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Bridges II: The Law-STEM Alliance & Next Generation Innovation

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What incentives would foster more collaboration between the law and STEM fields, in either academic or business/entrepreneurial settings?

There are already significant incentives for collaboration between law and STEM: commercializing technologies, creating architectures for data-sharing, and funding for interdisciplinary research, for example.

[1] The problem is getting legal and STEM academics to think seriously about these virtues at the beginning of their work rather than as an afterthought. In particular, and despite the hype surrounding patent disputes like CRISPR, many scientists do not think about the intellectual property issues surrounding their work until late in the research process.[2] For some, encouraging scientists to think about these issues in the course of their work has the potential to taint the "purity" of scientific research, however defined.[3] But even if one views the legal incentives to conduct STEM research negatively, it's important to think about how to manage such incentives, even if the decision is made to forgo such rights or give them away.[4]

Perhaps the best way to foster law–STEM collaborations is to simply create spaces for such work. Many scientific journals, for example, have been excellent at publishing legal academics' work on the intersection between law and science.[5] But there appears to be little of the reverse: law

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[1] *See, e.g.*, Jacob S. Sherkow, *Cancer's IP*, 96 N.C. L. REV. (forthcoming 2018), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2928241 [https://perma.cc/GXA3-6WB5] (discussing these virtues in the context of cancer research).

[2] Sharon Begley, *Broad Institute Prevails in Heated Dispute over CRISPR Patents*, STAT NEWS (Feb. 15, 2017), https://www.statnews.com/2017/02/15/crispr-patent-ruling/ [https://perma.cc/5DCT-KJQ5] (describing the disconnect between patent law and "how much of the science world has viewed [the scientists'] work").

[3] Michael Eisen *Patents are Destroying the Soul of Academic Science*, IT IS NOT JUNK (Feb. 20, 2017), http://www.michaeleisen.org/blog/?p=1981 [https://perma.cc/UUY5-MQV7].

[4] *See* Brian Owens, *Montreal Institute Going "Open" to Accelerate Science*, SCIENCE (Jan. 21, 2016), http://www.sciencemag.org/news/2016/01/montreal-institute-going-open-accel-erate-science [https://perma.cc/45FK-A7V5].

[5] *See, e.g.*, Eli Y. Adashi & I. Glenn Cohen, *Going Germline: Mitochondrial Replacement as a Guide to Genome Editing*, 164 CELL 832 (2016); Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter*

reviews, and the format of traditional law review articles, are less than conducive to housing the work of scientists.[6] Hosting conferences and symposium aimed at bringing together legal academics and STEM researchers—like Northwestern's recent Bridges II conference—are superlative attempts to encourage true interdisciplinary work between the two fields. These are good starts. But to truly encourage a cross-pollination of fields, such spaces need to be established with more regularity and directed more consistently. In practical terms, such events could be used to create clearinghouses for a variety of problems in the legal architecture of scientific research. Deceptively simple questions—like how to build and license a data pool—are resolved on almost exclusively ad hoc basis.[7] While such experimentation has been wonderful at producing a diversity of models, without further sustained collaboration between law and STEM, they remain daunting for an average scientist to implement.

Provide an example of a situation in which a Law-STEM collaboration aided a project or where the lack of collaboration between these two disciplines impeded a project.

Two biological repositories, AddGene and Hetionet, provide contrasting examples of how law–STEM collaborations—or the lack thereof—have contributed to STEM projects' success or failure. AddGene, for one, is a sterling example of collaboration and innovation between legal and scientific fields.[8] The organization is a not-for-profit repository of biological materials "dedicated to making it easier for scientists to share."[9] In particular, AddGene houses "a high-quality library of published [DNA modules] for use in research and discovery," allowing scientists to contribute their constructs to and borrow constructs from AddGene under a standard, nonnegotiable license: the Uniform Biological Material Transfer Agreement

Innovation? The Anticommons in Biomedical Research, 280 SCIENCE 698 (1998); Jacob S. Sherkow, *Pursuit of Profit Poisons Collaboration*, 532 NATURE 172 (2016).

[6] One notable exception to this dearth of collaborative opportunities is a recent UCLA Law Review PULSE symposium on the future of various scientific and technological developments. *See PULSE Symposium 2016*, UCLA L. REV. http://www.uclalawreview.org/pulse-symposium-2016/ [https://perma.cc/LWX7-25C7] (last visited Jun. 4, 2017). That symposium featured, among other contributions, a fascinating piece—with Bluebooked footnotes—by Christopher Kelty, a professor at UCLA's Institute for Society and Genetics, and not an attorney. *See* Christopher Kelty, *Two Fables*, 64 UCLA L. REV. DISC. 488 (2016).

[7] *See, e.g.*, Simon Oxenham, *Legal Maze Threatens to Slow Data Science*, 536 NATURE, Aug. 3, 2016, at 16 (describing the development of Hetionet, a metadatabase of gene-drug interactions).

[8] ADDGENE, https://www.addgene.org [https://perma.cc/65YU-KX8G] (last visited Jun. 4, 2017).

[9] *About AddGene*, ADDGENE, https://www.addgene.org/mission/ [https://perma.cc/QUG4-MVW7] (last visited Jun. 4, 2017).

(UBMTA).[10] Scientists at participating institutions who wish to deposit a construct with AddGene, or borrow one from the service, simply sign and go. For scientific researchers—and for their parent institutions—this process has numerous advantages: it allows researchers to outsource the day-to-day tasks of sharing to AddGene; it cuts license negotiating time down to zero by using a universal, take-it-or-leave-it agreement; it provides a central clearing house to track the results of borrowing—itself a separate, potential object of study; and it frees researcher time by vouching for samples' quality, purity, and identity. But for all of these goods, it bears repeating that the heart of AddGene is collaborative, legal innovation: the standard, non-negotiable UBMTA. This boilerplate, legal document—created as joint enterprise of industry and both legal and STEM academia in 1995[11]—is what allows AddGene to operate with fluidity. Deploying it in connection with an independent biological repository is one of the greater triumphs of collaboration between law and science.

By contrast, Hetionet, is a sad example of one of its failures. Hetionet survives as a meta-database: a database comprised of other data sources on the effect of drugs on certain illnesses and genetic conditions.[12] As originally reported in *Nature* in 2016, Hetionet's founder, data-scientist Daniel Himmelstein, attempted to create Hetionet by aggregating data from larger, independent databases.[13] Such an effort would have made data-mining for connections between drugs and disease substantially more powerful. But Hetionet's largest problems were not technical but legal: Himmelstein had difficulty getting licenses from each of the smaller databases to use in his larger service. Indeed, some potentially important and significant databases were not ultimately included in Hetionet simply because of vagaries of the licensing process. To date, Hetionet remains hampered by these licensing issues.[14] Some recent programs—like the Cancer Moonshot—are aimed at addressing precisely these types of issues for future projects.[15] But without direct collaboration among scientists and legal academics, success will ultimately remain difficult.

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[10] *Technology Transfer Information*, ADDGENE, https://www.addgene.org/techtransfer/ [https://perma.cc/AW29-FF32] (last visited Jun. 4, 2017).

[11] *See* Arti Kaur Rai, *Regulating Scientific Research: Intellectual Property Rights and the Norms of Science*, 94 NW. U. L. REV. 77, 113 (1999) (discussing the history of the UBMTA).

[12] *Hetnets in Biomedicine*, HET.IO, http://het.io [https://perma.cc/4S6L-VJTS].

[13] Oxenham, *supra* note 7, at 16.

[14] *Id.*

[15] Sherkow, *supra*, note 1, (manuscript at 20–21) (discussing the Moonshot's data-sharing goal).