

# Turning research into jobs

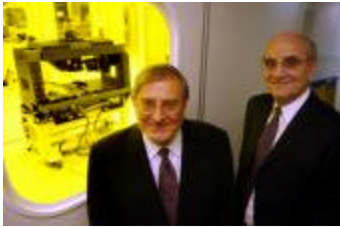
**Austin tech company is an example of the potential payoff of state research fund.**

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Any high-tech startup executive dreams of hitting a business home run, but Norman Schumaker envisions a real grand slam.

Schumaker says the company he heads, Molecular Imprints Inc., could become the kingpin of advanced lithography, a \$6 billion market that is crucial to making semiconductor devices and other cutting-edge products.



If that happens, then Austin might be home to a billion-dollar business with hundreds of engineering technical workers earning good pay and, perhaps, collecting lucrative stock options.

At least, that's the dream.

The four-year-old startup, which employs 90 people in Austin, has sold only a handful of its lithography systems so far, but experts say it has a shot at striking it rich within the next seven years.

Brian K. Diggs/AMERICANSTATESMAN

Molecular Imprints also is considered the kind of company that might play a role in Gov. Rick Perry's plan to bolster the Texas economy by supporting promising high-tech research.

[\(ENLARGE\)](#)

**Molecular Imprints, led by CEO Norman Schumaker, left, and Chief Operating Officer C. Mark Melliar-Smith, is considered the kind of company that might play a role in Gov. Rick Perry's plan to bolster the state's economy. Perry is seeking \$300 million from the Legislature to speed development of tech companies.**

Perry is seeking \$600 million from the Legislature to back two big economic development funds. One fund would go toward restocking the Texas Enterprise Fund, which has helped the state launch a \$3 billion chip factory to be built by Texas Instruments Inc. in Richardson and Home Depot center in Northeast Austin.

The second fund would provide \$300 million to back promising research and researchers in order to speed the development of technology companies. The concept is new to Texas, but some programs have been tried in other states, including New York and New Jersey.

New York's example is watched closely in Austin. New York Gov. George Pataki has pushed in advanced research programs at several state universities. The program helped stimulate a \$1.5 billion investment in advanced chip manufacturing and research in the Hudson Valley.

Other companies, including the Austin-based Sematech Inc. chip research consortium and equipment makers Applied Materials and Electron, have joined the Albany Nanotech research center at the State University of New York at Albany.

The issue of financing

Traditionally, the federal government and major corporations have paid for the lion's share of technology research. The federal government continues to be a prime source, but many large corporations have cut research spending. As companies spend less, major universities are counted on to spend more and to tackle research subjects that have potential commercial payoffs.

"Our big research universities are an underappreciated but growing asset to this country," says Mark Melliar-Smith, the former and now chief operating officer of Molecular Imprints. "The big corporate research labs like Bell Laboratories have been sort of the big research universities will have to pick up the slack."

Perry's research program is designed to promote collaboration among researchers at places such as the University of Texas and other companies. One such collaboration is the joint venture between Sematech and UT called the Advanced Materials Research Center, which received \$40 million in state Enterprise Fund money last year.

That program, coincidentally, backs some of the research of UT chemistry professor Grant Wilson, whose work on imprint lithography is licensed by Molecular Imprints.

Wilson worked in the late 1990s with mechanical engineering professor S.V. Sreenivasan on developing the technology. Sreer 2001 to become chief technology officer of the new company.

Whether the Enterprise Fund or the new technology fund gets the money Perry is asking for is open to question. State Comptroller Keeton Strayhorn said last week that the Legislature will have little tax revenue to spend in the current session beyond what is existing programs.

That tight budget scenario means spending proposals will face a tough fight, but a Perry spokeswoman said the governor will support economic development program.

Some economic development consultants in the state say they back Perry's proposal for a research fund but expect it will be difficult through the Legislature.

"Research is always a harder sell," said Jon Roberts, managing director of Tip Strategies Inc. in Austin. "The benefits primarily long-term areas, and there are very few short-term gains. But someone has to stand up and say this is in the best long-term interests of the state to be pushed very vigorously."

But Roberts said that many promising research programs are risky and many projects that receive state money might never turn into success stories.

If the Legislature does back Perry's research fund idea, what sorts of companies might benefit? Probably a range of tech firms established players and startups pursuing cutting-edge products.

Applied Materials, the largest maker of semiconductor manufacturing equipment, has said it would consider establishing future programs in Texas if the state created a research fund. Now, most of Applied's research goes on in Silicon Valley, while the company has about 2,300 workers in Austin to make its systems.

But among smaller companies, Molecular Imprints has the credentials to become a bidder for state funds: It has developed a high production equipment and sold systems to high-tech companies including Hewlett-Packard Co. and Motorola Inc.; it has won a federal research project grant; and it has strong ties to researchers at UT and the Sematech chip research consortium.

Nearly a quarter of its workers have doctorate degrees.

Wilson said he thinks that the Austin company's approach holds more promise than rival technologies in getting the chip industry past the technology bottleneck that it will face several years from now.

"Imprint lithography has a really good chance of taking over" in chip manufacturing, said Wilson, who serves on Molecular Imprints' advisers. "I do not see an alternative to this for very small structures."

Better lithography?

The task of lithography is to create precise patterns on silicon chips and other high-tech products. On chips, those patterns become thousands of electrical circuits. The chip industry now uses optical lithography to do the job, using ultraviolet light to transfer a pattern template onto the photosensitive surface of the chip. Optical lithography has been used for three decades, but it is starting to run into technical and cost challenges as chips become ever smaller.

Imprint lithography involves the direct stamp of a pattern onto the surface of a chip or other product. Supporters say the new technique is less than existing mainstream tools and it does a better job because it can create smaller patterns.

People who are familiar with Schumaker's company say it fits the profile of the kind of company that could participate in a state program because it already works closely with UT, and it is developing products that could be used in several promising markets.

"They have disruptive technology, and that is the very sort of thing we are looking for," said Austin lawyer Pike Powers, who is Perry's economic development team on the state's strategy. "Molecular Imprints is a good example of the kind of thing we ought to encourage in Texas to take us to another place."

Schumaker stresses that his company has moved beyond the research stage to become a real business with expanding sales. The company has sales in the "tens of millions" in 2006 and become a self-supporting business that year.

"We are beginning to sell tools to people who have real applications and real plans to put things into manufacturing," he says. It is coming because the company is building systems that are capable of handling factory production of new kinds of devices.

"We are not selling little laboratory instruments that sit on the table, and you can sort of play with them. These are tools that make money. It is real, viable technology."

But it will be several years before anyone can say that Schumaker's company will hit the grand slam he envisions.

That outcome won't be known until the semiconductor industry makes tough choices about which technical path it will support. The new chips that are probably two generations ahead of the current cutting-edge for chip production.

But even if the chip industry doesn't choose Molecular Imprints for mainstream production, analysts say the company has plenty of other ways to make money selling tools to create more specialized products, including tiny devices used in sensor devices, biotech devices, microfluidics components and digital display screens.

If Perry's research fund becomes reality, Schumaker says his company might consider applying for funds. He strongly supports the program, provided people understand that it can take many years before a research breakthrough makes its way out of the lab and into the commercial marketplace.

"People have to be careful not to anticipate that the payoff from research will be too close, because it takes a while," he said. "If you don't support the ongoing research, then you don't have the (economic) payoff that comes 10 years out. Research is absolutely critical to the future of this state and this nation. Without research, the future could turn pretty bleak."