



Green power

Jill and Derrick Green had it all: healthy kids, great jobs, and a comfortable life together. So how did a crusading researcher convince them to put it all on the line for an unproven new technology?

BY JOSHUA SAMUEL

In the summer of 2005, life was good for Derrick and Jill Green. They lived in the tree-lined suburbs of Cleveland, Ohio. Derrick was earning a six-figure salary as a staff scientist at Philips Medical Systems, developing medical magnetic resonance imaging (MRI) scanners. Moving up the ladder at Philips, one of the world's largest medical-device companies, he travelled extensively to share his scientific expertise with colleagues around the world. Jill, meanwhile, was the director of a county storm-water system and ran a private engineering-consulting business. With the birth of twins—Blake and Julia—in 2003, their life seemed complete. Neither Jill nor Derrick, who were both 34 at the time, could have envisioned leaving that existence to start a spin-off company from the University of New Brunswick's MRI Research Centre. "We really did have a good life down there," says Jill, looking back. "If you'd asked me whether we'd give it all up, I'd have said no."

Now, however, that settled life is just the opening scene of the adventure they relate to angel investors and venture capital fund managers. Their Fredericton-based company, Green

Jill: "Because of our backgrounds, we are comfortable with technology and starting new companies."



Imaging Technologies (GIT), is looking to close \$500,000 in equity financing so it can take MRI to the petroleum sector.

Raised and educated in New Brunswick, the Greens recently returned from the United States to commercialize a patent-pending technology that uses MRI to measure the amount of oil and water in rock. Their process yields results in one day rather than two to three weeks, which is the current industry standard. This means that oil-exploration companies can make decisions more accurately and more quickly than ever before about their extraction plans. Addressing an audience in Moncton recently that included potential angels, Derrick said, "The increasing price of oil, and a renewed focus on finding and exploiting new petroleum reservoirs, has generated significant interest in the new technology from oil industry executives in Houston."

The technology that is now the backbone of Green Imaging Technology is based on a decade of basic and applied research at UNB and sits at the crossroads of physics, engineering, computer science, and chemistry.

Derrick was first introduced to MRI after he completed his undergraduate engineering degree at UNB in 1995 and took a summer job at Bruce Balcom's pioneering MRI lab. "I was intrigued by the electronics," recalls Derrick, "and the underlying scientific principles are even more complex." This led him to do his PhD in electronic engineering under the supervision and mentorship of Balcom.

The Greens had known each other since they were six years old and started dating in their early 20s while they were UNB undergraduates. Derrick lived down the road from Jill and would often drive her to class, and they would work together on homework. They married when Jill graduated and Derrick started his doctoral degree. Jill became a civil engineer for the city of Fredericton; as Derrick approached graduation, they realized he had educated himself out of the job market in Canada. If he was to find work in his field, the couple would have to move either to Europe, Cleveland, or San Diego. They chose Cleveland so they would be close enough to be able to afford to visit family occasionally.

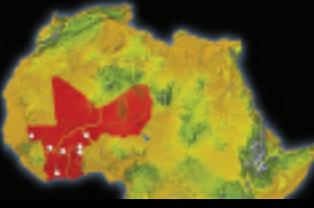
During Derrick's PhD work, he and Balcom would muse about someday creating a local spin-off company based on Balcom's research. Of course neither could anticipate what a Fredericton-based spin-off company might look like, yet both knew there was a demographic problem and that Atlantic Canada needed new industries. "The university was producing a lot of smart people who were almost qualified to do something," says Balcom. "It then meant sending them off to finishing school, which inevitably meant going somewhere else."

Derrick was no exception, and few finishing schools were as rigorous and demanding as Philips Medical Systems, where

Derrick: "The industry already has an existing method that they know works. The challenge is getting them to adopt our method."



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Bruce: "Green Imaging is not the culmination of what can be done. It is a nice chapter ending, but not the end of the story."

An innovator must not only come up with a new idea but also overcome the skepticism of risk averse managers, shareholders, and customers

he took his first job. Its medical-device division was flush with clever people, and Derrick learned to manage projects involving an intricate combination of hardware, software, and applied and theoretical science. Although he didn't realize it at the time, working at Philips would provide him with the skills and background that would prove critical for getting his first entrepreneurial venture off the ground. Derrick came to understand that an innovator must not only come up with a new idea but also overcome the skepticism of risk averse managers, shareholders, and customers. He could never have achieved this by staying in New Brunswick. "I can't imagine starting the company without the experience I gained by going away," says Derrick. Balcom agrees: "Jill and Derrick needed some leavening of experience. Going away and coming back was very important."

It also helps that the both of Greens come from a family of entrepreneurs. Derrick's maternal grandfather, Rex Chappell, owned a construction firm and built many of the highways in Nova Scotia. Derrick's father, Paul Green, left

Fredericton to learn the roof-truss business in Ottawa and Florida before returning to the Maritimes to buy a roof-truss business of his own, which he recently sold to his employees. Jill's father is Marc Schneider, a distinguished professor, serial inventor, and entrepreneur. Over a period of 20 years he refined a method for creating polymerized wood (it's now being produced by a company in Norway) and he has started a New Brunswick-based business to exploit several of the inventions he has developed over his career. Most recently he licensed a new adhesive to a company in the United States that makes construction panels from agricultural waste. "Because of our backgrounds, we are comfortable with technology and starting new companies," says Jill. "As a result, we feel we are in a unique position to capture emerging opportunities."

Even so, the couple admits that they were skeptical when Balcom called Derrick in the summer of 2005 to ask whether they would move back to Fredericton to commercialize some promising applications for MRI technologies. While the Greens were away, Balcom had been making progress on MRI research that

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would catch them unawares. Frustrated by not being able to keep talented people, Balcom had spent the five years after Derrick left the MRI centre striving to make UNB internationally competitive in industrial MRI and materials visualization. "I was trying to provide examples of what could be done," says Balcom, "so other people in the university would maybe say it is possible or this might be one way to do it locally."

A rigorous and aggressive academic researcher, Balcom, 43, was recruited to UNB in 1993 by then university president Robin Armstrong. At the time Armstrong was one of the best known physicists in Canada and spearheaded a campaign to create a state-of-the-art MRI lab in Atlantic Canada. He hired Balcom to make it happen. From 1999 to 2004, Balcom brought in more than \$10 million in big-ticket infrastructure and research funding. This included grants from the Canadian Foundation for Innovation and the Atlantic Innovation Fund, as well as a prestigious Canada Research Chair. This made him UNB's most prolific grant-getter, accounting for more research

income than the next two highest-ranking faculty members combined. The money went directly to electron microscopy, X-ray, and MRI research. Of the three technology platforms, electron microscopy had the most obvious value to the local community, providing imaging and elemental analysis to universities, government agencies, and industry across the region. X-ray was perhaps the sexiest; researchers used it to develop new technologies to detect landmines, explosives, drugs, and contraband concealed in luggage and cargo. MRI was the dark horse. No one could say what would come from it.

This changed when a Chinese petrophysicist named Quan Chen saw Balcom give a speech on MRI. Chen realized that with Balcom's help, MRI could be used to study the flow of liquid through rock. Balcom invited Chen to be a post-doctoral fellow in the UNB lab to pursue basic research. At UNB the two researchers invented a process that uses MRI to measure capillary pressure. This was the subject of a preliminary U.S. patent application in the fall of 2004.

Balcom and Chen felt that the process had potential applications in the lucrative oil-exploration industry. They successfully applied for a phase one \$125,000 commercialization grant under the Ideas to Innovation program administered by the National Science and Engineering Research Council. The money would go to demonstrating that their measurement could be used to test petroleum-reservoir rock cores. This work took a year to complete, and at the same time Balcom and the UNB office of research services filed a patent application in Canada and the U.S. and assessed the potential pathways for the technology.

Balcom and UNB director of intellectual property David Foord saw two potential avenues for commercialization: either establish a new company or license the technology to an existing Canadian company, an MRI-equipment manufacturer or a leading oil-field-services company such as Schlumberger or Halliburton. The licensing option was fraught with difficulties. First, there was no existing Canadian company in this specific marketplace. Mathis Instruments,

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a Fredericton outfit commercializing another physics technology, had initially expressed interest, although it wasn't an ideal match. Second, the technology hadn't been beta tested or accepted by the oil industry. So when UNB's Foord met face-to-face with representatives from Bruker, an MRI-device maker in Milton, Ont., he was told to come back with a fully tested commercial product.

By the summer of 2005, it was clear to Balcom and UNB that a start-up company would be the best vehicle to commercialize the capillary-pressure technology. That's when Balcom called the Greens in Cleveland. Although intrigued, Derrick and Jill were unconvinced that the opportunity had legs. Balcom was undeterred and persisted, flying Derrick to Fredericton that August to show him how research on industrial MRI had evolved over the past five years. He also invited him to attend a conference in Toronto later that month, where

Chen was presenting a paper to the oil and gas industry. Derrick took a holiday from work and drove the five hours from Cleveland to Toronto. Chen's seminar was standing room only, and, according to Derrick, it was the clincher. "After Quan gave his presentation, he was mobbed," Derrick says. "There were 10 or 12 people crowded around him, firing questions at him like, 'What are you doing with this technology? Who is commercializing it?' I overheard a guy from Shell saying that in the 15 years he had been going to that conference, this was the best new technology he'd ever seen."

If Derrick had any doubts about the potential markets for Balcom and Chen's technology, they were evaporating quickly. "I was driving back to Cleveland," he says, "and I had to pull over just before the border to call Jill and say, 'We have to do this.'"

The Greens' interest in the start-up opportunity heated up in the fall of 2005. This involved a week of brainstorming sessions and presentations to more than 40 businesspeople and potential investors in Fredericton. They included represen-

tatives from the Atlantic Canada Opportunities Agency, the Business Development Bank of Canada, and Mathis Instruments. This time it was Jill who came to Fredericton, since Derrick had to be careful about alerting Philips to his plans. "It was a whirlwind week looking at space and learning all the acronyms of the regional development and funding agencies," she says, "but the best input I got was when I sat down with the group of business leaders in the Fredericton area and threw my ideas out there. We got a lot of positive feedback and contacts."

While Derrick knew the science of the technology, it became evident to everyone at these meetings that it was Jill who would become the front end of the business. Smart and articulate, she can easily stand in front of a group of investors and enthusiastically tell a compelling story about GIT and where it's headed. She knows how to stick to a script, hammering home points about the team, the value proposition, and the market. She also knows to defer to Derrick when it comes to the technology and the development road map.

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One of Jill's meetings was with Mathis Instruments, an early supporter of technology. Chris Mathis, who co-founded the company with his wife, Nancy, was listening attentively to Jill when Nancy stepped into the room to say hello. At that point, Mathis realized the uncanny similarities between Jill and Derrick and Nancy and himself. "We are all engineers," he says, "but it is the women who would emerge to lead their the companies while

the men planned and executed the technology development." It is no coincidence that Chris Mathis now serves as a member of GIT's advisory board.

Most of the meetings were highly productive, although one with an institutional venture capital investor hit a snag. After the pitch, the investor flatly stated, "We don't like husband-and-wife teams." It is widely known that many equity investors, particularly venture

capitalists, won't invest in married couples. The conventional wisdom is that that if the marriage ends, so does the business. The bias hasn't been a significant obstacle for the Greens, although they have set up their shareholder agreements to protect investors in the event that their marriage ends.

Derrick and Jill see GIT as their third child. "There are only benefits," says Jill. "We have had a successful partnership for 10 years, and now we are taking it to the next level. I wouldn't want to do this early in the marriage, but now there is a good balance of strengths." Adds Derrick: "After 10 years it makes complete sense to be in business with your spouse. You know that person very well."

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When Jill returned to Cleveland following all her meetings in Fredericton, the couple decided to start the company and to move back home. "In the end, we thought that even if this didn't work out," recalls Derrick, "we would be farther ahead in our careers than if we just stayed in Cleveland." Drawing on her communication skills, Jill developed a business plan in collaboration with UNB's Foord. Meanwhile, Derrick and Balcom began to draw up a statement of work and budget for beta trials that would prove the technology to the oil industry.

The Greens formed GIT in November of 2005, and in December Derrick, Chen, and Foord flew to Houston to meet with large oil companies and testing labs. In three days of intensive sessions, they discussed the value of the technology and, perhaps more importantly, the potential business models. From this trip, Chevron and Core Labs, one of the biggest oil-service companies in the world, emerged as an industry champions for the technology.

By January the Greens were in Fredericton for good. Being able to focus on product development has permitted them to accelerate the MRI technology's time to market. "We grabbed hold of this because it was ready and the customers were identifiable," says Jill. And by founding the company in Fredericton rather than in the U.S., they have been able to tap into the support of family and friends, starting with the first round of financing. It also helps with travelling. "If

we have sick children, we can send them over to the grandparents," says Jill. "In Cleveland, we couldn't put as much time and energy into the company."

One year after first hearing about the opportunity, the Greens were assigned ownership of Balcom and Chen's capillary-pressure technology, and also optioned two other technologies that are under development in Balcom's lab. For now, however, the focus is on launching their first product and demonstrating the value of MRI into a conservative market. The major oil companies are notorious for preferring "tried and trusted" methods and resisting new ones for years, even though they offer strong advantages. "Ours is a new method," Derrick explains. "The industry already has an existing method that they know works. The challenge is getting the industry to adopt our method."

To convince the oil industry to invest in their new method, Derrick and Jill are taking a "push-pull strategy" that's designed to market to both the oil industry and the oil-services industry at the same time. To create demand from oil companies themselves, they are running the MRI capillary-pressure tests on old rock cores sent to them by the oil companies and comparing the outcomes with the results from the original tests. At the same time, GIT has partnered with Core Labs, who will soon start testing new rock cores twice: once with the old technology, and once with the Greens' technology. "The 'pull' is the big oil companies, who we're hoping will start asking the oil-services companies why they're not using our technology," Derrick explains. "The 'push' is the oil-services companies, who we're hoping will start telling the big oil companies that they can do the capillary pressure test faster and maybe even cheaper."

To develop and fully test their desktop MRI measurement system, the Greens have received financing from friends and family, angel investors, the Atlantic Canada Opportunities Agency and industrial partners. As well, UNB successfully applied for a second Idea to Innovation grant of \$200,000. The Greens plan to have a commercial product in the field within the next six months and generating annual revenues of more than \$3 million

within four years. Conceivably, the Greens can earn back in revenue the entire federal investment in Balcom's research infrastructure in another six years.

Ten years ago, no one could have envisioned what a New Brunswick-based MRI company might be. Now GIT is using this powerful technology to create applications for new industries. Balcom hopes the Greens' early success will encourage further investments in his and

other Atlantic Canadian labs. "Green Imaging is not the culmination of what can be done. It is a nice chapter ending, but not the end of the story." And as for the Greens, they say that they don't regret for a second their decision to come back home. "Well, I do miss the shopping sometimes," says Jill, laughing. "But it's been a wonderful adventure, and we've already learned so much. I wouldn't trade it for anything." 



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