRAIN HEALTH 11 (edited by Floyd Bloom et al. eds., 2003) ("Everyone undergoes different experiences, and everyone's brain develops differently").

152. See *Alfred Bell & Co. v. Catalda Fine Arts*, 191 F.2d 99, 105 (2d Cir. 1951).

153. See discussion *supra* Part II.A.

154. See *supra* note 32 and accompanying text.

155. See *supra* notes 32, 44 and accompanying text.

156. PBS, *supra* note 78.

157. See KALAT, *supra* note 109; BRYAN KOLB & IAN Q. WHISHAW, FUNDAMENTALS OF HUMAN NEUROPSYCHOLOGY 373 (6th ed., 2009) ("The function of the occipital lobe is vision."); DAVID HUBEL, *The Primary Visual Cortex*, in EYE, BRAIN, AND VISION 3 (1995) available at <http://hubel.med.harvard.edu/book/ch4.pdf> ("fibers leave the primary visual cortex and project to several other cortical regions").

158. See Doris Estelle Long, *Dissonant Harmonization: Limitations on "Cash N' Carry" Creativity*, 70 ALB. L. REV. 1163, 1178 (2007) ("Creativity has been variously associated with frontal lobe activity."); CAMBRIDGE UNIVERSITY PRESS, THE CAMBRIDGE HANDBOOK OF CREATIVITY 117 (James C. Kaufman & Robert J. Sternberg eds., 2010) ("The frontal lobes and the right hemisphere are most centrally engaged during creative thought and problem solving. . . the prefrontal cortex—are what make our species unique. They form the seat of the higher reaches of human nature, namely, consciousness, creativity, personality, and morality."); Erez Reuveni, *Copyright, Neuroscience, and Creativity*, 64 ALA. L. REV. 735, 749 (2013) ("The cognitive architecture produces the constellation of neural nodes that yields creativity by engaging in what neuroscientists call divergent and convergent neural processes. When facing a problem requiring creative thought, the brain first seeks easy answers, concentrating on obvious facts and familiar solutions. This is mostly a left hemisphere function. If that process fails, the left hemisphere begins working in tandem with the right hemisphere, which engages in what is called divergent thinking, scanning through nodes accessible to the neural network and searching for patterns and associations that may be relevant to the problem.").

159. The primary visual cortex does transform the visual information received. See HUBEL, *supra* note 157 ("the primary visual cortex does exert profound transformations on the information it receives."). These transformations are likely original. See *supra* notes 149–152 and accompanying text. Nevertheless, courts may wrestle with the unusual idea of an original work taken from the non-creative part of the brain.

might yield sufficiently distinguishable variations to a work.<sup>160</sup> The author may adopt these variations as his own<sup>161</sup>—that is, the variations are original to the author—even if the variations were unintentional.<sup>162</sup>

However, there is no conscious creativity in an author's bad eyesight or defective musculature. These are merely practical characteristics of an author that produce variations in a work. Nevertheless, the court determines such characteristics can lead to unintentional variations that are copyrightable.<sup>163</sup>

Similarly, mind-movies contain sufficiently distinguishable variations that are original to the author and copyrightable, despite being taken from a “non-creative” part of the author's brain. Although creative thought is not associated with the primary visual cortex,<sup>164</sup> there are distinguishable variations in mind-movies due to unique visual experiences,<sup>165</sup> and physiological differences in the primary visual cortex.<sup>166</sup> These variations are unintentional, but such unintentional variations are covered under *Catalda Fine Arts*.<sup>167</sup> Thus, the bar of originality is low enough to incorporate works that may not be the direct product of conscience creativity.

*Meshwerks* further supports this notion. *Meshwerks* presents the road to unoriginality as a one-way street: the person who intentionally seeks to be unoriginal is more likely to produce an unoriginal work; conversely, the person who is not intending to produce any kind of work can still claim copyright protection.<sup>168</sup> The court explicitly states the “accidental or spontaneous artist” can still be afforded “copyright protection for not intending to produce art.”<sup>169</sup>

By highlighting the accidental or spontaneous artist, the court leaves the door open for works to be original despite the author's lack of conscious creativity. There is no conscience creativity in a work that is “accidental” or “spontaneous” (terms synonymous with “unthinking”<sup>170</sup>). Arguably, the artist who randomly throws paint onto a canvas is not exhibiting the same conscious creativity, or making the same creative choices as Picasso (especially if the artist is not intending to

160. *Alfred Bell & Co. v. Catalda Fine Arts*, 191 F.2d 99, 105 (2d Cir. 1951).

161. *Id.*

162. *Id.*

163. *Id.*

164. *See supra* notes 157–158.

165. *See discussion supra* Part III.A.

166. *See supra* notes 149–152 and accompanying text.

167. *See Catalda Fine Arts*, 191 F.2d at 105 (“Having hit upon such a variation unintentionally, the ‘author’ may adopt it as his and copyright it.”).

168. *Meshwerks, Inc. v. Toyota Motor Sales U.S.A., Inc.*, 528 F.3d 1258, 1268 (10th Cir. 2008).

169. *Id.*

170. APPLE DICTIONARY (Version 2.1.3, 2009) (search “accidental” and “spontaneous” in Thesaurus).

produce a work at all). Nevertheless, the low standard of originality affords both artists copyright protection for their respective works.

Accordingly, mind-movies taken from the “non-creative” part of the brain are likely original. If the bar for originality is low enough to include works from the “accidental or spontaneous author,” then a mind-movie with sufficiently distinguishable variations is probably original, despite being taken from the “non-creative” part of the brain. Therefore, mind-movies meet the low bar of originality, despite the lack of conscious creativity.

Unique mental processes alter the visual experiences of everybody. Each person can claim his or her unique mental process as their own, which leads to originality in mind-movies. The standard of originality is low enough to include mind-movies as original works of authorship, even if mind-movies are recorded from an area of the brain not associated with creative thought. Thus, mind-movies are sufficiently original due to unique mental processes.

#### CONCLUSION

The world is entering a new age of mind-reading neurotechnology. As a result, judges and courts will inevitably be faced with the novel issues associated with mind-reading, including the copyrightability of content taken directly from the brain. Nonetheless, the doctrine of original authorship sets the bar low enough to include almost any work. Thus, mind-movies satisfy the originality standard based on the author’s unique visual experiences and unique mental processes.

Originality for mind-movies harkens back to the Romantic author—the precursor to copyright’s original author—because content taken directly from the author’s brain, is the most unique and personal work the author can offer to society. The mind-movie gives society a glimpse of the author’s soul, and the author’s experiences and perceptions of life. Therefore, the mind-movie is the truest work of Romantic and original authorship.