

Profile-Steven C. Vetter, Founder of Foresight Fellowships Entrepreneur for the Future

By C. A. Kennedy



Steven explaining the latest advances in Nanotechnology to his Minnesota Study Group

Steve Vetter possesses the soul of an entrepreneur, which resides in a mind and body of a man for whom unraveling the nuances of the physical universe has been a lifelong obsession. He is a man for whom creating corporations and running business enterprises is integral to his psyche as is his love of math and the sciences. "As long as I can remember, I have had an aptitude and interest in math, physics, business and computers," he said. "I had a passion for these things, and I also enjoyed explaining these things to people."

Vetter's photograph obviously depicts a pleasant countenance... a youthful man in his middle 40s, a staunch family man who dearly loves his wife of 24 years, Linda, and a man who is acutely proud of, and actively involved, with his two young sons. He regularly arranges informal soccer matches for his children, and takes the field with them. On the surface, it's a fairly familiar baby boomer portrait. He could be, and probably sometimes is, the guy standing next to you at the checkout counter at Home Depot.

What the photo doesn't reveal is Vetter's burning zeal for creating new corporations ("I'm addicted to start ups"), and his high-evangelical conviction that nanoscience will revolutionize and alter the way humans live on this earth. Vetter is that rarity, a practical-minded futurist who avidly believes that our future will change so radically within several decades that the way we will live, work and play then could be categorized as today's blue-sky fantasies

Vetter's short-version bio gives a bare outline of his achievements: He was the first Senior Associate of the Foresight Institute and has been an active member of both the Foresight and the Institute for Molecular Manufacturing for ten years. He was the chairperson of the Advanced Technologies session of a Space Manufacturing conference at Princeton, which focused on impacts of nanotechnology on space development. He is co-founder and CEO of Molecular Manufacturing enterprises, Inc., the first seed capital firm focused on nanotechnology, and is president of Angstrom Tools, Ltd., which is developing a scanning Tunneling Microscope specifically aimed at nanotechnology applications.

He took his BS and MS degrees in software engineering at the University of Illinois in Champaign/Urbana, and his MBA studies at the University of Michigan. Vetter has accumulated over 25 years of software engineering experience, including extensive project and people management.

In addition, he has founded, or co-founded, more than a dozen companies, including Computer Solutions Integrators & Products, a systems consulting company specializing in designing test systems primarily for biomedical device manufacturers. With Vetter at the helm, this company has experienced phenomenal growth during its four-year life, and was ranked seventh among Minnesota's fastest growing high-technology companies by Deloitte and Touche in their recent report.

His lifelong acquisition of scientific and mathematical knowledge, which meshes so congenially with his fascination with things entrepreneurial began early in life. His pecuniary training began, if not quite in the cradle, then certainly before his first school years. Vetter credits his father with fostering both his interest in the sciences, and in the world of business.

He recalls setting up his first company around the tender age of seven, which was the classic childhood enterprise, the lemonade stand. Many children have sold lemonade to kindly souls who encourage their attempts at earning money, but Vetter's father recognized an opportunity to teach solid business practices to his young son. Vetter was taught the basics of purchasing inventory and supplies (lemons, sugar, cups, etc.), and figuring costs, overhead and profit. Then the father and son went to the next level and formed a company, typing up stock certificates for Vetter, Inc., and selling stocks for five cents a share door-to-door in the neighborhood. Clearly delighted by the memory, Vetter recalled that "this was my first IPO" (Initial Public Offering), and he recalls making a profit and redeeming the stock at the end of the summer when he liquidated, his business to start fall classes.

Always looking for an opportunity to produce income, Vetter also remembers whipping up batches of fudge (from a mix, thereby maximizing his time and reducing the labor required) and selling the candy door-to door, no doubt gaining valuable basic retailing experience for years hence.

Clearly, the entrepreneurial gene was activated early on, as was the intense drive to absorb every bit of mathematical and scientific lore available. Heredity plays a role here also, he said. "Both of my parents were mathematically gifted." When he was a bit older, his father equipped the basement with a chemistry lab, and it became a haven for a solitary child with a genius-level curiosity. Vetter recalls a time when his zest for experimentation outstripped caution, "I always enjoyed Lego and Erector Sets. "I had an electric motor Erector Set - 110 volts - and asked my Dad to put a switch on it. He kept putting it off, and it figured I would do it myself. I plugged it (into the electric outlet) part way and arc welded a wrench and took the power out in the house." Vetter remembers that his father never uttered a word of reproach, but recalls that "Dad took the wrench, which had a large gap burned out of it, and put it on the bulletin board so that I would remember I was playing with something dangerous." (This tactic seemed to have worked extremely well for Vetter said he vividly understood that the burned out hollow in the metal could easily have been a void in his own anatomy.)

As the youngest of four, with his nearest sibling a sister who was ten years older, and two brothers who were adults, Vetter was a child who understood loneliness and was often left to his own devices. Although much loved by his parents, his father adhered to strict rules and Vetter notes that he was more or less surrounded by adults during his early years with a few friends that were either much older or much younger. Vetter candidly recalls some of the difficulties of his relationship with his adored father: "He was very conservative and strict. I didn't have a lot of freedom or social life. Emotions were a sign of weakness, and he was extremely chauvinistic," he recounted. Although sometimes difficult, these circumstances seemed to have contrived to lead him to independent and analytic thinking at a very early age.

The youngster acquired the use of a very basic computer from school that he was able to keep for

his own use until the 7th grade. This bit of luck presaged his later work with computers. "It was a simple computer with relays and switches and buttons. I would build electric combination locks and my sister would figure out how to open them, and then she would tell me how she figured it out. So then I would devise a new strategy, and finally built one she couldn't open. It was an arms race. I would decode decimal numbers into binary, and I programmed a (an early computer) game called DOTs - which was a real challenge to do with such limited resources."

Vetter's father remains a major influence in his life, and he recounts that his dad's untimely death was a watershed time for the 15-year-old who witnessed a strong, virile man weaken and become dependent. "I was stronger than him overnight," Vetter recalled those trying times. Emerging into young adulthood while witnessing his father's debilitating struggles with the effects of chemotherapy and radiation treatments for cancer, which ended only with the advent of a heart attack, still evokes stark memories.

"When I was little," he said, reaching back to childhood for a brighter recollection, "Dad and I would go for walks and the topic of our conversation would be, 'What would you do if you had a million dollars?' He said he would retire and have a restaurant...have our own business. He never did. He worked for Ma Bell for 30 years straight."

Vetter also remembers that years of stress and suppressed emotions kicked when the teenager couldn't breathe because of hyperventilation and had to be rushed to the emergency room. In the aftermath of his father's death, Vetter and his mother drew closer and, in time, he realized that the two of them had begun to come out of their respective shells. His quiet homemaker/mom became an accountant and a savvy businessperson able to provide the guidance and counsel her son needed through his last years in high school and as he entered college.

"In junior high school the discovery of physics decided what I was going to do with the rest of my life. I loved physics and programming computers." Although bored by school at first, he crammed seven years of math into four years of high school by taking advanced courses, talking school officials into allowing him to carry extra hours, and by sneaking into other schools for night classes. He discovered track, and broke the school record in the 50-yard dash. "I was really into learning and placed one year of college...placed as a sophomore," he recalled, still pleased with shaving a year from college.

"I blossomed socially, he said, detailing adolescent hi-jinks such as "trashing the transmission doing a neutral drop" and other rebellions. "I got it out of my system," he said. A self-described "intellectual misfit" in school, he solved that dilemma by joining a math club of like-minded students, which morphed into a computer club whose 20 or so members essentially socialized themselves. The catch was that the Computer Club had no computer. A year and a half later Vetter went on a phone company tour and hit pay dirt, bringing home unwanted relays which enabled the club to re-build an old computer - " a 1620 IBM...with transistors and hard disk. We were now programming with a symbolic language." Older members were mentors who taught Vetter all they knew about computers, software and engineering. And sound systems.

The budding engineers developed an audio tape of explosions played back at half speed, and then pumped it through a stereo at 750 watts per channel. "We couldn't hear anything inside the room, but the gutters were rattling as though there was an earthquake. It was cool...great...and a block away from the house we could hear a low rumbling." They had achieved ultra low frequency sound effects. (Parents of gifted children, take heed).

And the teaching bug? "I got the passion to be a teacher in the third grade, " he said and practiced by teaching math to younger children. Teaching remains an enthusiasm today as he reaches out on many levels to colleagues, venture capitalists, scientists and laymen alike to inform the world about the future he foresees as nanotechnology becomes more and more prevalent in our lives. He clarifies the term nanotechnology as, "Building things with atomic precision from the bottom up...a place for every atom and every atom in its place."

And what is rolling down the pike toward us in Vetter's view?

"One of the things will be increased security - ubiquitous surveillance- but it will be less obvious and we won't feel that our privacy has been invaded. Airplanes will be much safer, as will city streets. Society will have to decide what to do with this technology and the information it produces. " There is the question of regulation, of course, and who will get to watch whom. He ponders questions of government regulation, central power and possible abuse by dictatorships.

It is Vetter's thought that one way to avoid abuse of power would be to allow everyone to watch everyone else. "Gathering information is not so basic as what you do with the information. This (problem/situation) can work out okay, and another way to address the problem is to have computers that have enough smarts to detect criminal action while all other information is kept private. This would be the best way in my book". He recommends " The Transparent Society" by David Brin for those who wish to delve further into this subject.

Vetter can foresee that cheap access to space will become available... that there can be a "family spaceship" allowing entry to earth orbits and thence into space. Since the most expense takes place lifting out of the deep gravity well of earth, those who live in space will have an advantage, he explained. "There will be settlements off-planet, space manufacturing, and transportation to almost infinite distances with almost zero energy. Earthlike environments will be possible...and that means trees, bushes, grass. Rocks in space can be transformed into habitat suitable for humankind. One advantage is that Earth will be a giant world park. I would be willing to bet that it will happen in less than a hundred years. I personally expect to be living in space within 30 years", he said.

And most of these amazing events will come about through nanotechnology, Vetter explained. "Nanotech gives you materials eight times the strength of steel to aluminum. We will have more efficient computers and many changes in the economy. Manufacturing will change - the very way we make things will change. Products will be built from the bottom up."

A huge area of impact is medical, Vetter continued, especially biomedical devices, including smaller implantable devices. In pharmaceuticals right now rational drug design is working on crystallizing two proteins to figure out molecular shape in neuroreceptors. Molecules will be designed to block certain receptors but no other...this will happen in 5-to 10 years. Research takes the biggest chunk of time. Soon computers will do the work and you will hit a button and have a filled flask in the morning. It will cut 10 years out of the process."

"The first step is gaining knowledge, and as computer technology increases, we will have more complete and accurate information, and by improving their simulations we will skip a huge percentage of clinical trials. We will get to the point to where the entire cycle of identifying a disease to a treatment drug will be shortened to a couple of months. Advances will be rapid and so much more economically viable that rarer diseases can be addressed."

Vetter said he had one of those illuminating moments when something just seems to click and all the knowledge he had accumulated by bits and pieces on nanoscience seemed to fall into place. Vetter said, "I was attending a space conference in 1988, and I went to a lecture by Eric Drexler on nanotechnology and his book, "Engines of Creation." I saw it, and just went "YES!" It made a lot of sense." (Eric Drexler's book deals with nanotechnology and the potential benefits for industry, medicine and space travel. <http://wwwforesight.org/EOC>).

This eureka moment, and his belief in the inherent benefits of molecular manufacturing were to lead Vetter to membership in the Foresight Institute, which was founded by Drexler. Vetter then introduced, and organized, the Senior Associates program to enable the Institute to enlist all who wished to contribute on-going monetary and moral support to the Foresight vision. The program has grown and expanded over the years, and Vetter is so committed to the Associates program, and to the aims of the Foresight Institute, that he made his son the first member and himself the second. Then when his second child's birth was imminent, Vetter sent in two applications to the Senior Associates, one with a girl's name and the second with boy's name. When the blessed event occurred, he made a first call to inform Grandmom, but his second call was to the Foresight to ask them to activate the membership for their newest member, his son, who was literally only minutes old.

Vetter referred to "Unbounding the Future" by Drexler and Chris Peterson and Gayle Pergamit, as an excellent introduction to the impending impact of nanotechnology on the average person. He is adamant that the general public should be educated in preparation for the enormous challenges implicit in the changes that will be wrought by nanotechnology. "There will be cell repair machines within 30-50 years which will reverse aging and repair damage to the body. Life spans will be eventually extended to 100 years, and everyone will enjoy better health. Cryonics may become viable. Nanotech will tie in with quantum computing. Once we get the molecular motor under control, we wouldn't have to start from scratch."

Everything will be reconfigured in so many ways...tables that change height, chairs that automatically conform to the body, and houses in which rooms change size with beds that vanish during the day. Furniture will disappear into the floor or walls until it is summoned, he predicted.

"For instance, there will be "fogs" of infinitesimal nano materials that communicate with each other and will be able to lock arms and surround and protect the human body better than air bags. It could detect a fire and put it out. "We can look forward to the day when there will be a replicating assembler," Vetter said. "We would have our own assembler in our homes, a replicator the size of a microwave oven. It would plug into a hose that feeds it chemicals and electricity and download a recipe contains the instructions for a pair of new shoes. Eventually advanced applications will allow perfect replicas of food. A steak is just a collection of atoms...molecules built out of atoms. There is every reason to believe that we could build a steak and not be forced to kill animals. It might be 30 years, but it will be possible."

"The first applications will be with various handicaps such as replacing missing limbs and restoring sight and replacing organs, he outlined. Jokingly, Vetter suggested the extreme example that basketball players could have longer legs, illustrating his concern that there would have to be some reasonable limits. "Like the speed of race cars, technology is moving beyond what we sometimes need." We need to think now, he said because this technology represents the biggest opportunity and the biggest danger...it is very important that we make some very smart decision of how to do it best."

Now we communicate using phones...portable phones using headsets, but it is only a matter of time before cell phone implants will evolve, or an equivalent direct link to the auditory cortex, Vetter pointed out. "We will have intelligent paint-like substance on the walls...we can redecorate simply by instructing the computer to change the patterns. Chemotherapy will be a 1000 fold more effective against tumors and that can be here as soon as five years". Vetter foresees that many articles will be cheaper, smaller and more powerful leading to things like eyeglasses with intelligent lenses that compensate automatically. Autos will be much safer and will have sensors that avoid collisions.

Some applications are already with us, such as flat panel displays employing buckytubes, and soon a chemical variant of buckyballs may be used in blocking receptors in the HIV life cycle. There should be a FDA submission within a few years, Vetter reports.

Vetter has paid his dues over the years. Humorously, he describes himself as a serial start-up-aholic...a person who must have some extra hormone that drives him to found companies no matter what the risk or hardship. This is a man who lives with passion and daring. He has run the gamut from running a company part time to taking the ultimate plunge of leaving steady employment and incorporating a new firm. He has gone through periods of working full time and moonlighting just as many hours to keep a company afloat, and he had had his ideas turned down by those reluctant to incur risks, and endured partnerships that failed. He and his wife have certainly ridden the roller coaster of business ventures. He has known the frustration and the rewards, but he has always tapped his deep resources of vitality, resilience and belief in himself to come back to try once again.

Then about seven years ago life threw him a curve ball. After a long period of extremely hard work and disappointment in a company, his wife's employment as a technical writer ended, and a second baby was on the way. It was at that juncture, Vetter said, " I was diagnosed with Multiple Sclerosis, an auto immune disease which attacks they myelin sheath surrounding the nerves. Large parts of the body go numb when nerves that control the body are affected. And there is pain. For years I had an itch in the center of my back I can't reach. The disease was hard to diagnose because the tissue scars and that damage partially heals."

Of the devastating diagnosis, he commented, "It took a few months for me to recover from the news. And then I got very positive and decided to grab life with gusto...I just decided to go for it. And he did. He started another company.

The overwhelming impression Vetter imparts is that of intelligence wedded to enthusiasm. You just know that he will always have several more startups in mind. This is a man with MS who plays soccer not only with his children, but also competes in an adult soccer league with men half his age. "I'm the oldest on the team. It's great and keeps me in shape."

Steven Vetter has a mission to be in the forefront of the nanotechnology revolution and that firm belief in the future leads him to establish corporations involved in this new realm of science, impels him to disseminate knowledge, and to nurture education pertaining to this emerging science. An excellent teacher, he speaks quietly, but one cannot mistake the ardor, the intense desire to inculcate one more person with his vision. Yet, it is equally clear that, for a man who is tenaciously focused on the future, he has discovered how to live intensely in the present.

So, hearken to the passion of Steven C. Vetter as he declares that, "This is the first time ever that there has been a fundamental change in how we make things. Nanotechnology is going to outpace everybody and everything...It is bigger than anything ever has been." And never doubt that he will be

in the midst of that revolution.

LINKS:

Svetter@MMEI.com

Senior Associates Program/Foresight Institute

<http://www.foresight.org/SrAssoc>

Molecular Manufacturing Enterprises, Inc

9553 Wellington Lane

St. Paul. MN 55125

Svetter@maroon.tc.umn.edu

Angstrom Tools

<http://www.angstromtools.com/about.htm>