Many professors contemplate starting their own companies. At Pittcon earlier this month, a group of scientists shared their experiences in starting companies and offered advice to others considering the same sort of move. Most of the professors serve as founders and advisers to their companies but have not severed their ties to academia. They represent companies ranging from Bioanalytical Systems, founded by Purdue University chemistry professor Peter T. Kissinger in the 1970s, to the now-defunct Xanthon, started by chemistry professor H. Holden Thorp of the University of North Carolina, Chapel Hill.

Academics shouldn’t start companies if money is the sole motivating factor, several speakers warned. “Passion for the product or service” is essential, Kissinger said. In addition, there needs to be an “intellectual buzz,” according to symposium organizer Michael J. Natan, chief executive officer of Nanoplex Technologies. “You can’t be motivated by money, especially in this environment,” Natan said.

Adam Heller, a chemical engineering research professor at the University of Texas, Austin, cofounded with his son Ephraim the company TheraSense, located in Alameda, Calif., with the objective of helping people, he said. In 1996 and 1997, TheraSense needed capital to scale up. “We went to venture-capital funds and told them that making money was our second most important objective,” Heller said. By being so forthright, Heller “narrowed the number of funds to the ones we actually liked.” TheraSense manufactures sensors that measure glucose in 300-nL blood samples.

Hiring the right people is a key step in developing a company, speakers told the audience. “I hear people say they want to do everything. That’s ludicrous,” said Werner G. Kuhr, director of research at ZettaCore, a start-up company headquartered in Denver. Kuhr is currently on leave from the University of California, Riverside. “Nobody has all the right skill sets. You need to hire the right people.”

Kuhr pointed out that a company can’t compromise on the quality of its personnel. ZettaCore spent considerable time attracting people with significant experience in the semiconductor industry. The firm focuses on developing “molecular memory” for electronic products to take the place of conventional semiconductor memory.

Northwestern University chemistry professor Chad A. Mirkin noted that scientists want to control everything when they start a company. However, he said, they have to “admit their deficiencies” and hire people who can provide proper management skills. Mirkin is a founder of two companies: Nanosphere, Northbrook, Ill., which is commercializing nanoparticle labeling technology, and NanoInk, Chicago, which is commercializing dippen nanolithography.

According to David R. Walt, chemistry professor at Tufts University and a founder of Illumina, San Diego, the right choice of venture-capital backers can help attract the right people. Walt advised the audience that they should look for venture-capital funds that can add value in terms of people and experience.

In his own case, Walt was able to attract venture funds that were able to provide more than just money: the CW Group, Arch Venture Partners, and Venrock. They were able to attract the right people. The decision was made to locate the company in San Diego. Walt is often asked why the company isn’t in Boston, since he founded it. “I’m just a scientific founder. I’m not there day-to-day,” he told the audience.

Walt noted that academics should push ahead with starting a company only when all the pieces are in place. He warned that scientists should not forge ahead simply to satisfy their own egos. “Employees’ lives are involved,” he said.

Speakers emphasized the importance of a strong patent position. For example, Walt received 10 patents on various aspects of the technology that became Illumina’s technology platform—bead-based assays in wells on optical imaging fibers. “You never know what’s going to be important, so patent everything,” Walt advised. “It’s a portfolio of patents that’s important.”

Heller commented that it is more difficult to create a new market than to enter an existing market with a new technology. “Technology is important, but only in the context of the product you want to make,” he said.

Barry L. Karger, chemistry professor and director of the Barnett Institute at Northeastern University, echoed Heller. Karger said that technology is only as good as its application. “Many technologies have failed not because of bad technology, but because people didn’t understand the application.”

Karger emphasized that it is important to understand the competition for a given technology. “For something that is well established, you need to be a lot better than the competition,” he said. Karger is affiliated with the company Peoples Genetics, in Woburn, Mass., which uses high-fidelity polymerase chain reaction and constant denaturant capillary electrophoresis to identify point mutations in genes.

Kissinger started his first company in 1974. At the time, there was no connection
between academia and industry. "Now, starting a company is practically a requirement for tenure," he said. He said that the current climate at universities, particularly public ones, is very different from even 10 years ago. Today, universities "embrace their role in economic development," he said.

Kissinger wondered if the current conditions are swinging too far toward commercialization. "As a professor, you can't be paid twice for your time if you have integrity," he said. Professors must fulfill their obligations to the university, including teaching classes and interacting with students, in addition to any duties they have at a company.

Robert M. Corn, a professor at the University of Wisconsin, Madison, described a less typical company, one that has become profitable and remained small. GWC Instruments, also in Madison, started in 1997, now has only three full-time employees. It develops instruments for analysis using surface plasmon resonance. Self-financed by its founders, with no debt, the company achieved profitability in 2001.

SOME UNIVERSITIES are working to make it easier for professors to set up companies. When Mirkin first wanted to start a company, he knew little about the business side. He went over to Northwestern’s Kellogg School of Business and started "knocking on doors to find someone who knew about starting a business."

Mirkin was instrumental in setting up the Small Business Evaluation & Entrepreneurs (SBEE) program at Northwestern. His goal was to create a system that would lower the barrier to commercializing technology. Scientists and engineers—professors and students—can take their ideas to the business school, where business students help them write a business plan. Within the program, they have a $10 million fund to launch such businesses with seed funding. Mirkin used the SBEE program to help write the business plans and initiate the first-round financing for both Nanosphere and NanoInk.

Not every company that is started is going to survive.

Thorp described his experience with the company Xanthon, which was developing an electrochemical method for measuring gene expression based on the presence of guanine in the target sequences. DNA probe molecules and electrodes were deposited on an indium tin oxide (ITO) surface.

The company ran into several "stumbling blocks," Thorp said. The equity markets became inaccessible while Xanthon was in the midst of executing its manufacturing strategy. Also, the ITO chips were too difficult to manufacture, and the detectability of the probes was difficult. Finally, the sensitivity was excellent—but not good enough for the direct messenger RNA analysis Xanthon wanted to do.

In some ways, Xanthon serves as a cautionary tale. Thorp believes Xanthon was overly optimistic in setting its timelines for getting to market. However, he was able to develop an understanding of the electroactivity of the various nucleobases. He is currently working on ways to improve the sensitivity by developing catalytic elongation, a method which allows detection of amounts of DNA as small as 40 attomoles. The technology is being acquired by Motorola.

The only speaker who left academia to go into industry was Natan, now the CEO at Nanoplex Technologies in Mountain View, Calif. He left Pennsylvania State University to become chief technical officer at SurroMed because, he said, he had a "once-in-a-lifetime" opportunity.

Nanoplex, a wholly owned subsidiary of SurroMed, was spun out because SurroMed has a focus on biomarker discovery. Nanoplex is focusing on developing nano-bar code particles, which consist of cylindrical striped metal nanoparticles with alternating metal bands. One of the applications for nano-bar codes that Natan is working on is covert tags for clothing, explosives, and other products. "It was hard to justify working on that application within a life-sciences-based company," Natan said.

Although the speakers were dispensing advice, they realized that the lessons they learned in starting their companies might not be relevant in the current economic climate, where investment dollars are harder to attract.

In today’s climate, Mirkin said, he could not have successfully started NanoInk if he hadn’t already started Nanosphere, thus having established relationships in the financial community.

Until recently, the initial public offering, or IPO, has been the exit strategy of choice for the financial backers of start-up companies. However, IPOs may be impossible now, Harvard University chemistry professor George M. Whitesides said. Instead of thinking in terms of several rounds of venture-capital funding followed by an IPO, founders may need to think of developing a “real company,” he said.

The two companies that Whitesides described—Geltex and Surface Logix—were started at a time “when you could launch a company with the idea of working things out as you go along.” Now, he said, it may be necessary “to have all the pieces in place at a high level” from the outset. “Opportunism is still good,” he said, “but good management, technical certainty, and working prototypes may be better.”

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