

What are the potential economic breakthroughs for nanotechnology?

Rickert: Nanotechnology means less cost, less waste, less material, and amazing properties. Imagine in a few years solar energy only costing as much as coal or gas-based energy. Imagine electric cars costing about a dollar a gallon to fill. Imagine single-paned windows acting like double- or triple-paned windows. Imagine nano drugs that are low dose, affecting only the needed area. We'll put nano probes into the body, and they'll highlight the area for the surgeon, who will use a fiberoptic laparoscope to do the surgery. These are just a few of the examples of things that are going to happen with nanotechnology.

Will nanotechnology play a role in pulling us out of the current recession?

Rickert: Historically, almost every time there is a downturn in the economy, technology and innovation drive us back out. The companies that invest in technology will be the winners, whether they are technology companies or manufacturing companies that invest in technology. So I'd bet the next IPO market for stocks would be a new industry called the nanotechnology industry, in which people will be buying nanotech stocks as they go public.

How will we fund nanotechnology innovation?

Rickert: The PC and biotech industries wouldn't exist without the public market, and the nanotechnology industry will not exist without the public market either. Right now, nanotechnology is an enabler of other companies on the public market to do better and make more money, but the real breakthroughs are going to happen when the public invests in nanotechnology companies. For now, we're going to get incremental products, but the big home runs are waiting for capital. Things will continue at a glacial pace until there is a capital market for nanotechnology.

How can companies best capitalize on the future potential of nanotechnology?

Rickert: Companies today have two choices. They can be followers and follow whatever happens in the industry. By doing that they don't have to make any investments, and that's what most companies seem to be doing. This is short-term gain and a long-term way of going out of busi-

ness. The second group will be the leaders. They are investing in nanotechnology. They're doing it because they know the early bird catches the worm, and smart companies are all over this.

They're putting money in nanotechnology now because they want to be around for another 30 or 40 years.

Why is it important for companies to invest in nanotech?

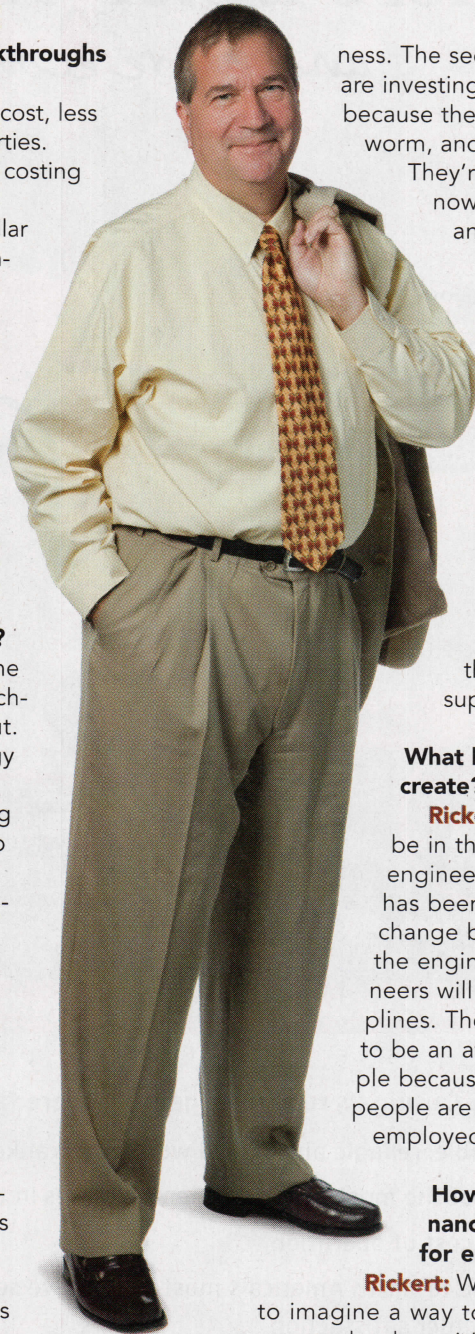
Rickert: Companies that don't invest in nanotechnology will be wiped out. Customers are going to say, 'What can you give me that's new and will help my business grow?' If you say, 'I've been cutting costs, and I'm very efficient and can lower your price,' they're going to say, 'So what? I already have a low price. I need something new.' When you can't give them anything new, they're going to be looking for a new supplier.

What kinds of jobs will nanotechnology create?

Rickert: The jobs in nanotechnology will be in the sciences and engineering — mostly engineering. The profession of engineering has been kind of stale for a while, but that will change because nanotechnology will reinvent the engineering field. Nanotechnology engineers will come from all the different disciplines. The profession of engineering is going to be an attractive career path for a lot of people because of nanotechnology, and a lot of people are going to go into it because they'll be employed.

How important a role will nanotechnology play in our quest for energy independence?

Rickert: Without nanotechnology, it's difficult to imagine a way to get away from foreign oil. With nanotechnology, it's difficult to imagine not doing it within the next 10 years. Nanotechnology is going to affect the solar and wind industry. It's going to affect every type of alternative energy, every type of electric vehicle, and every type of energy management. Everything you can think about is going to be nano-based or nano-enabled. For instance, how do we get the remaining oil out of the ground? We've got to reduce the viscosity and thin down the oil so it will come out. Nanotechnology will be the only way to do that. How do you take natural gas pipelines and seal them so they don't leak as much? Nanotechnology. The list of what nanotechnology will do is endless in making us energy-independent.



How will education play a role in nanotechnology?

Rickert: Currently, there are no nanotechnology engineering departments. If you think of every machine out there that is producing something today, nanotechnology is incorporated into the materials. The field engineer, service engineer, or development engineer will have to understand nanotechnology. We have great schools with great engineering programs, and the top ranked engineering schools are where these people are going to come from. At Nanofilm, we have a university for our new employees. We bring people in from all the different engineering disciplines, and they go through a course to learn about nanotechnology. After

they graduate from that course, they're able to contribute quite nicely as nanotechnology engineers.

What is the biggest challenge facing nanotechnology?

Rickert: Investment. We've got to invest in nanotechnology. If we continue to go at a glacial pace, we're going to be in a world of hurt. The stimulus plans and current investments are providing growth capital, but it's a trivial amount of what should be going into these new technologies. We need billions of dollars in capital investment, but the return would be many times that. The future of our country depends on it. ■

THE ASSIGNMENT

Nanofilm, a leader in nanotechnology, was co-founded by president and CEO Dr. Scott Rickert. He began the company in 1985 as a spin-off from research he was doing as a professor at Case Western Reserve University. Located in Valley View, Ohio, near Cleveland, the privately held company employs 65 people within 50,000 square feet of research, production, and executive space. *Area Development* recently asked Dr. Rickert about the potential and future of nanotechnology.

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