

# The Nano Investor

Issue 1: October 2005

Michael Sinkula  
mjsinkula@usnano.biz

## IN THIS ISSUE

Taking the Nano Plunge	1
How much risk can your portfolio handle?	3
Equity Research: Symyx Technologies	4

## SPONSORED BY



## Taking the Nano Plunge

Many investors share the common misconception that nanotechnology products and public market investment opportunities are several years down the road. Many investors immediately have written nanotechnology off as a futuristic and somewhat imaginary field because of its presence in science fiction and societal hype. This is not true as there are many nanotechnology pure plays as well as companies announcing nanotechnology activity listed on public exchanges. With that said, current nanotechnology opportunities continue to fall under the medium to long-term time horizon for a return on capital.

Over the past few years, nanotechnology stocks have built momentum, generating high returns for their shareholders. However, much of this growth can be attributed to the hype within the sector coupled with a scattering of promising partnerships. While there are some opportunities in the public markets, most of the nanotech stocks are highly risky and trade largely on the *nano-speculation*. Even though nanotechnology in the stock market is no where near a tipping point or consensus of opinion, many investors are still flocking to these stocks like the dot-coms of the previous decade. The risk-adverse money is waiting for financially defensible opportunities and reduced emotional volatility in nanotech stocks. But for both sides, it is vital that they understand the players, the pretenders, and the future leaders in this exciting field.

The general purpose technology of nanotechnology can be divided into five themes: Life Sciences (Drug Discovery, Diagnostics, Drug Delivery, etc.), Information Technology and Devices, Energy, Materials, and Instrumentation and Fabrication. In terms of market power and return, these themes reflect the margins and metrics of the industries into which these sectors sell. The first near term investment opportunity will come from the companies that provide the tools and materials for creating novel applications. This includes instrumentation and fabrication, metrology, imaging tools, nanomaterials, modeling software, and support services. The other earlier term opportunity will be the Materials sector, but long-term returns will be marginal at best. Life sciences will offer the highest returns in the long run, followed by IT/devices. True nanotechnological devices will be profound but will take several years to reach the market. The Energy sector will experience growth similar to that of the IT/Devices sector, but the impact of nanotechnology in the overall energy industry could be much more profound.

The following framework will provide a medium to long term investment thesis for five sectors of nanotechnology, including specific suggestions for public equity investment. Our themes include:

## Materials

As one of the first commercializing sectors in the nanotechnology revolution, the materials sector will supply the rest of the nanotech sector with a number of novel nanoparticles, films, and composites. After the initial impact of these new materials, margins will decrease, and those that are able to produce custom products will reap long-term rewards. As margins decrease and economies of scale rule manufacturing processes, competition will be fierce and success will be rare. Therefore, investors should not look to the nanomaterials market for long-term value and asset allocation should be underweight.

The nanomaterials market is currently saturated with several public companies as well as over 100 start-ups. Most of these companies are manufacturing similar materials with similar processes. If competition among smaller companies was not enough of an obstacle, these small innovative companies must deal with chemical incumbents that have developed multi-million manufacturing processes that will soon be converted to nanomaterials. These small companies will begin to fall away as they cannot compete with large companies on bulk production. If valuations remain high, acquisitions will not even be a plausible exit strategy for these small nanomaterials producers. The only answer for start-ups seems to be an alliance with larger chemical companies or through venture investments by the chemical company. Nanomaterials producers will succeed only if they have the end user in mind. Customized nanomaterials with clear innovation will be the only products that survive the onslaught by large chemical producers.

## Instrumentation and Fabrication

Government funding in nanotechnology is dramatically increasing and most of the funding will go to academia. When academia receives funding to begin nanotechnology research, the first purchases will be new instrumentation. A new lab will purchase AFMs, STMs, and other metrology equipment in addition to fabrication tools from the microelectronics sector. Software is a key tool for novel nanotechnology producers in their quest for truly innovative products and is also included in this section.

Investments in software companies have traditionally offered good opportunities because of low capital requirements and ease of scalability.

## Information Technology and Devices

This sector includes all of the advances made at the nanoscale in electronics such as computer data storage, chip density, and computer processing. This sector is probably the most difficult to gauge as a whole because of the numerous misconceptions surrounding potential products and disagreements in what is possible. Some believe that the ultimate goal of nanotechnology is to create self-assembling devices and functional machines atom by atom, but the real potential of such feats remains under debate. There are some scientists that laugh at the possibility of self-replicating machines, and others that can scientifically make the case for self-assembling structures atom by atom. So what is an investor to do when even scientists are unsure of the potential? Focus on the near term. Remember, one must separate good science from realistic technology. The initial areas of investment for devices will be in sectors that deal with mechanical improvements to current products like information storage, nanoscale logic, MEMS/NEMS, and interface and integration technology. In the longer term (hopefully), device investments will include molecular computing, molecular memory and switches.

This sector includes all of the advances made at the nanoscale in electronics such as computer data storage, chip density, and computer processing. This sector is probably the most difficult to gauge as a whole because of the numerous misconceptions surrounding potential products and disagreements in what is possible. Some believe that the ultimate goal of nanotechnology is to create self-assembling devices and functional machines atom by atom, but the real potential of such feats remains under debate. There are some scientists that laugh at the possibility of self-replicating machines, and others that can scientifically make the case for self-assembling structures atom by atom. So what is an investor to do when even scientists are unsure of the potential? Focus on the near term. Remember, one must separate good science from realistic technology.

The initial areas of investment for devices will be in sectors that deal with mechanical improvements to current products like information storage, nanoscale logic, MEMS/NEMS, and interface and integration technology. In the longer term (hopefully), device investments will include molecular computing, molecular memory and switches.

## Energy

Our reliance on fossil fuels has become an increasingly troubling issue for most. World demand for oil and gasoline has increased at a time when not only are supplies being threatened by geopolitical forces, but concerns are growing that production of fossil fuels will peak in the next decade or so. Nanotechnology offers new ways to increase the efficiency of fossil fuels as well as provide better alternatives to them. The National Science Foundation predicts that nanotechnology will help reduce the world power consumption by 10%. One of the rising product technologies in energy is photovoltaics, a technology that harnesses solar energy and converts it into electrical current. Fuel cells are also being impacted by nanotechnology, and portable versions of these products will be on the shelves within three to five years. But the nearest term opportunities for nanotechnology in energy will be in the catalyst business – replacing current expensive catalysts like platinum.

## How much risk can your portfolio handle?

Generally speaking, the companies that currently operate in nanotechnology are primarily in a phase of intense R&D. Blue chip companies will use nanotechnology to maintain competitive position and market leadership. They will most likely gain some of this intelligence from smaller companies and research centers holding valuable IP. In this early phase of nanotechnology there are generally three approaches to investing.

## Corporations that are investing in nanotechnology

The easiest way to make nanotechnology a part of a portfolio is to invest in companies that are actively pursuing nanotechnology in their R&D – some have contributed up to one third of their R&D budgets to the new field. These companies however are typically just exploring nanotechnology as it may enhance existing products. Some corporations, such as IBM and Hewlett Packard, have been investing millions in nanotechnology for several years and are ahead of most start-ups in the field. These efforts within corporate laboratories make a strong case for nanotech leadership emerging from large corporations, at least in the near term, especially since these companies already know where and how to apply nanotechnology to manufacturing processes and end products.

Since these companies are typically very large in terms of market capitalization, nanotechnology is not a primary concern yet, nor will it make a noticeable impact on their financials. Nanotechnology will, however, eventually be embedded in future products that give the company competitive advantages in the market. The analysis of these companies depends largely on other factors and therefore will not be included in this report which is focused primarily on pure plays in nanotechnology.

## Companies that make nanotechnology equipment and supplies

This group of companies serves as the enablers for novel nanotechnology products. While this group is riskier than the first, the companies included are normally not pure plays, and have diversified product lines for various industries.

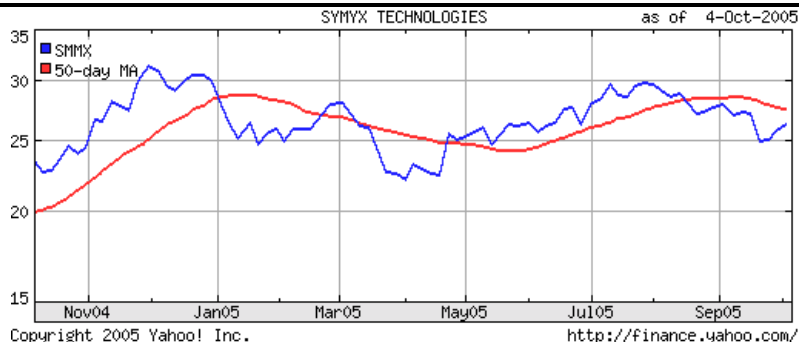
## Nanotechnology pure plays

As was noted earlier, there are very few nanotechnology pure plays listed on public equity exchanges. The ones that are listed are still very risky, volatile, and early stage. These companies are still looking for crucial contracts to generate near to medium term revenues that will fuel continued IP portfolio development.

# Equity Research: Symyx Technologies (Nasdaq: SMMX)

3100 Central Expressway  
Santa Clara, CA 95051  
Phone: 408-764-2000  
www.symyx.com

**Recent Price (10/05/05):** \$25.73  
**Market Capitalization:** \$847.85 million  
**Price/Earnings:** 77.97  
**Shares Outstanding:** 32.95 million  
**EPS (ttm):** 0.33  
**52 Week High/Low:** 32.20 / 21.47  
**R&D/Sales:** 63.6%



## Profile

Symyx Technologies was founded in 1994 by Drs. Zaffaroni and Schultz to build high-throughput experimentation systems for the discovery of materials. The technology was inspired by that of Affymax and Affymetrix, which utilized high throughput techniques for pharmaceutical and genetic research. Symyx sells software, high-throughput systems, sensors, and licenses technology and research. According to Jeri Hilleman of Symyx: "Our technologies enable scientists to perform a thousand experiments a day, versus conventional research methodologies that enable 1-2 experiments a day. This high throughput experimentation increases the productivity of research, in terms of faster timelines and lower costs, as well as by enabling the discovery of unexpected, breakthrough solutions." And while the founders came from Affymetrix and Affymax, Hilleman makes it clear that Symyx's technology is indeed very different: "While the approaches are similar at the theoretical level, the technologies used to implement the missions are completely different, because the chemistries and testing requirements are completely different and require very different technical approaches."

## Strengths: Customer Base and IP

Symyx uses proprietary technology to perform combinatorial synthesis for the development of novel chemical compounds, specialty materials, and catalysts. Combinatorial methods have been frequently used to screen and synthesize new compounds in the pharmaceutical industry, but it is only recently that this technique has been applied to the chemical industry – and Symyx is ahead of the pack. Since Symyx opened its doors in 1994, most competitors (and the list is very short) are at least two years behind Symyx, making it the clear leader in the field. The company currently holds over 235 patents, with an additional 385 applications pending. Symyx is currently focused on large volume petrochemicals rather than small volume fine or specialty chemicals because the potential returns are so much greater. They are partnering with the big commodity players because one breakthrough catalyst can pay for all of the research efforts.

While the company currently sells scientific devices for research purposes, the real value rests in future commercialization of materials developed internally. With the high-throughput screening, Symyx estimates that the company's 150 scientists are able to conduct research 100 times faster than internal efforts at large chemical companies.

This technique essentially reduces costs by nearly 99%. But even customers that purchase Symyx tools have reported some testing periods reduced from 2 years to 2 months.

Symyx relies on its partners for the successful deployment of its products, where in return, Symyx collects royalties. licenses its technology to a collection of 25 industry leaders including Dow Chemical, Eli Lilly, and Applied Biosystems. Additionally, the company has collaborations with ExxonMobil, Merck, and Unilever. The Dow contract is probably its strongest asset with long-term and very hopeful catalyst products. The partnership companies recently announced the manufacturing of a new family of specialty propylene-ethylene copolymers using new catalysts. Renegotiated in December 2004, this relationship should generate \$120 million in funding for Symyx as well as royalties on the sale of products.

In July 2003, the company formalized a 5-year research pact with ExxonMobil to develop chemical and fuel products. It is estimated that this agreement with boost Symyx's revenues by over \$200 million over the five year period, with additional royalty revenues. The CEO of Symyx, Steven Goldby, said that immediately after the deal was signed with ExxonMobil, he had other industry giants interested. The company has disclosed additional deals totaling over \$280 million in funding. The Dow and ExxonMobil deals are structured so that 40-50% of the funding goes toward services, 25-30% toward products, and 20-30% toward royalties.

Early in 2004, the company added Pfizer to the customer base when it supplied the pharmaceutical giant with a drug discovery tool based on its Renaissance Software platform. This system will help Pfizer to identify specific chemical compositions for drug targets. Pfizer is the first pharmaceutical company to license Symyx's software for independent drug discovery.

## Growth Strategy

Symyx currently sells its Discovery Tools systems and licenses high-speed research methodologies. These proprietary technologies are based on the theory that smaller is more efficient.

The systems include robotics that assemble nano-scale quantities of material on miniature chips to be tested for their physical and functional properties. Even though these tools were originally developed for in-house use, they have helped the company sustain financial health, specifically maintaining a strong cash position of \$4.43 per share. The company offers 6 major platforms for chemical development and an additional 6 platforms for pharmaceutical development.

The company plans to dramatically boost revenues in 2005 with the anticipated commercialization of a polyolefin catalyst through Dow Chemical that would alone target a potential market of almost \$2B. Revenues from polyolefins account for 25% of Dow's \$27 billion in sales. Symyx has positioned itself very well by recently extending its 3-year collaboration with Dow. Currently, revenues from Dow account for 14%, but could dramatically increase when the new line of catalysts hit the market. In fact, J.P. Morgan predicts that new Dow products could generate \$25 million a year in revenues for Symyx. Overall, the company projects that it will earn 1-5% royalties on licensed products with annual worldwide sales \$100M-\$1B. In 2006, the company will commercialize an additional product for Dow and one for Celanese. In 2007, Symyx is slated to commercialize products for Cannon, Dow, Hella, and Unilever.

In addition to their core competencies in high throughput screening, the company is developing three distinctly different lines of informatics software that covers experimental design, automation and data analysis for conventional and high-throughput research. In February 2005, Symyx acquired Synthematrix to strengthen its software offerings. There is a huge market demand for this type of software in a number of industries and the quality of Symyx's solutions is certainly one of the leaders. Software can dramatically reduce experimental design time and reduce the number of chemical and pharmaceutical candidates. Thus far, Symyx claims that customers have reported an average of 20% time saved. In addition, Symyx has a competitive advantage in the fact that potential users are already customers of its high throughput screening service.

### Material discovery pipeline (as of May 2005)

Commercialized Discoveries	3
Potential 2006 Commercialization	4
Potential 2007 Commercialization	5
Potential 2008 Commercialization	4
Emerging Development Candidates	12

Source: Symyx

### Financial Condition

While Symyx experienced a highly inflated IPO in 1999, the subsequent fall of its stock price in 2000 was not nearly as drastic as its counterparts – and for good reason. Unlike many technology driven companies, Symyx has experienced solid revenue growth of \$13.8 million in 1998 to \$83.2 million in 2004 and has achieved and sustained profitability. While most of the company's revenue relies on industry outsourcing, it also generates supplemental streams from royalties and the sales of instrumentation.

Given the product pipeline and current agreements, Symyx should see revenues rise substantially through the collaborative efforts. Symyx has experienced and will continue to experience solid growth in the primary financial metrics. Compared to the financial data in 2003, Symyx will double its revenues, triple its EPS, and more than quadruple its pro forma operating income in 2005. In 2005, nearly half of the company's revenue will be driven by research collaborations, while another 25% is generated from the sale of discovery tools. Thus, Symyx's platform allows for multiple strong revenue streams. Over the long term, growth will be driven by a revenue shift from research collaborations to licensing opportunities. In addition, it is important to note that software will begin to emerge as a material revenue segment.

### Symyx Financial Metrics

	2003	2004	2005 (est.)
Revenues (\$M)	63	83	108 - 118
Operating Income (\$M)	5	16	21 - 24
Pro Forma Diluted EPS	0.14	0.32	0.40 - 0.45

Source: Symyx

### Commentary

Symyx has already established itself as a global leader in the synthesis of advanced chemicals and has proven its leadership through a strong patent portfolio and long-term contracts with high market cap companies. The high acclaim of the Discovery Tools systems reflects strongly on the proprietary technologies that Symyx uses internally to synthesize specialty chemicals for a strong client list that includes ExxonMobil, Dow Chemical, and Pfizer. Because of these rock solid contracts, Symyx has the ability to provide financial guidance through 2005. For example, in the first half of 2005, Symyx generated \$45.5 million in revenues and still has approximately \$55 million currently under contract that it expects to recognize during the remaining two quarters of 2005. That only leaves roughly \$8-18 million to meet their revenue expectations of \$108-118 million. But there is always concern when a company depends heavily on too few customers – for example, ExxonMobil accounted for 45% of the company's revenues in Q1 2005. Hilleman points out that "It is our ability to convince an expanding group of companies of the need to broadly implement our solutions that will continue to drive our business forward."

While significant success and value appreciation should not be expected over the near-term, the company's long-term outlook appears very bright and the current price trading at a forward P/E of 42 is justifiable. It is likely that Symyx could receive considerably more through revenues that it has guided thus far, which would significantly impact the bottom line. However, the relatively high valuation can pose concerns if royalty revenues are not met. The company is still profitable even though it devotes over 60% of its revenues to continued R&D. This extraordinary commitment to future growth and financial responsibility makes Symyx a moderate buy. Long term growth will depend on the benefits provided by its technology to its partners and may include a greater concentration on software.