# ‘Open Source’ Goes ‘Open Science’

by Nancy A. Del Pizzo

Innovation is the ultimate quest of the open source model, which is why it has naturally moved into biotechnology—and not just for software applications that may, for instance, help solve science-related problems, but also for development of synthetic biological tools for improving the food supply and fighting disease.[1] ‘Open source’ has long referred to software “whose code is made freely available to all users,” on the theory that a “crowd-sourced product, where the public is permitted to modify the code, will be superior to a privately developed” product.[2] Still, the licenses under which open source code is provided make it important for clients to identify the source of code and the terms of those licenses. This same caution will undoubtedly be necessary in the biotechnology arena if the open source concept becomes implanted there as well.

But the open source concept is not smoothly transferred into ‘open science.’ For one thing, the protectable interests generally involve different intellectual property rights. Open source software code generally implicates copyright law, while open science generally implicates patent law. Copyright holders have less of an initial financial outlay (copyright applications, after all, are not as costly as patent applications) and a longer term of protection (more than a lifetime compared to 20 years).[3] Because biotechnology research is expensive and competitive, and the term of protection and financial benefit of patent protection is shorter than copyright protection, the sharing and openness found in software coding are limited in the biotechnology space.[4]

Moreover, because patent holders have less time to financially capitalize on their inventions, they are motivated to enforce those rights. Consider *Bowman v. Monsanto Company*, where the holder of the patent for genetically modified soybean seed sued a farmer who licensed the right to use the seed for one season but planted the seeds of that one season’s crops in the subsequent season.[5] The United States Supreme Court found against the farmer for patent infringement, and noted that any other result would essentially render Monsanto’s patent useless.[6]

Still, there is a move afoot to share scientific research based on the open source model. The following paragraphs discuss how open source is used for software coding and efforts to expand the concept into open science.

## The Software Model

Software developers have been using open source code to help them more efficiently develop new software products, which can result in their services costing less money. The code provided via open source is typically provided under a license, which though allowing for free use and distribution, comes with restrictions. Some are quite rigid, such as the requirement that any new program using the open source code must also become open source and, thus, freely available to the public too.[7] In fact, there are upwards of 100 different licenses associated with open source code.[8] Software code is copyrightable, so it makes sense that some of these licenses require any new work developed using the code include a copyright notice acknowledging the author of the open source code used.[9]

Likewise, it also makes sense that when a party uses open source code and does not comply with the license for its use, the causes of action available to the owner of the open source code are not restricted to breach of contract.[10] The fact that open source code is made available at no cost does not render restrictions in a license meaningless.[11] In fact, the copyright holder of the open source code can grant a right to make certain modifications to the code while retaining the right to restrict other modifications.[12] Potential harm includes more than just loss of money, such as market share the program creator may obtain by providing components of software free to the public or an increase in the programmer’s (or company’s) international reputation, meaning it is possible for the alleged harm to be based exclusively on a theory of copyright infringement.[13]

That is not the same for open science, where patent law, not copyright law, is implicated.

### Protectability Issues in Biotechnology

Biotechnology incorporates synthetic biology, which "encompasses all aspects of research regarding genetic material."[14] At its core, synthetic biology naturally employs deoxyribonucleic acid (DNA), which encapsulates the genetic data of an organism.[15] Recent cases have distinguished what is patentable in this genre. Specifically, the United States Supreme Court recently held that naturally occurring DNA is not eligible for patent protection even where it takes some skill to isolate the DNA.[16] There, the Court distinguished naturally occurring DNA from synthetic DNA (called cDNA), holding that because cDNA is created in a laboratory (as opposed to having been isolated from nature) and, therefore, is "something new," it is distinct from the DNA from which it is derived, and may be patent-protected.[17]

However, unlike software code, "gene data...cannot be copyrighted."[18] Additionally, though there may be limited implications of trade secret law where software code is shared through open sources,[19] trade secret law may be completely thwarted in the open science context, since patents necessarily require public disclosure.

Thus, the limited protection of a utility patent (20 years),[20] compared to the more than lifetime protection under copyright law and other potential legal claims available where one infringes an open source computer code license, could dissuade the sharing of protectable information that would be needed for the open science concept to work. Nonetheless, there are several entities seeking to make that happen.

### Open Science Opportunities

Several entities have emerged to create open science opportunities. These include: 1) the BioBricks Foundation, a California entity created to encourage the sharing of genetically coded functions;[21] 2) the Internationally Genetically Engineered Machine Foundation (iGEM), which provides open access to more than 20,000 genetic parts for "building biological devices and systems;"[22] and, 3) CAMBIA,[23] an Australian-based nonprofit institute focusing on open science biology that provides, among others, The LENS, which provides access to patent applications[24] with full text and images and open source software.

The BioBricks Foundation's open science model is distinctly different than open source in the software realm, because it does not seek to 'license' what it offers. Instead, it sets out to enter into a contract with its users, whereby the users agree not to seek to prevent any other BioBricks user from using the technology shared and, if patented, agree not to enforce the patent against other BioBricks users.[25] The company

does not preclude a user from creating a novel material or application, assuming that could be done, or from obtaining patent protection for that result, though it does suggest the user "give back."[26]

Similarly, iGEM seeks to build its community collection of parts for a yearly $500 subscription fee.[27] The company also holds competitions for synthetic biology students.[28]

CAMBIA's The Lens is not all the entity offers. In its efforts to share science, CAMBIA LABS, an initiative of CAMBIA that for nearly two decades has created biological-enabling technologies, is in the process of abandoning patent protection for its inventions and no longer requiring licenses.[29] Instead, its plans include simply asking users of its technology or know-how to acknowledge its contribution to a work.[30]

## Conclusion

Assuming the open source model becomes more entrenched in biotechnology, it remains uncertain how much of an impact it will have, particularly since the biotechnology industry is competitive and new technology is capable of protection largely under patent law. At present, unlike with open source software code, a search of Westlaw does not identify any cases involving BioBricks, CAMBIA or iGEM, or open science and infringement. Perhaps the models are working or not engaging corporate scientists. Still, just like where a company intends to distribute, manufacture and/or sell the software product derived, in part, from open source code, it is imperative to recognize freely shared science does not necessarily come without cost, and careful attention to open science agreements are just as imperative as those involving open source code. ⚖

***Nancy A. Del Pizzo*** *is a partner in the intellectual property, commercial litigation and privacy, data and cyber law practice groups at Rivkin Radler LLP. She is based at the firm's Hackensack office.*

## ENDNOTES

1. Tej Singh, Open Source Business Models and Synthetic Biology, 14 *Chi-Kent J. Intell. Prop.* 455, 459 (Spring, 2015).
2. *See Versata Software, Inc. v. Ameriprise Fin., Inc.*, No.: A-14-CA-12-SS, 2014 U.S. Dist. LEXIS 30934, at *3-4 (W.D. Texas March 11, 2014).
3. *See* 35 U.S.C. § 154(a)(2) and 17 U.S.C. 302, 304.
4. *See* David W. Opderbeck, The Penguin's Genome, or Coase and Open Source Biotechnology, 18 *Harv. J. Law & Tec*. 167, 171 (Fall, 2004).
5. *Bowman v. Monsanto Company*, 133 S. Ct. 1761 (2013).
6. *Id*. at 1767, 1769.
7. *Id.* at *4 (referencing the terms of the GNU General Public License for XimpleWare's VTD-XML software).
8. *See* website of the Open Source Initiative, https://opensource.org/licenses/category (last reviewed on March 25, 2017).
9. *Id.*
10. *Jacobsen v. Katzer*, 535 F.3d 1373, 1381-82 (Fed. Cir. 2008) (holding that "copyright holders who engage in open source licensing have the right to control the modification and distribution of copyright material") (*citing Gillam v. ABC*, 538 F.2d 14, 21 (2d Cir. 1976)).
11. *Jacobsen*, 535 F.3d at 1381.
12. *Id*. at 1382.
13. *See id*. at 1379.
14. Singh, 14 *Chi-Kent J. Intell. Prop*. at 459.
15. *Id*.
16. *Assoc. for Molecular Pathology v. Myriad Genetics, Inc*., 133 S. Ct. 2107, 2109 (2013) (denying patent protection to company that uncovered the location and genetic sequence of BRCA1 and BRCA2 genes within chromosomes).
17. *Myriad Genetics, Inc.*, 133 S. Ct. at 2119.
18. Singh, 14 *Chi-Kent J. Intell. Prop*. at 464 (*citing* Stephen Maurer, Before It's Too Late, 10 *Eur. Molecular Biology Org. Rep.* 806, 808, note 11 (2009)).
19. *Id*. at 691.
20. 35 U.S.C. § 154(a)(2).
21. *See* www.biobricks.org (last viewed on April 9, 2017).
22. *See* www.igem.org/about (last viewed on April 9, 2017).
23. http://www.cambia.org/daisy/cambia/home.html (last viewed on April 9, 2017).
24. https://www.lens.org/lens/ (last viewed on April 9, 2017).
25. https://biobricks.org/bpa/faq/ (last viewed on April 9, 2017).
26. *Id*.
27. http://igem.org/Labs_Program (last visited on April 9, 2017).
28. http://igem.org/Competition (last visited on April 9, 2017).
29. http://www.cambia.org/daisy/cambialabs/ip_portfolio.html (last visited on April 9, 2017).
30. *Id.*