

## Thin Film Solutions Help Move Other Innovations Forward

University of South Florida



A University of South Florida marine scientist invents a novel approach to using direct optical projection for micro patterning helped launch a thriving spin-off company, and today helps bring research to a new level.

Marine scientist David Fries describes the scene: there he was, watching the sunset from the back deck of a sailing vessel off the coast of Florida and collecting data for an experiment designed to test an underwater device he had invented. Then, during a lull in the work, Fries let his mind wander, and that is when the idea for a new technology — one that had eluded him for the previous two years — suddenly came to him.

This particular scientific concept involved the use of spatial light modulators, or tiny mirrors, to make patterns — a process also known as lithography. Much like a printing press transfers words or images onto paper, Fries' new direct optical projection lithography uses light to create patterns, such as that of a circuit board, onto a wide variety of surfaces and materials. Fries, a researcher at the University of South Florida (USF) College of Marine Sciences, designed a successful prototype and joined with Jay Sasserath, Ph.D., a local scientist-turned-businessman to develop a marketable product and start a thriving spin-off company.

Today, Intelligent Micro Patterning (IMP), LLC, headquartered in St. Petersburg, FL, influences manufacturing and scientific discovery all around the globe. The company provides unique and critical tools, in the formation of thin film solutions, needed by researchers and manufacturers across a wide range of sectors such as biotechnology, nanotech devices and microwave devices. Intelligent Micro Patterning's patented Smart Filter 100 technology produces microdevices like mini-circuit boards and sensors and can pattern onto various surfaces from glass microscope slides and intravenous needles to the inside of a ping pong ball. The ability to pattern onto copper tape, for instance, has been a key step in the development of radio frequency identification chips, such as those used in tollway fee transmitters and dog ID implants. Other applications include the patterning of metal conductor lines onto traditionally nonconductive materials such as ceramic.

### Help From Family and Humble Beginnings

Going from the "eureka" moment to a profitable business did require some help. Fries refined his initial idea, assembled a prototype patterning device in his laboratory at USF and assigned his nine-year-old son the task of first-time user of the prototype. When they demonstrated success, Fries knew that it was time to approach the Division of Patents and Licensing at USF. The technology transfer experts encouraged Fries to partner with an experienced businessperson, and he did so with Sasserath — no stranger to the microelectronics industry in the St. Petersburg area.

Sasserath has served as CEO since the company was founded in 2001. At that time, the Smart Filter technology had just been licensed from USF, while the company was granted the exclusive global rights to the technology. Fries continues to serve as chief technical officer of Intelligent Micro Patterning.

"The original research for the development of the technology was funded through a project that David Fries had with the Office of Naval Research," says Sasserath. "This was used to develop the technology in the late '90s."

From the perspective of the Division of Patents and Licensing at USF, the founding and steady progress of IMP has been an ideal experience. Director Valerie McDevitt points out that a key component of the formula has been the experienced and aggressive managers who "knew how to take a product and run with it." Add to the mix a savvy researcher who has remained a USF faculty member and maintains many beneficial university connections, and finally, a smart and sound technology for which there was a niche.

"Altogether, we had all the pieces to the puzzle," says McDevitt, "so the company hit the ground running and got to a profitable point very quickly."

McDevitt says that Intelligent Micro Patterning is a very good example of her division's key mission of economic development. The company provides an added bonus by hiring university students and faculty.

Ever since Fries first obtained initial development funding for demonstrating the prototype at the university, the two have succeeded in gaining enough private funding to allow the company to remain financially independent. As the principal owners of the company, they have yet to tap into venture capital or other primary outside funding sources.

### Impacting the Local and Global Markets

Now with four full-time and 10 part-time employees, Intelligent Micro Patterning is expanding at an encouraging rate. The company proudly announced record financial results for the year 2005, according to Sasserath, earning more than \$1 million in annual revenue. Its success was driven by the introduction of the SF-100 Auto Stage — an automated version of the SF-100 maskless lithography system. The year also marked the move of the company to significantly larger facilities in the St. Petersburg area.

“*The presence of Intelligent Micro Patterning within the St. Petersburg business community has been especially fulfilling for Fries, whose civic-mindedness is evident.*”

“I have always felt that this area could use some balance in its economic picture, with a more diverse portfolio,” he says, “As an entrepreneurial seat, it needs to grow its reputation, [and there’s] something I can do to make it happen. Our company and others can begin to feed off each other and create an industrial ecosystem over the long term.”

Looking beyond the local economy, Intelligent Micro Patterning established a worldwide sales and service effort with offices throughout North America, Europe and Asia. Sixteen sales representatives are now employed by the company and the list of industrial giants who are using the Smart Filter technology include Hewlett Packard and two other Fortune 100 companies.

“Our company partners with technologists that seek new, unique, and innovative technologies to accomplish their goals,” says Sasserath.

Half the sales of the Smart Filter system are in the biotechnology sector and include researchers who need to manipulate cells and DNA, produce biochips or design state-of-the-art biotech devices. While many of Intelligent Micro Patterning’s clients are major universities such as Purdue, Arizona State and the University of North Carolina, half the company’s business is with private companies, and information about the use of IMP’s technology is proprietary.

Fries is pleased with the growth that Intelligent Micro Patterning has achieved in its brief lifespan as a university spin-off. Probably most rewarding for him is what the technology represents with respect to those who use it.

“Our company allows people to have access to a technology that can accelerate innovation,” says Fries. “Through its ability to help people develop other technologies and test their products more quickly, it is helping to shape society by allowing the cycle of innovation to move faster.”

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