

# The Washington Post

www.washingtonpost.com

FRIDAY, JANUARY 17, 2020

## EDUCATION

### Think universities are making lots of money from inventions? Think again.

BY JON MARCUS

**W**hen Daria Mochly-Rosen discovered a compound in her lab that promised to lessen the effects of heart attacks, she set out to convince pharmaceutical companies to develop it.

She couldn't.

So the professor of chemistry and systems biology at Stanford University's School of Medicine took a leave of absence and started her own company to further test and potentially commercialize the drug.

It seemed the obvious next step. After all, universities often speak of their success in turning research into products that make life better, with the added bonus of contributing to the economy. There are seemingly countless examples, including Gatorade, invented at the University of Florida; Google, which began at Stanford; web browsers and plasma screens, both created at the University of Illinois; and the drug that became the allergy medicine Allegra, developed at Georgetown University.

But Mochly-Rosen quickly learned myriad obstacles stood in the way of those kinds of payoffs, which turned out to be more exceptions than rules.

"Other universities look at those very few rare cases" and imagine they can also hit the invention jackpot, she said. But "academicians are absolutely clueless about what needs to be done to make a project attractive to industry."

For those and other reasons, and at a time when they would seem to be searching for new sources of revenue, U.S. colleges and universities are producing a surprisingly small proportion of the nation's

patents and start-ups and making so little money from licensing inventions that, at many schools, it doesn't even cover the cost of managing them.

Most of the more than \$75 billion a year from the federal government and other sources that the National Science Foundation calculates is spent by academia on research is not intended to immediately result in commercial applications. It's about fundamental knowledge. The basic research performed in university laboratories underpins discoveries that may take years to end up in the market, if they ever do.

But higher education itself often draws a connection between its research and financial returns, as it did in December after Congress increased annual research funding by \$2.6 billion. The money will "enhance U.S. global competitiveness [and] national security, and lead to innovations that grow our economy while improving quality of life," the Association of Public and Land-grant Universities proclaimed.

Trying to prod more commercialization of discoveries from federally sponsored research is also why, 40 years ago this year, Congress passed the Bayh-Dole Act, which gave universities the rights to the licensing revenue resulting from their research.

In fact, academic institutions accounted for only 6,639 of the 304,126 patents granted in 2016, the last year for which the figure is available, according to the National Science Board.

"When you look at university PR offices, they always talk about how there's this new research coming out of some depart-

ment, and it's going to revolutionize the economy," said Lee Vinsel, an assistant professor of science, technology and society at Virginia Tech who is a co-author of a forthcoming book, "The Innovator's Delusion." But, he said, "we've been overestimating the role we're playing."

Universities and colleges spun off 11,000 start-ups between 1996 and 2015 — an average of less than 600 per year — according to the Association of University Technology Managers, whose members oversee what is known as technology transfer. That's one-tenth of 1 percent of the roughly 400,000 annual start-ups reported by the Bureau of Labor Statistics.

"It has almost become de rigueur among chancellors and presidents in selling the value of their universities to the larger community to say that we are engines of economic development, and there's scant evidence to support that," said Marc Levine, an emeritus professor of history at the University of Wisconsin at Milwaukee who has studied this subject.

Now, some institutions are redoubling their efforts to smooth the way for their discoveries to be shared and sold.

That's increasingly important, and not only because universities and colleges are facing state budget cuts, enrollment declines and other financial challenges. The federal portion of funding for university research has also been steadily declining, forcing institutions to look for other sources of support. And money that comes from licensing typically goes back into the research budget.

Moving research from a lab to the market is complex. First, researchers have to be willing to invest time in translating abstract concepts into tangible products. Many aren't, technology-transfer directors said. One called it the unbaked cake phenomenon: Academic researchers show up in her office with a metaphorical bag of flour and a cup of sugar, she said, when what investors and potential partners want is a fully baked cake.

Mochly-Rosen said she has seen this among her colleagues and counterparts. "They're saying, 'This is as far as I want to take it, and someone else can take it from there.'"

After all, faculty are awarded tenure and promotion based on measures such as how much research money they bring in and how many papers they publish, not their numbers of patents or start-ups or the licensing revenue they earn. Even the profits from commercialization, which most universities share with them, prove little motivation.

That's because the process takes so long. Getting a patent can take five to seven years, and testing a drug or developing a product even longer. Many fail, falling into what investors call the "valley of death" of abandoned ideas.

Some universities are responding not only to the potential financial benefits but also to prodding from their own faculty or from the government agencies that fund them. And the annual number of patents, while still low, has begun to rise.

After her rocky experience with the compound she developed that aids heart-attack recovery, Mochly-Rosen founded an organization called Spark to speed transformation of academic discoveries

into Food and Drug Administration-approved drugs and treatments.

Spark does this by bringing in volunteer experts from industry to help train faculty and students about how to bring the results of their research to market, and by giving them \$50,000 a year for two years to create product proposals, also known as proofs of concept.

Sixty-two percent of Spark projects are in clinical trials or have been licensed to new or existing companies or transferred to industry, a case study found, a much higher proportion than occurs with academic research discoveries in general. The model has spread to more than 60 universities and colleges in 22 countries.

Stanford reorganized its Office of Technology Licensing, under a new director who began in mid-2018, centralizing its functions and hiring new business development staff. The goal, it said, is to realize "a higher return on our marketing efforts."

It's paying off. Stanford reported 560 invention disclosures and 150 licensing agreements in 2018, all up significantly over five years.

Even the university that receives the most research funding in the nation, Johns Hopkins, did some soul-searching when faculty who were trying to commercialize their findings complained about a lack of institutional support.

Its \$1.5 billion of research in 2012, a resulting investigation found, produced less than \$16 million in licensing fees, about one-tenth as much as rivals including Columbia University and MIT. There was no mentorship or funding to encourage licensing or start-ups, and technology transfer efforts were fragmented.

There, too, the process has been revamped, with the creation of Johns Hopkins Technology Ventures. The university says it has now pulled ahead of Harvard, MIT, Columbia and Stanford in the number of new licenses it has entered into and is tied for fourth in the number of start-ups.

"There was a lot of untapped commercial potential," said Christy Wyskiel, executive director of the technology venture, who was brought in from the private sector. "The question became, 'Why, from a job-creation or a licensing-revenue perspective, were we also not at the top?' This ought to be a major part of our mission."

Even the institutions where this work is getting more attention serve as examples of how long it takes to see returns and how small they seem in comparison to the dollar value of the research they do.

One of the technologies licensed by Stanford earned just \$11 in 2018, and 760 made less than \$100,000 each. Only seven cleared \$1 million or more.

Most universities make even less. Twenty-nine of the 187 that reported their activity to the Association of University Technology Managers collected less than \$100,000 apiece in licensing revenue in 2017, the last year for which the figures are available, according to an analysis of the data by The Hechinger Report. Just 15 accounted for 72 percent of all the money.

"It's a bit like college football," said Levine, the University of Wisconsin at Milwaukee history professor: "There are some big-time programs that make a lot of money. There are some winners in the tech transfer, commercialization-of-research game, but those tend to be fairly few and far between."

(#S080693) Reprinted with permission from The Washington Post. Copyright © 2020.  
For more information about reprints and licensing visit [www.parsintl.com](http://www.parsintl.com).

---

<https://sparkmed.stanford.edu/>  
<https://sparkglobal.io/>  
<https://otl.stanford.edu/sites/g/files/sbiybj10286/f/otlar18.pdf>