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TECHSPOSE

Ping Fu

Co-Founder & CEO, Geomagic

Your life's story reads like a gripping novel, combining iconic stories of rags-to-riches and immigrant-works-hard-and-makes-good. Have you spoken with anyone about writing a book or a screenplay?

I have a book contract with Penguin, with the book scheduled to come out towards the end of 2012 which I'm writing with a co-author. The working Title is: *Life is a Mountain Range*.

Do you notice that people who know your story treat you differently when they meet you?

At the business-level, people tend to feel they know me already if they've read my story. This gives me an opportunity to get to know them more quickly because we don't have to start at the beginning.

It is a different story with my employees. The people who work at Geomagic are proud of me and proud to be associated with the company, because they share my values; it's not based solely on my personal story. If people want to work with Geomagic just because of my story, not because of what the company does, they don't fit in well.

At a personal level, I find that people treat me slightly differently if they know my story before we meet. They seek me out and want to talk about my story. I don't generally feel that this is intrusive, although not all the questions are particularly comfortable for me to answer. But I do appreciate that they're interested.

You missed a lot of school during China's Cultural Revolution of the 1960s and 1970s, yet you seemed to assimilate quickly into the American academic world, and ultimately earned your MS in computer science at the University of Illinois. How did you overcome those early academic disadvantages?

I didn't have the K-12 type of schooling because I was working, but in college in China, I studied literature, which didn't require a lot of previous schooling. Then I came to the United States and studied computer science because my English wasn't very good yet I still needed a marketable skill. I was lucky that I picked Computer Science. It was difficult because I really had to study hard to catch up on the science and mathematics that I hadn't previously studied.

What surprised me was that much of what we study in K-12 isn't that useful for the computer science studies I had chosen. Much of what we learn in early school we don't remember, other than things like the multiplication table. When I got into college in New Mexico, I knew basic concepts and arithmetic. For many things I could use a calculator, which helped. But the advanced concepts for computing still needed to be learned beyond standard K-12 schooling, which I can follow just fine.

I know even today that I have certain gaps in my knowledge because I didn't go through the normal schooling. But I had already developed a strong capability in self-learning. Even when I grew up working in the factory, I had to operate machines and learn mechanical concepts. I had to learn on the spot and that trained me in self-learning. I certainly didn't have the systematic learning like others but I had to learn every day, when you need it to survive.

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Being deprived from school, something which I really wanted to attend left me with a burning desire to learn. As a result, I'm a life-long learner and I never get tired of learning. I'm pragmatic about what I learn, but I also like concepts. I go out and learn ideas and philosophy that I may never really use, I'm just interested.

The *Inc.* article implied that, as late as 1993 when you revisited China, you felt somewhat isolated in American culture. Has that changed?

1993 was the first time in 10 years I'd been back to China. I left there in January 1983 when China was, by and large, a communist country, so, when I left, I thought I could never go back. There was no economic development at that time.

In 1993, as a US citizen, I realized I *could* go back. By then, it wasn't the China I had known: Everything I knew as a child had changed. In the early 1990s, economic development had changed the country and the people I had known now wanted to make a few bucks wherever possible. Since I was now American, everyone thought I was a rich - although I was in the university at the time. Instead of being able to revisit my youth and rekindle friendships, I now felt everyone wanted money from me to start their businesses. That was when I felt isolated and dislocated from my birth country. For the first 10 years after I left China, I was trying to be an American, to learn the local culture, to learn about the country that had adopted me. But I still felt a kinship to China. After that return to China in 1993, I felt more as if I belonged to America, like any other US citizen.

What changed throughout the 1990s was that China became more economically strong. Toward the late 1990s, I got asked about China a lot because people could see that I was Chinese and I realized then that I belonged to both countries. It invigorated me to study more about China and its history, and it allowed me to see that during the 20-some years I lived there, we were studying Mao, not China. At this point I began to see that I could relate to China and that I should be proud of China and its history. Like black people should not feel ashamed of being born black, I no longer feel the pain of born Chinese.

Which of your personal traits have been most responsible for getting you and Geomagic to your current level of success?

1. Resilience
2. Optimism
3. Being non-judgmental. I've seen so much in life that I have learned to be radically non-judgmental, more compassionate and accepting. So many different things can happen under different circumstances. I've seen really good people make bad decisions under times of stress. As the co-founder of a start-up company, at times I made a business decision that looked like a bad contract. But given the circumstance, it was a good decision. I've worked hard in both China and in the United States, worked my butt off, and I've seen the breadth of human behavior both good

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and bad. These experiences have allowed me to create a more compassionate, friendly environment at Geomagic.

In Myers-Briggs terms, you're an INTP – tending toward being introverted, intuitive, thinking, and perceptive. How do those traits show up in your management style?

Myers-Briggs is more about personal inherent *preferences*, not who you are. For instance, if you're right-handed, you prefer to use your right hand, although you could use your left, but not as adeptly. At Geomagic, we learned as a team that people have different preferences, and you perform better when you work in an area that's aligned with your preferences, as when you perform better with your right hand if that's your preference. When you hire, you should consider those preferences.
It was only through studying that that I came to understand my preferences and my behavior better. Some people's preferences are very strong. In my case, the only one of the four that's really strong is the T - the thinking piece. Otherwise, I don't have strong behavioral preferences. For instance, I'm an introvert, but not a strong introvert. My communication style is introversion, but my leadership style isn't. So I don't read too much into these tests, except trying to be more understanding.

In the mid-2000s, you felt a need to improve your management skills. How would you rate those skills now?

There are leadership skills and management skills. I'm not a strong administrator, but I'm a creative and strategic thinker, a gap finder. I'm a top-down thinker who doesn't like a lot of information, but love insights. Those are, one can say, leadership characteristics.

Management is different. It is inspiring people, conducting meetings, developing better teamwork. I learned that I struggle with some of those, that I was very good one-on-one but had trouble with the team. It's not that our team didn't work smoothly or get along, but somehow there wasn't that tightness. Then one day I met someone who said that, because I didn't grow up with team sports, I didn't have the sensitivity about how to create and play in a team. Men are more likely to grow up with team sports and they know how to coach with teams and how to play together. Women don't normally do that – they tend to do bicycling, individual sports.

Once I learned that, I studied team sports. I saw team sports in America but had no appreciation or understanding of how to build a cogent team. If you grew up that way, you will have more developed instincts. I didn't so I had little sensitivity for it.

Once I understood that I had this knowledge gap, though, it became easier. I started reading books about coaches and coaching philosophy, Coach K *[Mike Krzyewski, basketball coach at Duke University]*, for instance. To continue to lead the company and be its leader, I knew that I needed to change and learn. When the company was small, I didn't need to know how to deal with many different personalities. As the company grew, I had to learn to deal with big egos, people who are better than I am at certain things, people with completely different points of view. That's been quite an adjustment.

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Which technologies do you prefer for your own training?

I read all the time. I go to a lot of conferences of many different types, and I talk with a lot of people from many different backgrounds. These are my main tools for learning and how I keep up with the latest in technologies.

What's the magic in Geomagic?

Geomagic delivers software that allows information from different sources (scans of physical objects etc.) to be turned into usable 3D data. We call it 3D Imaging. *[You can see more about the technology itself in the question below.]*

The Geomagic software products do the really complex mathematical calculations that deliver accurate 3D data in a very easy way for customers.

The *Magic* itself is what our customers do with the data.

Our customers do amazing things once they have a physical object into digital formats. They recreate engine parts that are now obsolete; they invent new medical treatments that are less invasive and more successful; they custom-build dental implants; they create pieces of art and create archives of historical artifacts so they can be restored, explored and studied. They design new products, custom-fit shoes for example, and then print them out directly from the computer. The 3D data is used in movies for realism and authenticity. Those are just a few examples of what people do to create magic. Geomagic enables that.

Explain 3D Imaging and Processing how Geomagic developed it and uses it to serve its customers.

3D Imaging is similar to 2D images. Everyone knows how to take a photo using a camera, but the picture is flat. 3D imaging is not flat; it represents the shape from the real world and real people. Processing is about taking the 3D imaging, and using mathematics to transform the data into multiple formats for design, manufacturing and quality assurance. There are many case studies on our website will illustrate this.

Back in the 1960s, we had signal processing, which is digitizing one-dimensional curves (signals), applications are digital music and mobile phone, for example. In 70s, we had image processing, which is digitizing images and text. Some of the applications seen here are desktop publishing, web and computer graphics for games and movies.

Geomagic software enables the processing of a shape, anything being captured in the real world, we can make them useful. We combine the artistry of one-of-a-kind hand craftsmanship with the massive power of software technology to enable mass customization - where products can be made one-of the-kind at the economic efficiency of mass production.

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In which ways has Geomagic used technology innovatively to set itself apart in your industry?

We both invent and innovate. Innovation isn't invention. Invention is making something that didn't exist; innovation is about applying an invention with relevance in the market place or for people. At Geomagic, we have invented software and we're innovative in helping our users apply the technology to allow them to both invent and innovate.

What sets Geomagic apart is helping our customers to use our new products and services to solve their problems and for them to offer product and services to consumer that didn't exist before. We care much more about the solution and how technology can help provide those solutions.

You and Geomagic have won many awards in the past decade. How do you continue to spark the magic of innovation in your people?

We need to have a culture of innovation. The whole company must be excited about it. We must also create time, processes, and budgets for people's ideas to become useful. We have a support system in which people can be innovative, which selects winning ideas, and which provides ways to carry out their ideas.

People with great ideas and contributions receive recognition from their peers, and that is motivating. We all want to be relevant, respected and loved, there is no better way to receive and feel a sense of achievement than being recognized as an innovator. We have many different kinds of awards: peer awards; monetary rewards; verbal recognition (like a pat on the back); and annual awards from manager and the president that are peer nominated.

Which types of problems are bouncing around in your head, begging to be solved in the next few years?

I travel a lot, visiting customer sites and partner sites and listening to what's new and what the market needs and what we can provide. This year, one of the hot technologies is 3D printing and how can we create fast, easy and inexpensive content to feed the 3D printers. We're also looking at digital photography, called "computational photography." A camera to properly handle this isn't even on the market yet and I'm already jumping all over it to figure out how a flat (2D) camera can be used to take 3D photos.

Also, cloud computing is hot. Its essence is that in a few years, computing will be like utility, like how we use electric power. I'm thinking of how Geomagic should leverage cloud computing because our data can often be huge. Add to that how we can leverage mobile computing. We have to transition from desktop to cloud and to mobile. How to combine power and mobility is always an interesting problem to solve. We tend to determine what's suitable for us and how can we benefit our customers using these technologies.

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What's been the most gut-churning event in your Geomagic journey from 1997 to today?

The first difficult time was in 2000 when Geomagic was near death. We basically ran out of money and the company was at the brink of bankruptcy. I had a company that everyone thought would die within 3 months. But I was able to rally my people. Nobody left at the time. I became the main sales person and we very quickly got enough money from the customers to float the company. We also managed to get government grants which was a blessing because I certainly couldn't get money from investors at that point.

Then, just as I thought I was able to breathe, 9-11 happened and there was absolutely no visibility in the economy. I put my house up as collateral for the bank, and invested my own cash. I didn't pay myself. At one point I thought I might lose all my cash, my family and friends' money, my house. My decisions started to look like they were foolish mistakes. But, with some strength and resolve, they turned out to be okay and we made it through.

And the most fun?

When the company actually survived through those dark moments, I made an announcement to my employees that we'd gotten enough money to stay open. Three months earlier I had told them that we needed 3 deals to survive and that I'd pay them first when money came in. Three months later I secured $3 million with 3 customers, we were safe and my teams told me that, while they hadn't believed I could do it, they also weren't going to let me die alone. It was a lot of fun when we celebrated the survival and the deep bond we built with each other.

Since 2003, we've grown internationally, grown our product line. It's much more fun to run a business when we don't have to worry about payroll again.

What important lessons did you learn on that journey for leaders of small tech companies during hard times?

First, you have to make some tough decisions. For example, I signed a contract that, at the time, everyone thought was a bad contract - for $2 million with no recurring revenue. In a normal situation, I wouldn't have signed it, but at that point, I was completely focused on survival and cash was urgently needed to survive. I knew I was trading dollars for pennies but I was laser-focused on cash. What kept us afloat was me making that decision without support from anyone and being focused on the outcome rather than my ego.

I remember my grandfather sold a precious collection he owned so that he could put food on the table because we were starving. It didn't matter what the value was. It was all about survival. When I needed that money for Geomagic, I signed the contract the minute that company said they'd buy. You must have the guts to make a decision in extreme circumstances that you have to stand by and keep the resolve to see it through.

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And, second, is to assume the best in people in bad times. Focus on goodness and trust. Down times inevitably bring out people's worst behavior and the finger pointing starts. If a team is not together, you cannot survive. I found that, if you assume the best intention and insist on people's best behavior, you bring out the best in them.

As I look back, I can see that different times require leaders to have different skill sets and attitudes. When you're in survival mode, there's a clear and common goal, which is to survive. It was easier for me to be a good leader during the rough times because of that one clear focus. In the good times, everyone has their own ideas about what to do and you tend to have more silos, less focus and a harder time creating that focus. I learned that leading well in bad times didn't guarantee that I'd be a good team leader when things got better. There is a book called **What Got You Here Won't Get You There**, by **Marshall Goldsmith**. With this, I learned not to rest on my past success.

What do you predict to be the most exciting technologies in your industry?

I think the democratization of 3D imaging and 3D printing is the next big thing. With costs dropping, there is huge potential for 3D to become mainstream in the consumer market. This is very exciting and we are focusing on how our software will be a key player in that rapidly evolving market.

In your lifetime, which new technologies have had the greatest impact on you?

I would say software. I got into software design and development in the early 1980s when it was a new field. Marc Andreessen, my former student, said recently that today every company is a software company. It's very interesting seeing how software has penetrated everyone's life and every corner of our businesses, and how software programming has become the best job, the highest paid, and programmers are almost never out of jobs. I hope more women will take computer science as their field of study - we have a hard time finding female software engineers.

Which books or ideas have had the greatest force in your life?

The book, ***On Becoming a Leader***, by **Warren Bennis**. This book resonates with me when I study leadership. He defined leadership as a being, not as a position. That made a huge impact on me because from then I developed my leadership skills around how I wanted to develop myself. Not many companies have the founding CEO that remains CEO as the company grows, the ones does are some of the strongest companies, and I believe this book helped make that possible for me.

Would you like to add anything else?

I would like to note the roles that Geomagic and I play as community leaders. Even though we're a global company, we play a local community role. Our employees and managers are active in our neighborhoods and elsewhere in North Carolina. We've adopted inner city schools and are active in supporting educational programs, teaching kids about engineering, and running intern programs with local universities. We're involved with many charities and non-profit events. I have employees come to me with questions about helping them get involved.

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The second thing that I do is to have a conversation with employees on happiness. I believe this helps create a positive environment, which creates productive employees. I think of happiness in 3 ways and you need to have all 3 to be happy:

1. *Personal pleasure* (family, sports, and such) – this is about your personal mental health.
2. *Flow (*the concept that you love what you do so much that you forget time) – this applies to your career.
3. *Meaning (*what you do that is bigger than yourself) – this is about your legacy, what you want to leave to the world.

When I break happiness down to these 3 simple tenets, I can always identify what makes me unhappy; is it personal, career, or meaning of life, then I know what to do to be happier. So I like to share this with everyone.

I want people to come to work in the morning feeling excited about what they do and to go home in the evening feeling fulfilled for what they have done.

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