

George Dotson

# OPENING A NEW ECONOMIC FRONTIER

Academic scientists and engineers are taking their discoveries and inventions outside the laboratory and into the world of commerce.

BY DEBRA LEVY MARTINELLI

PHOTOS BY ROBERT TAYLOR

Many of us have experienced that fleeting moment of recognition laced with regret when we have thought, "Damn, I should have invested in that when I had the chance." Maybe the golden opportunity was a small company testing a new drug, a part-time inventor looking for funding for a do-dad that would ease our daily lives, or even a dilapidated house in the middle of nowhere, around which eventually sprang a thriving community. The one that got away, we lament; the chance that will never come again.

Never say never.

*continued*

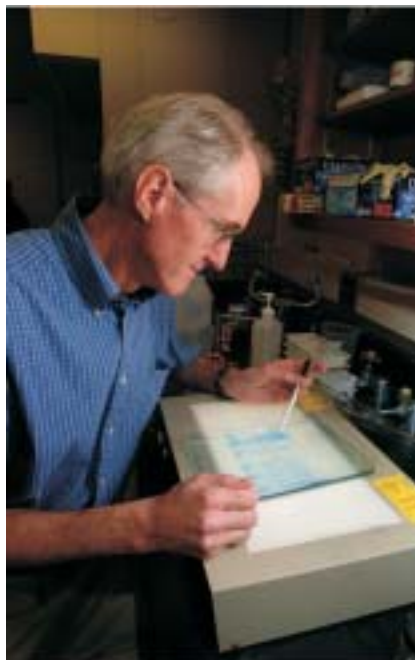


Our ancestors who settled the Oklahoma plains never did. They followed their dream and staked their claim for free land when the land runs opened the territory. Years later, rich oil and gas reserves were discovered in Oklahoma's red clay, and vast fields were developed by pioneers whose vision and hard work helped shape the state's economy—names like Kerr, McGee, Noble, Getty and Phillips.

Today Oklahoma's economy is no longer exclusively dependent on natural resources. Abundant opportunities to again transform the state can still be found in its own backyard through the University of Oklahoma's Office of Technology Development.

Since 1998, the OTD has worked with the University's faculty and researchers to market their scientific discoveries and advances to Oklahoma businesses. The development and transfer of intellectual property technology from the academic environment to the private sector is a winning proposition for all involved—and could forever change the state's economic landscape.

W. Arthur "Skip" Porter came to OU in 1998 as vice president for Technology Development and dean of the College of Engineering and as the state's first Secretary of Technology Development. He brought with him the rare combination of razor-sharp business acumen and academic credentials. When recruited by OU, the 17-year Texas A&M faculty



TOP: Sukhwan Soontravanich measures the rate of precipitation on a calorimeter for surfactant research.

BOTTOM: Roger Harrison examines a gel that is part of "gel electrophoresis," a process used to evaluate the purity of anticancer proteins.

member was serving as president and CEO of the Houston Advanced Research Center, a nonprofit, university-linked organization that fosters scientific research and technology development and scholarly imagination. On his watch, OU has licensed 68 technologies and created 16 start-up companies that have generated

more than \$9 million in license income and more than \$12 million in equity. In fiscal year 2004 alone, 33 patent applications were filed and six patents were issued.

Shortly after the Office of Technology Development was created, Oklahoma voters approved State Questions 680 and 681, which helped clear the way for higher education institutions and their researchers to form business partnerships with private industry. The resulting environment, Porter believes, has brought Oklahomans to a fork in the road.

"This is a defining moment in the development of our state," he contends. "We have an opportunity to shape our own economic destiny by investing in creating our own talent and our own technology as well as the infrastructure and support systems that keeps them here. OU has geared up to feed the results of its faculty's research directly into the Oklahoma economy. Research growth leads to economic growth, which in turn leads to the creation of higher paying jobs that will enable the state's young people to stay in Oklahoma."

How can this transformation be accomplished? The same way our forefathers did it with land, oil and gas: by seizing the moment and never wavering, Porter says.

While Porter has ultimate oversight for OTD, he has entrusted the nuts and bolts of day-to-day operations to a small but cracker-jack team led by his long-time colleague, executive director Dan Davis, a CPA who worked with Porter at both Texas A&M and the Houston Advanced Research Center before joining him at OU in 2001.

The eight-member OTD team covers all three OU campuses—Norman, Oklahoma City and Tulsa—developing relationships with researchers and explaining to them the benefits of commercialization of their projects.

"Ours is a unique structure for a university," Davis explains. "Typically, the technology transfer officer reports either to the university's chief business officer or the vice president for research. That can work fine, because it takes the technology created as a result of the research and markets it, but it requires trading off the



Graduate research assistant Justin Fuller, left, and associate professor David Baldwin conduct bridge vibration tests in the Center for Structural Control and Vibration Research.



Engineering replacement blood vessels is the goal of graduate student Joel Daniel, above, and research assistant professor Peter McFetridge.

value of the intellectual property to get the research. Here at OU, we're focused on commercialization—getting value from the technology that's developed here—which, in turn, increases the research.

"Our goal is to create companies or to find Oklahoma companies that can benefit from our technology. Either way, we're creating jobs and economic value for the state," he adds. "The OTID has created 16 companies and the University has equity in 12 of them. The companies have generated \$60 million in capital and more than 120 jobs. That might not sound

like a lot of jobs, but they pay twice the median household income in Oklahoma."

When OU researchers have developed a process or product that lends itself to transfer to the marketplace, OTID's first task is to explain to them the value of turning scientific innovation into something that can both benefit humankind and, to put it bluntly, make money for the researcher, the University and the state. Davis says some researchers are dubious about the commercial aspect.

"There are two kinds of researchers at public

institutions: those who think their discoveries should be free for anyone to use—the public paid for it, therefore the public owns it—and those who are interested in the commercialization of their discoveries. They see a problem and they want to solve it, but they don't realize there may be people all over the world with the same problem, and they've just found the solution for all of them," Davis explains.

But even those who hold the latter view may need to be convinced that commercialization is both possible and at-

tainable. "They get more excited about technology transfer as they begin to see results," he says. "They must have confidence that you know what you're doing and that you're not wasting their time."

OU's royalty distribution structure favors the inventors, who receive 35 percent of gross revenues for their commercialized intellectual property. Another 31 percent of net revenues go to a "growth fund" to help researchers move their inventions forward.

Like inventors, potential Oklahoma investors often need to be convinced of the benefits of the new technology. "Their initial reaction is first curiosity and then lethargy," says Porter. "If they can't see it or drive by it, they don't want to invest in it."

He understands that perspective but is working diligently to change it. "While financial investment in technology may not reap immediate rewards, it's absolutely a winning proposition for everyone. Investors need to act quickly to get in on the ground level, but then exercise patience when it comes to seeing a return on their investments," he says.

How does he plan to convince investors that developments in science, medicine and technology are the way to make money? "We make one of these early ventures a big success," Porter says. "Then investors will be clamoring to get in on the next deal. We won't have to call them anymore. They'll call us."

That call could be right around the corner. Through the OTID, OU and its researchers have had some stunning successes in transferring scientific discoveries and advances to the private sector. Here is how it works:

First, explains Davis, the researcher fills out a disclosure form that identifies the discovery, the date it was made and the inventors. If there are multiple inventors, the disclosure form also describes each person's contribution. "Multiple inventors agree on the split when the disclosure is made. That's really impor-



With the Ekids' Breathmeter™ specific molecules in breath samples can be measured for diagnosis and monitoring of diseases such as asthma.

tant, because if there's money down the road, it's a whole lot easier to agree on who contributed what before that money's on the table," he says.

The disclosure form also requires a description of the technology and includes questions aimed at protecting the inventor and the discovery by determining what may have already been published or disclosed at academic gatherings or even on a researcher's Web page. This process helps determine whether the inventor has exclusive rights to the invention.

Once the form is on file, the OTD staff conducts a patent search to identify similar existing discoveries and market research to determine whether the invention has commercial potential. If it passes muster on both counts, the next step is to create a company based on the technology or, alternatively, licensing the technology to sell to an existing for-profit organization.

Some of the most promising start-up companies created from technology developed at OU are:

**n Southwest Nanotechnologies**, also known as SWeNT, produces high-quality single-wall carbon nanotubes, a product whose conductivity, strength and mechanical properties is expected to lead to such extraordinary scientific advances as medical tools used to conduct molecular-scale surgery, targeting specific cancer cells or even repairing DNA. The company's lead researcher, OU chemical engineering professor Daniel Resasco, also has pioneered a process that should dramatically lower the price of mass producing single-wall nanotubes.

**n Selexys Corp.**, a new biopharmaceutical company formed from research conducted at OU's Health Sciences Center, is exploring new

treatments for inflammatory and thrombotic disorders, specifically deep vein thrombosis and ischemia reperfusion injury in organ transplantation.

**n Weather Decision Technologies Inc.**, an alliance between OU's Center for Analysis and Prediction of Storms and the Oklahoma Climatological Survey, provides high-resolution weather information content. The company partners with utility and energy entities for internal business decision support, television broadcasting companies for weather prediction and forecasting systems and Internet applications for Doppler radar data display.

**n Inoveon Inc.**, a company founded by three members of the OU Health Sciences Center faculty, is developing technology to monitor diabetic retinopathy, the leading cause of preventable blindness worldwide.

**n Surbec Environmental L.L.C.**, formed by a group of OU College of Engineering faculty, develops advanced technologies to correct soil and groundwater situations in a faster and less expensive manner than traditional approaches can provide. Its successes include a core "super soap"

technology that has been used to conduct some 20 environmental cleanups around the country and overseas.

**n Ekids Technologies Inc.**, an Oklahoma start-up company headed by electrical and computer engineering professor Patrick McCann, uses patented laser fabrication technologies to develop and manufacture mid-infrared and ultraviolet lasers and laser systems designed to measure specific chemical compounds. The company recently was awarded a \$750,000 National Institutes of Health grant to support clinical studies for obtaining FDA approval of its Breathmeter®, a laser-based breath analysis instrument designed to aid in the diagnosis and treatment of asthma and other respiratory conditions.

**n Scrub Oak Technologies Inc.** is adapting technology developed by OU College of Engineering faculty for highway and industrial applications of an electronically monitored "shock absorber" for bridges. The device, which compensates for the pounding bridges get from heavy traffic, could extend the lives of thousands of aging highway bridges throughout the country.

And there are many more prospects on OUID's list. Start-up companies are being created for 178 other technologies as varied as a high-quality, water-repellent and environmentally friendly cotton fabric, a revolutionary aircraft instrument landing system, an integrated mobile and wireless system for law enforcement agency use and an implantable coil for hearing aid devices.

Porter insists that a major benefit of retaining all of this cutting-edge technology in Oklahoma is keeping our best and brightest young people in the state, where they can live, work and raise their families.

"The formula is simple: find, attract and keep top talent and provide an environment that supports taking the risks of creating and controlling one's own economic destiny," he says. "Working together, Oklahomans are making it happen."

*Debra Levy Martinelli, '00m joun, is communications director for the OU College of Engineering.*