

Nanotech given boost

Backers say it would aid state's future

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As Arizona lays down bets on a future in biotechnology, there is a related industry looking to cash in and help hedge the risk.

Leaders in nanotechnology - the study and development of products at the molecular level - say that if Arizona becomes a hub for the biosciences, the state will offer something that other research-heavy places don't: Expertise in bioscience and nanotechnology in one location.

"In Phoenix, there is a real hunger from everyone, government and investors. Right now, Arizona isn't in the top 10 (for nanotechnology), but that doesn't mean anything. Our plus is that we can do a nano-bio mix that other places cannot. Nano-bio is really emerging, and we could jump everyone," said Matt Kim, chairman of the 200-member Arizona Nanotechnology Cluster.

As president of Scottsdale-based QuantTera, Kim wants to turn Arizona into a nanotech powerhouse.

"It is key that we take advantage of our semiconductor and biosciences industries and combine them to form a nano-bio alliance," he said. "This will be the area of largest growth, and the potential for very high returns would be a boon for the Arizona economy."

To understand the impact of nanotechnology on day-to-day life, imagine driving along Interstate 10 when suddenly you get a message from your car alerting you to specific mechanical trouble.

The message directs you to a service station, where the technician already knows about the problem and has the part you need in stock.

That's what nanotechnology can do, and if Doug Goodman gets his way, you won't have to imagine the scenario. The nanotechnology company president is working to make it happen.

"We provide products and services that predict electronic failures before they occur in critical systems," said Goodman, who is also chief executive officer of Tucson-based Ridgetop Group. Ridgetop is working with the truck division of an automotive company to develop the technology.

"We're taking some of the technology we developed initially under a federal government contract for aircraft and applying the same things we learned in the automotive field," Goodman said.

To understand nanotechnology, the science of the small, you have to realize just how small Goodman and Kim are talking about. The letter "I" printed here is about 1 million nanometers wide. A human hair is about 100,000 nanometers wide.

Nanotechnology involves measuring, manipulating and manufacturing things roughly between 1 and 100 nanometers. By manipulating the very small particles, often at the atomic level, scientists can change one piece of matter into something new.

A recent national poll on nanotechnology found that knowledge among Americans has increased since 2004, but most have heard little to nothing about the developing field.

The telephone survey, commissioned by the Project on Emerging Nanotechnologies at the Woodrow Wilson International Center for Scholars in Washington, D.C., found that about 42 percent of Americans know nothing about nanotechnology.

That's about to change in Arizona.

"Nanotechnology is extremely fundamental to everything," said Michael Kozicki, a professor of electrical engineering at Arizona State University and chief technology officer for Axon Technologies Corp. in Scottsdale

Kozicki's work in the semiconductor industry boils down to packing more memory into small spaces and adding personalities.

"The chips of tomorrow will be flexible enough to change personality," he said. "At one moment, they do one function. The next moment, they literally change to become something else."

Kozicki sees the development of nanotechnology as essential to progress.

"Nanotechnology is important to every state and every industrialized country as it is becoming fundamental to critical developments over a wide range of technology fields," he said. "Arizona cannot afford to be left behind, especially since we have held strong positions in leading-edge, high-tech areas that will benefit greatly from nanotechnology."

Kim agreed that Arizona must be a part of the leap into nanotechnology. He also agreed with Kozicki that the presence of other technologies can lay the groundwork for the vision to take root.

"For Arizona to become a main technology center in America, it is key that we take advantage of our semiconductor and biosciences industries and combine them to form a nano-bio alliance, since this will be the area of largest growth," Kim said.

Because nanotechnology is still defining itself as an industry, Kim said he would not venture a guess at how many companies in Arizona might be exploring the field.

"The definition of nanotech is very rough, so it's hard to get a real number for Arizona companies," he said. "It's an emerging field, that's what's exciting. If it were established it wouldn't be so exciting."

Having expertise is one thing, but nothing gets built or developed without money. Nanotechnology is not a cheap business to get into, and that can hold back startup companies.

Goodman envisions a way to give nanotech entrepreneurs a financial boost.

"We're looking into putting together a proposal for Arizona Nanotech Skill Integration Centers, one in Tucson and one in Mesa," he said.

"The idea here is to address the problem of providing access to very expensive equipment and software to startup companies. Startups would have the ability to use on a time-share basis this expensive design and analysis tool."

He said the centers could involve government funding and university or college scholarships.

"The future is bright, and will be brighter if the Arizona Nanotechnology Integration Center is funded," he said. "The tools to develop and refine nanotechnology are expensive and out of reach of startup and emerging businesses."

Among Arizona's nanotechnology community, the desire and hopes are there. Now, they must convince others that the payoff will be worth the investment.

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