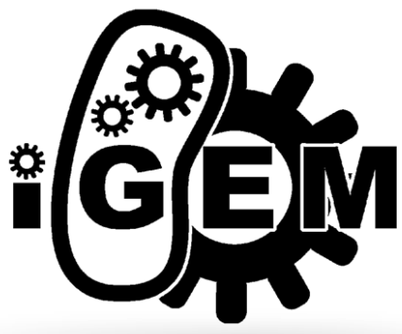
Open Tech. Frameworks

Ten practical lessons learned

drew endy

Stanford Bioengineering & BioBricks & iGEM Foundations

31 august 2021

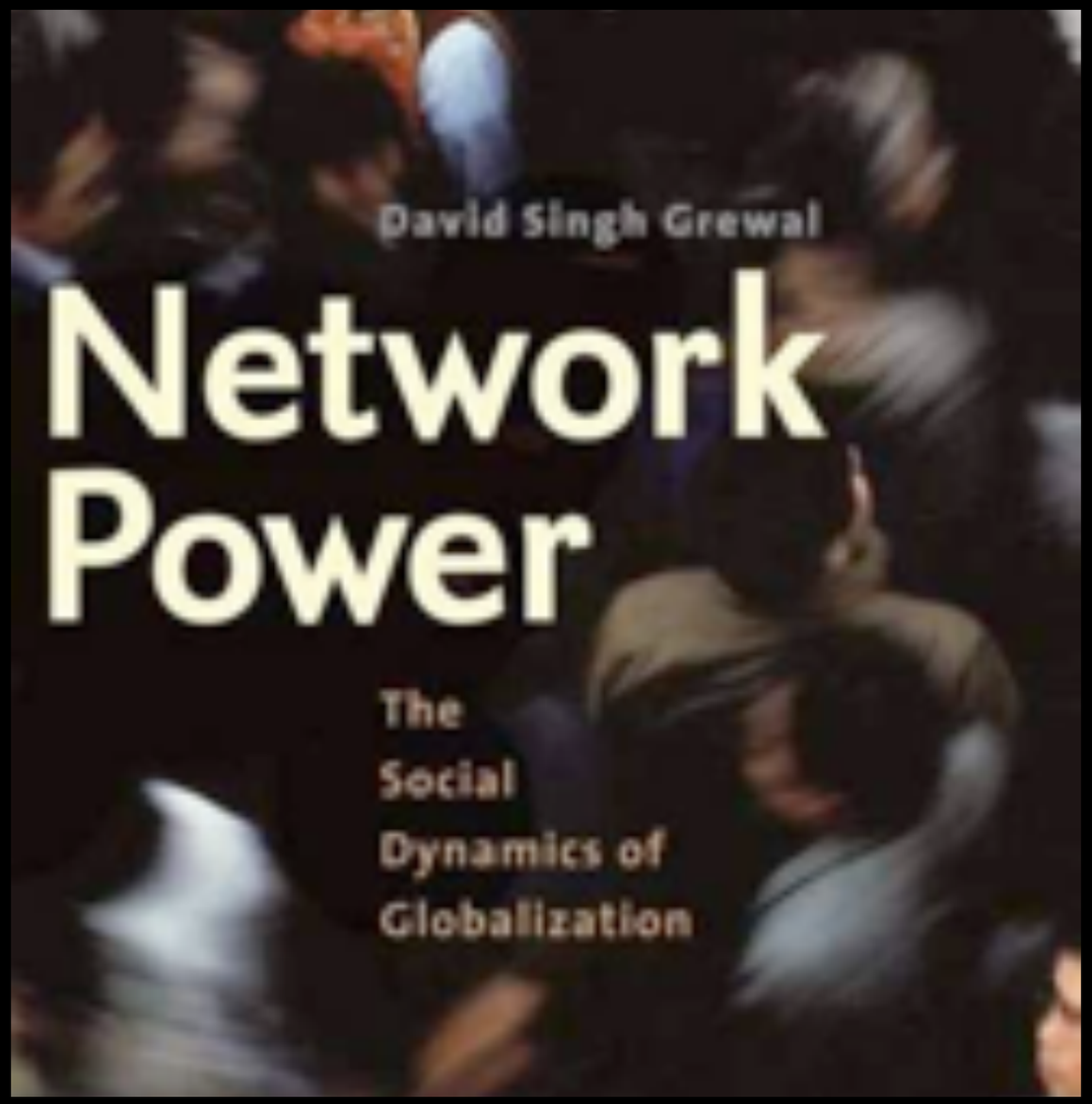


Lesson 1 — Enable the “me, me, me” for the “we, we, we”

“Most people are other people (so what’s your plan?)”

David Grewal

Enable people to more readily benefit each other (infrastructure)



https://en.wikipedia.org/wiki/Joy%27s_law_(management)

https://yalebooks.yale.edu/book/9780300151343/network-power

Lesson 2 — Embrace legal limbo

Not having 100% solid approach is OK (for a while)

Arti Rai

James Boyle

Duke Law Center for the Study of the Public Domain

https://www.theguardian.com/gnm-press-office/2017/jul/05/guardian-launches-new-virtual-reality-experience-limbo-focused-on-experiences-of-asylum-seekers

https://web.law.duke.edu/cspd/

Lesson 3 — Check property rights at the door

Don't let ill-suited IP regimes slow you down.

Mark Alan Fischer

attorney with perspectives from the GNU Emacs License to the BioBrick Public Agreement

Patents?
Copyright?
Tradesecrets?
Trademarks?
Maskworks?
Contracts?

https://www.oreilly.com/openbook/freedom/ch09.html

https://en.wikipedia.org/wiki/Mark_Fischer_(attorney)

Lesson 4 — It's good to have options

"Have you read our patent policy?"

Kathy Ku

Getting things to happen in the real world is not one-size fits all

1. Patent Policy

A. Board Policy

1. All potentially patentable inventions conceived or first reduced to practice in whole or in part by members of the faculty or staff (including student employees) of the University in the course of their University responsibilities or with more than incidental use of University resources, shall be disclosed on a timely basis to the University. Title to such inventions shall be assigned to the University, regardless of the source of funding, if any.

2. The University shall share royalties from inventions assigned to the University with the inventor.

3. The inventors, acting collectively where there is more than one, are free to place their inventions in the public domain if they believe that would be in the best interest of technology transfer and if doing so is not in violation of the terms of any agreements that supported or related to the work.

https://doresearch.stanford.edu/policies/research-policy-handbook/intellectual-property/inventions-patents-and-licensing

https://www.wsgr.com/en/people/katharine-ku.html

Lesson 5 — Understand encumbrances practically & holistically

"The great thing about patents is that they expire!"

Linda Kahl

Most biotech transactions practically bog down over exchange of physical goods, not patents

COMMENTARY

OPEN

Opening options for material transfer

Linda Kahl, Jennifer Molloy, Nicola Patron, Colette Matthewman, Jim Haseloff, David Grewal, Richard Johnson & Drew Endy

The Open Material Transfer Agreement is a material-transfer agreement that enables broader sharing and use of biological materials by biotechnology practitioners working within the practical realities of technology transfer.

Material-transfer agreements (MTAs) underlie the legal frameworks within which biotechnology practitioners define the terms and conditions for sharing biomaterials ranging, for example, from plasmid DNA to patient samples. If MTAs are easy to use and well adapted to the needs of individual researchers, institutions, and broader communities, then more sharing, innovation, and translation can occur. However, the MTA frameworks currently in place were developed in the 1990s—before widespread adoption of the World Wide Web, genome sequencing, and gene synthesis—and are not always well adapted for contemporary research and translation practices or aligned with social objectives.

Here, we introduce a new MTA, the Open Material Transfer Agreement (OpenMTA), that relaxes restrictions on the redistribution and commercial use of biomaterials while maintaining aspects of standard MTAs that support widespread adoption (for example, incorporation into semiautomated administration systems). In developing the OpenMTA, our motivation was to realize a simple, standardized legal tool for sharing biological materials as broadly as possible without undue restrictions, while respecting the rights of creators and promoting safe practices and responsible research. Importantly, we wanted the tool to work within the practical realities of technology transfer and to be sufficiently flexible to accommodate the needs of many groups globally (for example, providing support for international transfers and compatibility with public and philanthropic funding policies).

Traditional MTAs

Currently, the most used MTA in biology and biotechnology is the Uniform Biological Material Transfer Agreement (UBMTA), which was developed and widely adopted in the 1990s (https://www.ott.nih.gov/resources/). The UBMTA represented a major step forward in providing a standard template intended to help decrease administrative transaction costs for material exchange among academic research institutions. Despite widespread adoption of the UBMTA, many institutions continue to insist on MTAs specific to their own institution[1]. In ment default to the terms of the UBMTA, and because researchers may share materials informally without knowing that such terms apply by default[4], the ability of everyone to legitimately use and further develop materials remains in limbo, at best.

Most widely used MTAs place two restrictions on material transfers, neither of which is often useful or desired (**Table 1**). First, MTAs typically disallow redistribution of materials (i.e., so-received materials cannot formally be shared with others). Second, any and all commercial uses of the so-received biomaterials are specifically prohibited. Although these two restrictions are appropriate for materials that require tight control of provenance for reasons of safety, security, or commercialization, such restrictions make little sense for most of the materials used widely throughout research (for example, basic samples, strains, or plasmids). Because the potential commercial value of most widely used materials is quite low, and MTAs are unlikely to ever be monitored and enforced[1], blanket restrictions on redistribution and commercial use create unnecessary barriers and costs within research communities and to society at large.

https://www.nature.com/articles/nbt.4263

https://about.lens.org/team-members/cambia/linda-kahl-phd-jd/

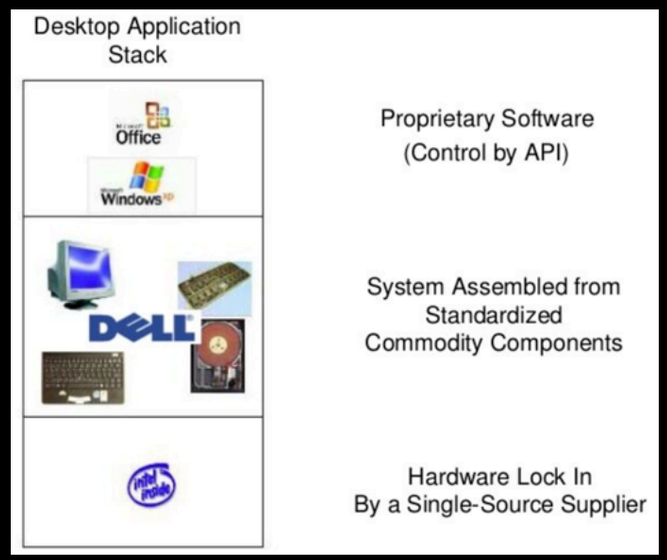
Lesson 6 — Success of open enables private profits elsewhere

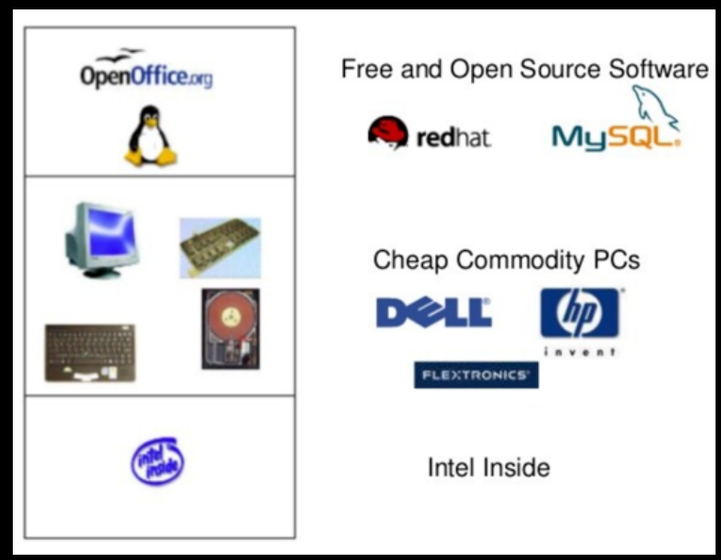
"The Law of Conservation of Attractive Profits"

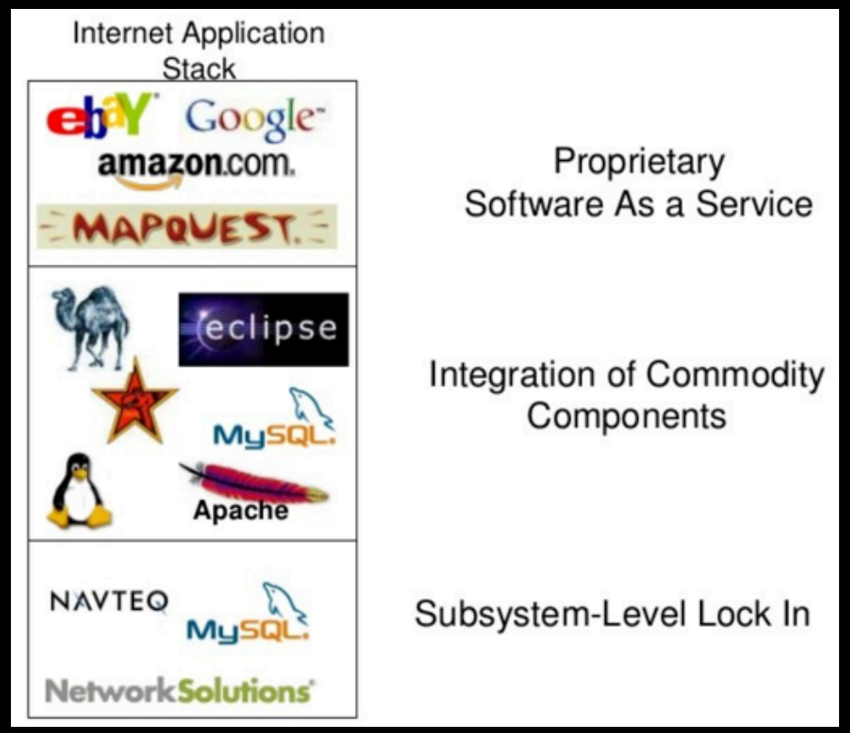
— Clayton Christensen

Tim O'Reilly

Architecture of the system…





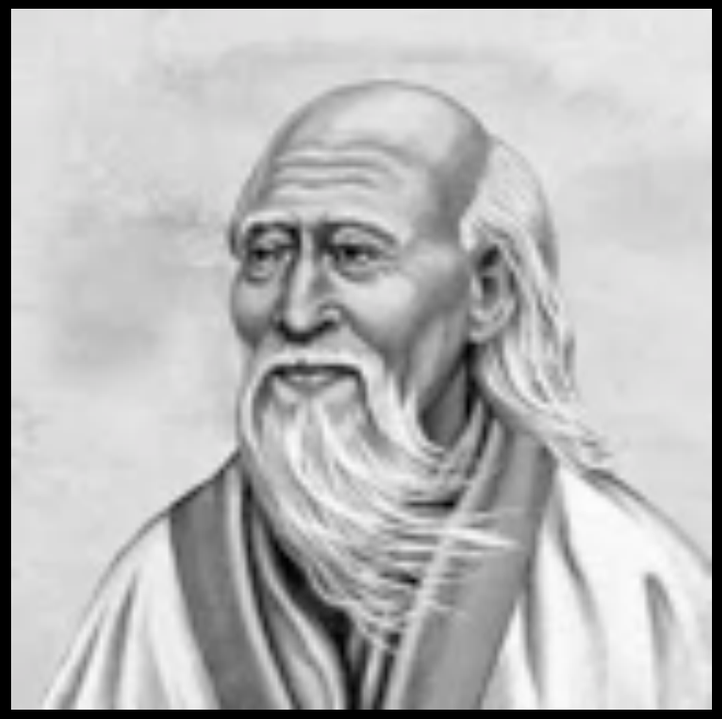


http://radar.oreilly.com/2015/10/open-source-lessons-for-synthetic-biology.html

https://www.slideshare.net/Timoreilly1/lessons-from-software-for-synthetic-biology

Lesson 7 — Strive to get the architecture of the system right

Morality, righteousness, & obedience are exhausting and limiting



Lao Tzu

Great power, not clinging to power,
has true power.
Lesser power, clinging to power,
lacks true power.
Great power, doing nothing,
has nothing to do.
Lesser power, doing nothing,
has an end in view.

The good the truly good do
has no end in view.
The right the very righteous do
has an end in view.
And those who act in true obedience to law
roll up their sleeves
and make the disobedient obey.

So: when we lose the Way we find power;
losing power we find goodness;
losing goodness we find righteousness;
losing righteousness we're left with obedience.

Obedience to law is the dry husk
of loyalty and good faith.
Opinion is the barren flower of the Way,
the beginning of ignorance.

So great-minded people
abide in the kernel not the husk,

https://www.brainpickings.org/2016/10/21/lao-tzu-tao-te-ching-ursula-k-le-guin/

Dennis Ritchie et al.

"a system around which
a *fellowship can form*"

http://www.artificialroutine.com/dennis-macalistair-ritchie-creator-c-programming-linux/

Lesson 8 — Understand what you (others) are aiming for

"Over 30 years partnering with Silicon Valley, we've learned that patents are important if you want to start one company, AND that giving things away is the way to go if you want to launch an entire industry"

- retired chair, UC Berkeley Department of Electrical Engineering

The National Academies of | SCIENCES ENGINEERING MEDICINE

Board on Science, Technology and Economic Policy

The Board on Science, Technology and Economic Policy (STEP) advises federal, state, and local governments and informs the public about economic and related public policies to promote the creation, diffusion, and application of new scientific and technical knowledge to enhance the productivity and competitiveness of the U.S. economy and foster economic prosperity for all Americans.

https://www.nationalacademies.org/step/board-on-science-technology-and-economic-policy

Lesson 9 — Surf the intrinsic advantage of openness

"Our victory's inevitable, our timing's uncertain"

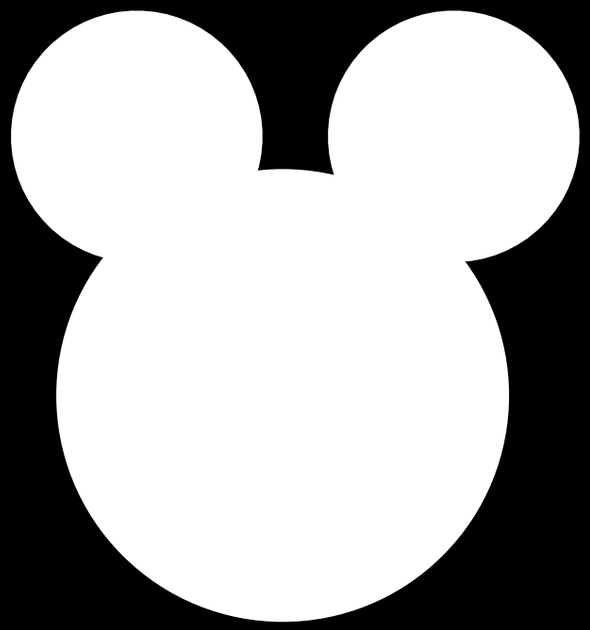
Talli Somekh

Languages are under positive and negative selection to become free to use otherwise they risk going extinct. The ultimate intrinsic cost of using a language is the cost of learning the language.

https://www.northeastern.edu/graduate/blog/most-popular-programming-languages/

Lesson 10 — Don’t cheat the long term

What will <your favorite technology> be like when Disney’s copyright and trademark’s on Mickey Mouse™ expirie?



DNA Copyright

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41 Pages • Posted: 11 Mar 2012

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University of Kansas - School of Law

Date Written: March 8, 2012

Abstract

Copyright law has traditionally afforded protection to works of authorship such as books, magazines, photographs, paintings, music, and sculpture. The Copyright Act has proved admirably flexible at accommodating novel categories of authorship, specifically contemplating future developments by covering "original works of authorship fixed in any tangible medium of expression, now known or later developed." This has led to explicit copyright protection for nontraditional subject matter, such as works of architecture and computer software. Sequences of DNA should also be acknowledged as eligible for copyright protection. Unaltered genomic DNA sequences would seem poor candidates for copyright protection. The case is stronger for copyright protection of recombinant DNA sequences. Strongest is the case for the copyright eligibility of synthetic DNA sequences designed nucleotide by nucleotide and chemically constructed de novo. Whereas DNA copyright has previously remained a largely hypothetical prospect, advances in synthetic biology may now force recognition of copyright protection as an alternative (or complement) to patent protection. A DNA copyright regime would differ substantially from the current DNA patent regime. Notably, acquiring copyright protection for DNA would be less expensive and much more rapid than pursuing patent protection. While patent law recognizes few and weak exceptions to infringement, copyright law offers a robust fair use exception for copying done in contexts such as scholarship and research. Furthermore, copyright protection would be limited in the case of DNA molecules whose structures are dictated by functional constraints, thus providing the public greater and salutary access to useful genes. Copyright protection for DNA lies pregnant within current copyright law. What is required is an effort to make use of this existing protection. A DNA copyright regime would not only allow a more robust set of safe harbors for use of particular DNA sequences, especially in genetic research, it would also facilitate the possibility of an open source biology movement. Finally, just as the prospects of patent protection for at least some forms of DNA have become uncertain, copyright protection could fill any resulting gap by affording a reasonable level of intellectual property protection, while simultaneously allowing society to enjoy some of the benefits of genetic knowledge more freely than patent protection currently allows.

Keywords: copyright, DNA, gene, nucleotide, synthetic biology, synthetic DNA, synthetic gene, recombinant DNA, intellectual property, IP, patent, biotechnology, author, authorship, expression, expressive, functionality, functional, useful, fair use, software, literary, literary work

https://arstechnica.com/tech-policy/2019/01/a-whole-years-worth-of-works-just-fell-into-the-public-domain/

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2017670