

LIMITS



LAUNCH

Is the UC's two-tiered tech-transfer system
restraining innovation and economic growth?

BY STEVEN YODER

ILLUSTRATION
ANDREW J. NILSEN



Leaders at UC Davis have long touted the school's role in helping fire Sacramento's economy. They've produced numbers to back that up: A university-commissioned report last spring showed that in the seven-county region, the campus generated almost \$7 billion in economic activity and about 65,000 jobs.

But the school gives the market another boost that doesn't show up in those numbers — its intellectual property (read: ideas and inventions) turned into products and startups that spark more spending and create jobs. Entrepreneurs pay for licenses to use that IP in launching their ventures. Often it's not an outside company buying the license and spinning off a business — it's a current or former school employee. But some experts and entrepreneurs worry that the UC system over-emphasizes revenue at the expense of getting innovative ideas into the market.

COMPETING MISSIONS

There's no better example than Stanford of how a river of ideas can grow a cluster of booming companies downstream. Stanford's research on solid-state physics and related disciplines created a wave of inventions. Those moved the computer industry from vacuum tubes to semiconductors and helped turn the fruit orchards of the South Bay into Silicon Valley.

That flow of IP produced a win for all sides — the spinoffs begun as a result of technology developed at the school gave it a reputation as a world-class university, and the regional economy gained thousands of high-paying jobs.

Most IP moves from universities into the market in informal ways — as when students become skilled workers in the private sector, or when researchers publish academic papers or take speaking engagements to share what they've learned. But the formal mechanism for pricing and selling licenses to use university IP is known as technology transfer.

To that end, most major research universities have tech-transfer teams to negotiate compensation for the use of their IP by private entities. But because universities are publicly funded, these teams have another, sometimes-competing mission: to contribute to the public good by creating new businesses, products and jobs. Getting the balance right — moving the most ideas possible to market while selling IP licenses to earn revenue for the school — is no mean feat.

That ideas-to-market mission has a big impact on the state economy. Between 1968 and June 2015, 1,267 companies in just the STEM-related fields launched using

UC-generated IP or were founded by faculty, staff or students within a year of finishing their UC affiliation, according to a UC-commissioned report by the Bay Area Council Economic Institute last August. About half those companies are still in business, nearly all of them headquartered in California. Those in California support at least 146,000 jobs and add at least \$20 billion yearly to the state economy.

As for the IP-to-revenue mission, licenses issued for UC inventions have generated an average of \$125 million annually for the latest four years for which there are data. Six varieties of strawberries licensed by UC Davis, for example, brought in \$7.5 million in 2015, according to UC statistics.

But the bitter legal battle that surrounded those strawberry strains also shows the disputes that arise over how transfer of IP to private companies should be handled. UC Davis charged that two university scientists who left the school in 2014 took with them genetic strains they'd developed while employed there and used them to design newer varieties. But the scientists accused the school of refusing to grant them access to patents on plants they'd developed. UC Davis sued, and the scientists countersued.

In May, after a jury found for UC Davis, Federal Judge Vince Chhabria read an extraordinary statement: "... Both sides profess to care a great deal about California's strawberry breeding program," he said. "But I will tell you that if you really care about the strawberries, and if you really care about California's strawberry breeding program ... you would have by now figured out a way to avoid subjecting them to this custody battle." In September, the two sides settled.

That case hints at the disagreements about how to manage tech transfer in the UC system. Some UC insiders think the rules tilt too far in the direction of reaping revenues for the school, ultimately holding back innovations that could turn into startups.

COMPARING TECH-TRANSFER SYSTEMS

Tech-transfer programs started in 1980 with passage of the Bayh-Dole Act, which assigned to universities the ownership of marketable ideas that they develop with public funding — meaning employees don't own their discoveries.

Under the current tech-transfer system, marketable ideas go through three major steps. First there's disclosure, in which the employee informs the school what they've found. Second, since the school owns the rights, it then files for a patent. Third, if the patent goes through, the school licenses the idea to a buyer. (While this is essentially the same scenario in the private sector, private companies have no double-barreled mission; the goal is to earn as much licensing revenue as possible.)

The key tech-transfer steps are the same at UC campuses as at an IP powerhouse like Stanford. But while the UC's licensing guidelines take up 25 pages, Stanford's less-detailed rules run about five paragraphs. All UC licensing agreements go to the system's Office of General Counsel or Laboratory Counsel for sign-off; Stanford normally doesn't require legal approval for its licenses, according to Katharine Ku, head of Stanford's Office of Technology Licensing.

Unlike at Stanford, the UC system is also a two-tiered operation, with responsibility for crafting policy residing in the UC president's office and each campus running its own tech-transfer team. At least one person wonders whether that restricts campus teams' ability to innovate. "It's not obvious to me what role the UC plays in encouraging tech transfer other than making companies jump through the required hurdles," says Michael Gilson, a UC Davis Foundation trustee and former corporate executive and entrepreneur.

It's unclear how much the design of the UC system affects how current and former UC employees seeking a license experience the tech-transfer process. Tom Shapland is a former UC Davis post-doc who took an idea he developed in a school lab and turned it into Tule Technologies, which

makes sensors that let farmers irrigate more efficiently. Getting from disclosure to a license took 2.5 years, which he says he found frustrating. (Ku says Stanford's license agreements can take as little as a day to finish if both parties agree quickly, though the longest ones can take "years.")

Shapland applauds the work of Venture Catalyst, UC Davis' tech-transfer team, in helping him navigate UC system rules. And the founder of another UC Davis spin-off — former School of Medicine orthopedic surgeon resident Jose Mejia Oneto — said Venture Catalyst was "wonderful in getting to a licensing agreement that we both found compelling and appealing."

But for Shapland, the rules were frustrating: The amount of time it took to get the license cost money he didn't have. Filing the patent and negotiating the license with the university cost him about \$20,000 in lawyer fees, he says. "What [UC Davis staff] told me again and again as a post-doc and then after my post-doc was, 'Go get investors to put money in, and then you can use that to pay for the fees to get this license.'" But without a license, and thus customers, investors wouldn't put up the cash.

Shapland was lucky — Y Combinator, dubbed "the world's most powerful startup incubator" by *Fast Company*

GREATER SACRAMENTO
ECONOMIC COUNCIL

We Drive Growth

The Greater Sacramento Economic Council is the catalyst for innovative growth strategies in the Capital Region of California.

- Community Led**
Greater Sacramento works directly with surrounding communities to set and achieve local visions and goals, while building on community strengths and collaborating across sectors.
- Business Recruitment and Growth**
We market the region's talent, access, and profitability to attract and retain new companies and position the region as an opportunity for existing companies to scale up.
- Improve Competitiveness**
Elevate regional brand
Optimize business climate
Upgrade infrastructure
Develop workforce
Advance industry clusters
- Job Creation**
We improve competitiveness, acquire new companies, and provide existing businesses opportunities for growth - all with the goal of driving an influx of new jobs to the region.

Info@selectsacramento.com Tel. 916.441.2144 400 Capitol Mall, Suite 2520

and based in Silicon Valley, took a bet on his idea and came up with a chunk of the money. Shapland had connections to Y Combinator; most young university entrepreneurs won't be so fortunate, he says. Today Tule Technologies has seven employees and serves about a thousand farm fields around California.

Dushyant Pathak, who started Venture Catalyst in 2013, says his team was just getting started when Shapland came to them — they had no staff and few connections at the time. “We were converting a propeller engine plane into a jet-engine plane while we were flying,” he says. Today, his team could link a promising spinoff like Shapland's to a quality law firm that would defer payment until such time as the inventors were able to raise capital, he says.

“I've talked to UC representatives; they asked for my advice,” Shapland says, and when he aired his grievances, “again and again they said ‘That's a UC policy.’ They can't change that because it conflicts with public mandates that they generate revenue.” (The UC's Office of Innovation & Entrepreneurship declined to respond to an emailed list of questions about UC tech-transfer policies. “The UC is constantly examining its policies and practices to achieve better outcomes for all of its stakeholders, including inventors, campuses and other institutions,” said Christine Gulbranson, who heads the office, as part of an emailed statement.)

Shapland wanted a simpler template license with fixed terms that wasn't negotiated and that erred on the side of the entrepreneur — that would have cut his delays and costs, he says. He's not alone — complaints about UC tech transfer go back at least a decade. A 2007 article in *The Scientist* magazine described the story of UCLA genetics researcher Barry Merriman, who claimed that the school's tech transfer office refused to move forward with a patent or license for an invention that Merriman says had a few interested companies.

Criticism of how long licensing takes is “fairly common,” says Andrew Hargadon, chair in entrepreneurship at UC Davis' Graduate School of Management and found-

ing director of the school's Institute for Innovation and Entrepreneurship. And the Bay Area Council report suggests Shapland's isn't an isolated concern. “Many feel that ... the licensing process by definition restricts the flow of technology into the economy; that the licensing processes can be cumbersome and constitute significant barriers to commercialization; and that the revenue generated by licensing is, on the whole, too small to justify the restrictions it entails,” it states. The report offers no specific recommendations for changing the current system, noting that the process should be “as navigable and user-friendly as possible.”

The dual goals of tech-transfer offices may complicate efforts to make the process more user-friendly. Martin Kenney is a UC Davis professor of community and regional development who's written widely on tech transfer. “TTOs are often evaluated on how many dollars they generate, and if they don't bring in enough, the state legislature says ‘fire them,’” he says. “So if you're a TTO, your incentive is to bargain hard, to squeeze the inventor and the licensing company. And if I'm a big firm, I end up saying, ‘These guys are a-----s and I won't work with them again’ ... So you see the conundrum that TTOs are in.”

It's not clear that even after all their hard bargaining, tech-transfer offices pay for themselves. A 2012 article in

Research-Technology Management magazine by a former Penn State vice president for research noted that by 2010, the school was spending almost a million dollars a year more on intellectual property protection than it was earning in licensing revenues. And 2014 research by Santa Clara University law professor Brian Love on intellectual property protection efforts at top universities indicated that schools' efforts to obtain and protect their high-tech patents yielded a return of negative 3 percent.

(The UC's Office of Innovation and Entrepreneurship didn't respond to a question about the net revenue of UC tech-transfer offices.)

“No business development person in a startup company who's worth his or her salt is going to just agree to something without wanting to negotiate it.”

— Dushyant Pathak, executive director, UC Davis Venture Catalyst

THE DEBATE OVER THE WAY FORWARD

There's a movement afoot to make tech-transfer licensing easier, and an argument about whether doing so is even the correct strategy.

On one side is a reform wing that advocates simplifying the licensing process — what Shapland says he wanted. In the UC system, they're represented by UC San Diego. In 2015, the school launched a program called Open Flow Innovation that makes it easier for school employees to start companies and for outside startups to license school technologies. When an employee-entrepreneur's research yields a marketable idea, the employee startup and school sign a standard two- to three-page licensing agreement that can be done in a few hours. The terms are standard: The school gets 5-percent equity that starts diluting after the company hits a valuation of \$2 million. The setup is designed to favor the company, says Paul Roben, UCSD associate vice chancellor for innovation and commercialization. And the shortened process cuts licensees' legal fees.

Roben claims the new process is paying off in startups launched: In the three months ending September 2017, 10 new companies were started using technology developed at UCSD, double the school's previous record for startups in a quarter. (Roben said the school doesn't have figures on how many of those startups used the expedited license.) And the UC Office of the President actually helped along creation of the express license: It not only approved the new approach but shortened the licensing agreement from one that UCSD had originally proposed, he says. That's a sign that the UC may be opening up to new approaches by campus TTOs that some perceive as more entrepreneur-friendly. (See side-

bar: “*The Changing Face of UC Tech Transfer*”).

On the other side are those who say the current setup is mostly working just fine. Each deal for university IP is different, says Pathak. A cookie-cutter approach to licenses could actually hurt spin-offs from

inexperienced employee-entrepreneurs by encouraging them to sign licensing agreements that aren't in their interests, he argues. And experienced startup executives will want to negotiate the terms: “No business development person in a startup company who's worth his or her salt is



Making the Grade with Higher Education

If you're going to do work for the region's largest educational institutions, you have to be a quick study.

Our higher education law practice has grown as fast as our firm. With fifteen lawyers, we've nearly doubled in size, and our clients have kept pace. Private and public educational institutions expect a short learning curve when it comes to university legal issues. Whether it's daily problem solving, long-term planning or big hurdles, Delfino Madden makes the grade.



going to just agree to something without wanting to negotiate it," says Pathak, who spent his career launching and running startups before coming to UC Davis.

That's why he says UC Davis isn't pursuing anything similar to UCSD's initiative, though he did cut the length of UC Davis' licensing agreement from 25 pages to 12. At Stanford, Ku says her team also offers no expedited license

THE CHANGING FACE OF UC TECH TRANSFER

The composition of a tech-transfer office matters. Teams stocked with former business people — instead of lawyers — are typically less interested in locking up intellectual property, says Andrew Nelson, a University of Oregon associate professor of management who studies tech-transfer programs. "To broadly categorize, among tech licensing offices, there seem to be those that are worried most about enforcing rules and protecting the university's interests versus those that really see themselves as service shops," he says.

That could mean change is underway in the UC Office of Innovation & Entrepreneurship. Christine Gulbranson was appointed senior vice president of the office last May. She is a scientist, engineer and CEO of Christalis, a strategic advisory firm for high-tech clients, and previously was a partner at a venture capital firm.

Wendy Lim, her chief of staff who started in August, came from Yelp, where she was vice president of strategic finance. Victoria Slivkoff, the head of strategic partnerships, joined in July. Her previous work includes product and market research, digital marketing, and logistics and supply chain-management for sports, health and beauty products.



option. "We actually don't believe in that because not every [IP] technology fits into a company in the same way," she says. "To set a price on anything [such as a standard equity level under an expedited licensing scheme] is sort of odd."

Kenney and others make up a third, more radical wing that would turn IP ownership over to the employee-entrepreneurs who discover it. Making them owners, Kenney argues, would move more ideas to market because universities often decline to pursue a patent on IP that they think won't yield a profitable license. He says an inventor who owns rights to their IP understands its potential and is more likely to find a way to pay for a patent to see the idea brought to market. And if the inventor launches a profitable company without going through a tough negotiation with the university, they're more likely to become a generous donor down the road, Kenney says.

He sees Canada's University of Waterloo as an example of what that change could achieve. The school assigns IP ownership to the inventor, and a 2015 *Globe and Mail* article called it one of the "key breeding grounds" for tech startups, with more than a hundred university spinoffs operating in the Kitchener-Waterloo region.

Hargadon suggests a two-tiered approach for navigating the available options. A relative handful of UC patents in just two areas — biotechnology and plant genetics — generate the bulk of UC system-wide royalties each year. If campuses engaged in tough negotiations for licenses in biotech and plants, "what would we be losing if we didn't do so in engineering?" he wonders. "Are we unnecessarily restricting patents in areas that wouldn't be as valuable? If that's stopping anything from getting out, is it worth it?" he asks.

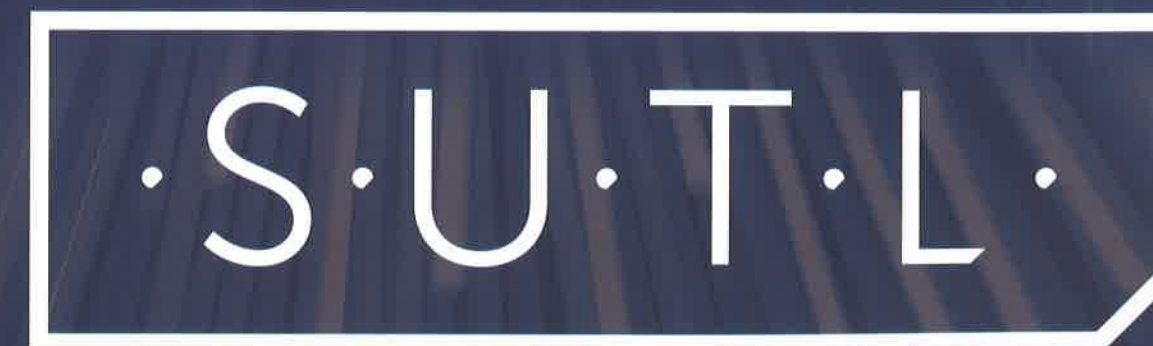
The discussion will go on, and the proof will be in the results. A report last April by the Santa Monica-based Milken Institute ranked 230 public and private research universities' tech-transfer performance on number of patents and licenses issued, amount of licensing income, and number of startups formed, taking into account each school's research budget. Stanford, UCSD, and UC Davis all ranked in the top 50: Stanford was 5th, UCSD 20th, and UC Davis 41st. Stay tuned. ■

Steven Yoder writes about business, real estate and criminal justice. His work has appeared in The Fiscal Times, Salon, The American Prospect and elsewhere. On Twitter @syodertweet and at stevenyoder.net.

MAYOR'S OFFICE *for* INNOVATION & ENTREPRENEURSHIP CITY OF SACRAMENTO

TRANSFORMING SACRAMENTO INTO AN URBAN TECHNOLOGY LAB

Find out how we're expanding the startup pipeline, engaging the innovation ecosystem, and catalyzing the creative economy.



SACRAMENTO URBAN TECHNOLOGY LAB

Learn more at SUTL.innovatesac.org