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SCIENCE

Why one woman stole 50 million academic papers — and made them all free to read

by **Brian Resnick**

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Sci-hub.io

Brian Resnick was Vox's science and health editor and is the co-creator of Unexplainable, Vox's podcast about unanswered questions in science.

Many academic journals are extremely expensive. Want to read just one article? That could cost you around \$30. The best way to access academic papers is through universities or libraries. But those institutions can pay millions of dollars a year to subscribe to a comprehensive collection.

Alexandra Elbakyan has had enough.

Elbakyan is a Russia-based neuroscientist turned academic Robin Hood. In 2011 she founded the website Sci-Hub, which has grown to host some 50 million academic papers — Elbakyan claims this is nearly all the paywalled scientific knowledge that exists in the world. These papers are free for anyone to view and download.

For students and researchers around the globe who can't afford academic journals, Elbakyan is a hero. For academic publishers that have historically been shielded from competition, she's a villain.

Either way, what she's doing is most definitely illegal.

Last year, leading journal publisher Elsevier took action against Sci-Hub, claiming it violated US copyright laws and the Computer Fraud and Abuse Act, which prohibits the fraudulent access of computer systems. In October, a New York district court ordered that the site be taken down. Elbakyan was unfazed. Soon after, in November Sci-Hub reemerged with a new overseas domain.

This story is bigger than a single court ruling. It's a new front in the academic publishing wars. What's at stake is the question of who has access to scientific knowledge: wealthy institutions, or anyone with an internet connection?

If Sci-Hub wins, the age of academic paywalls may effectively be over.

How Sci-Hub breaks the paywall





Elbakyan's personal story is like many others. When she was a student, she needed access to research papers. She didn't have that access. She also didn't have the money to download dozens of papers one by one.

Elbakyan explained her predicament in a letter to the New York court that ruled against her:

When I was a student in Kazakhstan university, I did not have access to any research papers. These papers I needed for my research project. Payment of 32 dollars is just insane when you need to skim or read tens or hundreds of these papers to do research. I obtained these papers by pirating them. Later I found there are lots and lots of researchers (not even students, but university researchers) just like me, especially in developing countries.

In creating Sci-Hub, Elbakyan basically mechanized something that already occurs: password sharing.

Most university libraries have online portals for their students and faculty. Enter these portals with a university password, and voilà — all the world's scientific knowledge is at your fingertips.

Before Sci-Hub, Elbakyan simply asked fellow researchers with access to those portals to fetch articles for her. Sci-Hub streamlines this process. When a Sci-Hub user requests an article, the site will try to log in to a university portal, using passwords that were reportedly donated, and grab the article. (In a news story published in Science on April 28, Elbakyan cautiously denied claims that the login credentials were obtained via phishing attacks. "I cannot confirm the exact

source of the credentials,” she told *Science*, “but can confirm that I did not send any phishing emails myself.”)

Once that’s done, Sci-Hub will make a copy of the paper for its servers. That way, Sci-Hub won’t have to go through a portal the next time someone needs a paper.

“The goal is to collect all research papers ever published, and make them free,” Elbakyan told the website *Torrent Freak* last June.

And with 50 million papers, she’s getting close. *Science* reports that only 4.3 percent of Sci-Hub’s monthly download requests are for articles not already in the database.

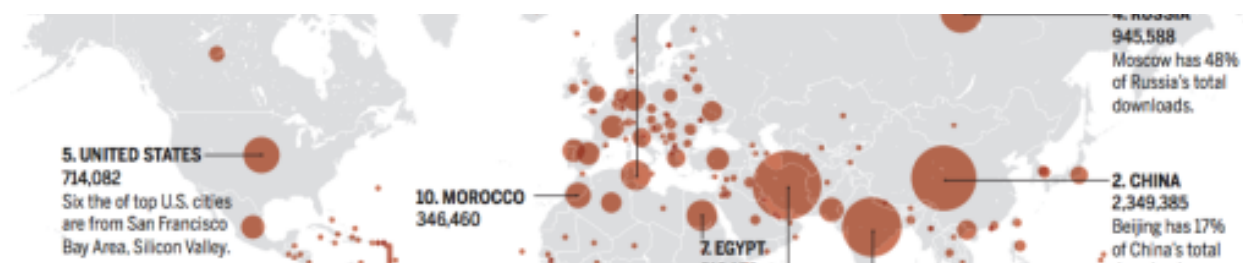
How popular is Sci-Hub?

Popular!

Science recently conducted an analysis of Sci-Hub’s web traffic (with the cooperation of Elbakyan). It found that 3 million unique IP addresses downloaded a total of 28 million documents in a six-month period between September and March 2016. And the number of users could actually be even higher “because thousands of people on a university campus can share the same IP address,” according to *Science*.

Many of these users came from the United States. But a great many others came from poorer nations like Tunisia and India where the biggest hurdle to accessing scientific information may high journal costs.

This map, produced by *Science*, shows where in the world the downloads are coming from.



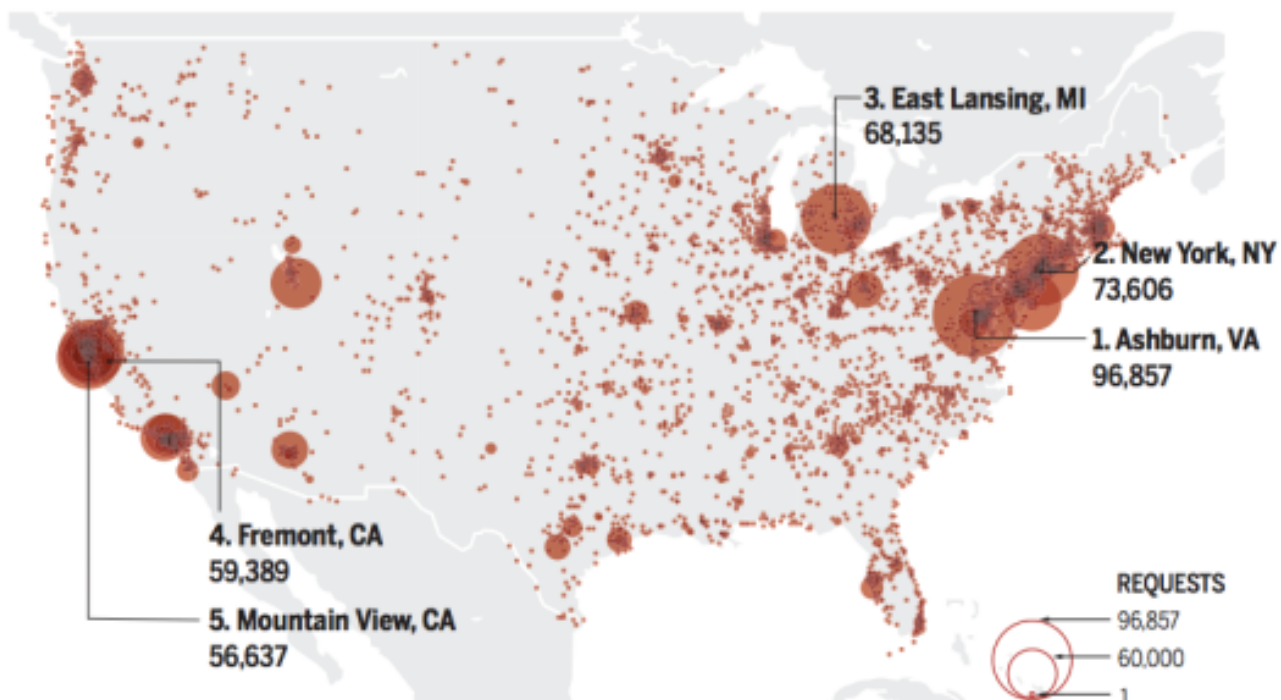
Via *Science*

In the United States, Sci-Hub users seem to be clustered around academic hot-spots, such as East Lansing, Michigan, where Michigan State University is located.

This suggest students and researchers are using Sci-Hub despite having journal access. It's easy to understand why. University libraries have complicated (and sometimes multiple) catalog programs to deliver scientific papers to students and staff. Sci-Hub offers a singular, simple-to-use portal.

Need or convenience?

Sci-Hub users in the United States seem to congregate near universities and likely have institutional access to the articles they request. This map excludes 27,000 download requests from anonymous U.S. IP addresses.



Via *Science*

Is this legal?

No.

Publishers like Elsevier own the copyright to the articles, plain and simple. Elbakyan allegedly took the copyrighted material and distributed it without permission of the owner. That's illegal. This would be like if I photocopied *The Hunger Games* and handed the copies out in the street.

Elbakyan doesn't deny this. Instead, she's arguing that the copyrights are wrong to begin with. "We advocate for cancellation of intellectual property, or copyright laws, for scientific and educational resources," the Sci-Hub website states.

Elbakyan (and a large community of like-minded people) sees several problems with the current academic journal publishing model:

1. Paywalls keep publicly funded research out of the public's reach.
2. While publishers own the copyrights, they didn't create the content. Researchers typically do not receive any royalties from the money their work generates.
3. This model only exists because academic journals confer prestige on authors. Authors willingly give up rights to their own research because they believe it will help their careers.

How did academic journals get so expensive?

For its part, Elsevier argued to the court that its paywalls "protect the delicate ecosystem which supports scientific research worldwide." And it's true that publishers add value, namely in facilitating peer review to ensure the published research meets rigorous standards.

“Journals have real costs, even though they don’t pay authors or reviewers, as they help ensure accuracy, consistency, and clarity in scientific communication,”

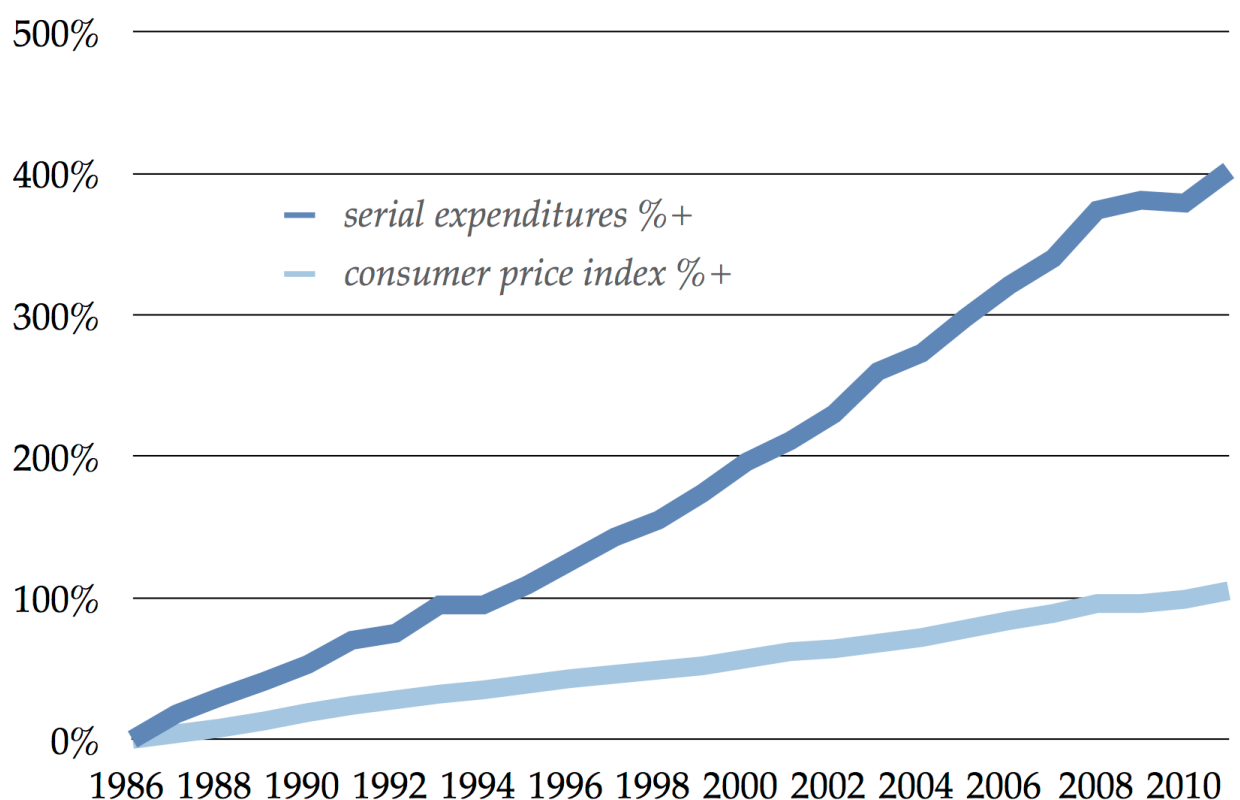
Science editor-in-chief Marcia McNutt writes in an editorial in which she describes her “love-hate” feelings on Sci-Hub. McNutt worries (perhaps rightly so) that non-profit science publishers will be harmed by continued pirating.

Yet others argue that the costs across the industry have grown out of control — and now exceed what’s needed to support research.

In 2012, Harvard University said the growing cost of journal subscriptions was an “untenable situation” for the school’s library, which shelled out \$3.5 million a year for them.

“Prices for online content from two providers have increased by about 145% over the past six years, which far exceeds not only the consumer price index, but also the higher education and the library price indices,” an internal Harvard memo read.

Serials expenditures percentage increase over 1986



A Harvard researcher crunched the numbers: The cost of academic journals is rising much faster than the consumer price index.

It's not just Harvard struggling with these costs. An analysis from the **University of South Florida** found that **“American research libraries spent 227% more for their journal collections in 2002 than in 1986. The CPI increased 57% during the same period.”**

The frustrating irony is that universities have to pay these sky-high prices despite the fact they are the institutions funding the research in the journals. Similarly, taxpayers spend \$140 billion every year supporting research they can't easily access.

Publishers say the costs are necessary to ensure the quality of the research. But a **2005 analysis of Elsevier's business model by Deutsche Bank** **claims** **that profits are what the publishers are really after.** **“If the process really were as complex, costly and value-added as the publishers protest that it is, 40 percent [profit] margins wouldn't be available,”** Deutsche Bank **wrote.**

So how did these journals get so expensive?

Universities have no choice but to pay the high fees. Their students and faculties need access to research. On top of that, the majority of academic journals are published by just a handful of companies. This creates a market that greatly favors the publishers.

Or as Scientific American explains:

It's kind of like the way that HBO can control its subscription price. If you want to watch Game of Thrones, you have to subscribe to HBO. You may get it via Time Warner or Direct TV, but HBO can still set the price. The major difference here is that unlike TV shows for entertainment purposes, some scholarly content can be considered vital to the educational and research mission of a college, making it difficult to say *NO* to.

Sci-Hub will be incredibly difficult to take down

Sci-Hub's continued existence will pose a challenge for the science publishing business. Libraries won't immediately start canceling subscriptions and encouraging their students to pirate papers.

But as history shows, once a source of media becomes freely accessible to masses — like Napster did for music in the 1990s and 2000s — it can trigger a massive restructuring of the underlying industry. Now it's easy to purchase single tracks of music for little money or stream huge catalogues of it for just a few dollars a month. Perhaps continued pirating will put that same pressure on academic publishing.

Internet pirates have been extremely hard to take down, especially if they operate internationally. Sci-Hub follows in the footsteps of other pirating websites, such as the Pirate Bay — a portal for movies, music, and other entertainment — which has cleverly avoided shutdown for years, despite significant international legal action.

When the New York court issued its injunction against Sci-Hub in October, it banned the domain “www.sci-hub.org.” But just days later, Sci-Hub was back on the web, under the new domain “sci-hub.io.”

“The new domain will be hard for a US-based lawsuit, like Elsevier's from last year, to shut down,” Quartz explains. “The US only has jurisdiction over registrars based in the US, such as .com, .net, and .org.”

(Contrast this with what happened to internet activist Aaron Swartz, who in 2010 and 2011 downloaded 450,000 journal articles using MIT's network. Swartz was a US citizen operating on US soil, so it was easier for him to be arrested and charged with a crime.)

Sci-Hub may be able to fool legal systems the world over by continually changing servers or distributing them across many continents and on many service providers. And though the court order made Sci-Hub temporarily unavailable on the mainstream internet, it was up and running on Tor, an encrypted, totally anonymous network. As Kaveh Waddell points out in the Atlantic, it took an enormous amount of effort for the government to bring down the Silk Road, a Tor network that sold drugs. It's “unlikely the new Sci-Hub website would attract the same amount of negative attention,” he writes.

By all accounts, Elbakyan has resolved to keep the project going. “We are definitely not going to stop spreading the knowledge,” she told Nature in December.