

1960 PC Users Group Investment SIG

Investment in Break- through Technologies

By

Larry McKee

Investment SIG Leader

May 13, 2010

Investment in Break-through Technologies

A peek into the future:

- ◆ Beam me up Scotty
- ◆ The invisibility cloak
- ◆ Cancer treated by a “silver bullet”

Beam me up Scotty (Quantum Teleportation)

- ◆ In the Star Trek series, they had a cylindrical chamber that person could enter on the orbiting spaceship, the Enterprise, that would then **beam the person in particle form** to the surface of the planet and return them on demand. This is called **teleportation**.
- ◆ In quantum physics experiments researchers are finding that **they can produce the fundamental effect of teleportation**.
- ◆ Physicist Anton Zeilinger (University of Vienna) has been working for 20 years on entangled light particles. He has demonstrated repeatedly that the two particles will **react instantly**, even exceeding the speed of light, so as to reflect changes of one on the other— **even though they are half a planet** (or a galaxy) away from each other.
- ◆ The theory of Quantum Mechanics (**Particle Physics**) and **Einstein's General Theory of Relativity are not compatible** in several areas, particularly in the area of gravity. There is not yet a theory that is able to explain or reconcile the two.
- ◆ (I believe that **in the next generation**, there will be **discoveries in theoretical physics** that will dwarf the achievements of the last 100 years. The Large Hadron Collider will probably be the lead in for that.)
- ◆ Talk about opportunities to invest in new technology!

The Invisibility Cloak

- ◆ In the Harry Potter series, one of the characters has an **invisibility cloak**.
Preposterous? Maybe not
- ◆ The **laws of refraction of light** via prisms etc were codified in AD 984. But like Einstein's General Theory of Relativity things **are changing**.
- ◆ Light is one form of an electromagnetic wave. Scientists in Hong Kong developed ways of bending sound waves and Xiang Zhang at UCLA has done the same with light. The principle is that **these waves could flow around an object just like water flows around a rock in a stream**.
- ◆ By altering the chemical composition and structure of materials (called **metamaterial**) it is possible to **bend electromagnetic waves so that they move around or through a material and resumes its exact prior path**. Hence if a person is looking at a light source and there is a cloaked object in between, he would only see the light source, not the object.
- ◆ This **has been now been accomplished at higher wave lengths** and scientist predict an easy extension into the light wave spectrum.
- ◆ **Applications** will affect all items that interact with the flows of wave forms: quiet rooms, water waves on oil rigs, radiation shields, scientific testing devices, wireless modems, airport security, and surgical tools can be used with out affecting an MRI scan. How about military applications?

Throat Cancer Treated by a Silver Bullet

The promise of next generation medicine is to **treat and eradicate the cancer cells with out damaging the normal cells.**

- ◆ In **photodynamic therapy** the patients are given an intravenous injection of a light sensitive drug (porfimer sodium) which passes through normal cells, but **collects in cancerous and precancerous cells.** Two or three days later, the doctor uses a fiber optic circuit in a laryngoscope to deliver the red laser beam directly on to the cancer cells. Procedure takes about 9 minutes. Patient goes home the same day.
- ◆ Works on cancers near the skin surface and is FDA approved for esophageal, lung, a scalp caners. **Has an 88% success rate**
- ◆ My brother **had this procedure in 2005 and it worked exactly as advertised.** His voice is much softer/weaker than before, but he lives a normal life—except smoking was normal for him before and is forbidden now.
- ◆ The realm of practicality is arriving.

Investment in Break-through Technologies

- ◆ What are some of the **past examples of the benefit of owning stocks in a new technology company?**
 - Microsoft up by 28,800% since IPO March 13, 1986
 - Google up 711% at its max since IPO August 19, 2004
 - Apple up 6,900% since IPO Jan 7, 1984

Investment in Break-through Technologies

Are there still opportunities?

- ◆ **“Everything that can be invented has already been invented.”**
(A Quote from Charles H Duell, Commissioner of US Office of Patents, 1899)
- ◆ **The rate of knowledge acquisition is asymptotically increasing because:**
 - ◆ The routine sharing of research advances world wide, the ever accelerating computer calculation / processing capability / speed, the number of scientists, and money for development are larger than ever before and is growing. *The developments in the next generation will be more astounding than in the last one especially as there likely will be a confluence of many technologies that will leverage the effect of all of them.*
- ◆ **IBM has 5 year prediction of what they see coming:**
[100512-aYouTube - IBM Reveals 5 Innovations That Will Change Lives in the Next Five Years.mht](#)

Investment in Break-through Technologies

Some likely areas of practical applications:

1. Nanotechnology

◆ What is it

- ◆ **Nanotechnology** is the engineering of functional systems at the **scale of a molecule** or even a few **atoms**

◆ What are some **applications**

- ◆ Electronics
- ◆ Medicine
- ◆ Energy

Investment in Break-through Technologies

Some likely areas of practical applications:

1. Nanotechnology-Electronic Example

◆ **Ultra-Capacitor** Batteries (Digital Energy Storage Devices—DESDs)

- Stores electrical energy in a mechanical device instead of in chemical device like a lead-acid or lithium battery.
- Has millions of small carbon nanotubes of particles that store electrical energy on their surface
- Can recharge in a few seconds to a few minutes, depending on the size
- Provides power over a long period of time

Investment in Break-through Technologies

Some likely areas of practical applications:

1. Nanotechnology Electronic Example (Continued)

- Ultra-Capacitor Batteries – (Continued)
(Digital Energy Storage Devices—DESDs)
 - ◆ Retains a charge for years if not activated
 - ◆ Can be recharged hundreds of thousands of times
 - ◆ Applications: Everything from power distribution systems to Automobiles to cell phones to heart monitors.

Investment in Break-through Technologies

Some likely areas of practical applications:

1. Nanotechnology Electronic Example (Continued)

- Ultra-Capacitor Batteries – (Continued)
(Digital Energy Storage Devices—DESDs)
 - ◆ Does not contain hazardous materials vs. landfill problems
 - ◆ Who is working on them and when will they be available?

[100507The University of Arizona Breakthrough.doc](#)

[C:\Documents and Settings\Larry G McKee\My Documents\2010 SIG Investment Meetings Monthly\2010 May 13 SIG Investment Meeting\100517 Sci Amer Charging Ahead Carbon Nanotubes Could Hold Long-Sought Battery Technology Breakthrough Scientific American.mht](#)

[100507 EEStor's Ultra CapTechnology Review Battery Breakthrough.mht](#)

Investment in Break-through Technologies

Some likely areas of practical applications:

1. Nanotechnology – Electronic Example (Concluded)

- ◆ IBM is developing how to make processors which use light conducted in a circuit instead of electricity. The conductors of light would be no more than about **ten atoms in diameter**.
- ◆ The big advantage: **Power consumption and heat**. Someday a 1.5 volt battery will power a fully functioning computer.
- ◆ IBM already has the requisite **ultrafast light diodes** developed for this application.

Investment in Break-through Technologies

Some likely areas of practical applications:

2. Biotechnology-Regenerative Medicine Example

- ◆ Apligraf, the world's **first skin substitute** (tissue engineering) was approved by the FDA in 1998 for The Organogenesis Company.
- ◆ An interview with an **early pioneer in regenerative medicine**:
 - ◆ [100509 Excerpts from An interview with Dr Lanza.doc](#)
- ◆ The National Institute of Health (**NIH**) summarizes their program:
 - ◆ [100509 NIH Regenerative Medicine National Institutes of Health.doc](#)
- ◆ **Stem Cell breakthroughs**:
 - ◆ [100509The Second Huge Stem Cell Breakthrough In A Week.doc](#)
- ◆ Where are we headed? The US Army is funding research to **regenerate arms and legs** lost by soldiers during wars.
 - Biologists are studying the way salamanders naturally regrow severed limbs



- ◆ Recent discovery of effect of injection of stem cells

- ◆ [..\..\2010 Medical and Health info\100602 blaylock june10fir 72.pdf](#)

Investment in Break-through Technologies

Some likely areas of practical applications:

3. Energy

◆ Thorium vs Uranium

- Annual fuel cost for a 1GW reactor is \$10K vs Uranium \$55 million
- 98% of the element is consumed, so the waste is much lower and it is not a hazardous waste.
- By products of Thorium are useless in making nuclear weapons, so terrorist would be thwarted

<http://energyfromthorium.com/essay3rs/>

◆ Ultrasonic removal of sulfur from Diesel fuel at the refinery

- SulphCo (a Houston company) can greatly reduce the use of hydrogen and energy that is now required to remove the sulfur from diesel fuel.

Investment in Break-through Technologies

Should one invest?:

How are some of these companies doing?

- ◆ ESSTor's patented process for Ultra Capacitor Batteries is publicly available to review. There are **several critics** of the process:
 - ◆ [100507 EESstor's Ultra CapTechnology Review Battery Breakthrough.mht](#)
 - ◆ [100513 ZENN Motors and Mystery of EESstor Ultracapacitor Gets Deeper Gas 2_0.mht](#)
- ◆ Apligraf, the skin substitute
 - Organogenesis **filed for bankruptcy after four years**. Why did it go under economically if it had such an advantageoust product:
 - ◆ It cost more to make than they could sell it for
 - ◆ Shipping live cells was a new logistical problem and the company didn't deal with it well
 - ◆ Novartis, a financial backer, pulled out as the tissue engineering field languished.
 - Organogenesis **got a new CEO** who was more business minded and the company survived by solving problems, slashing costs, and developing other product lines
- ◆ There can be a big difference in the **skills needed to solve a high tech problem** and **skills needed to market, sell, manufacture and deliver a product**. If the company management team doesn't learn or adjust to operations quickly, they will not survive.

Investment in Break-through Technologies

Should one invest?:

How are some of these companies doing today?

[Alpha.mht](#)

[100513 BioTime \(BTIM\) Stock -- Seeking](#)

[..\Fa June10, 2010 SIG Mtg HYPERLINKS\100608 ACTC OB Technical Analysis for ADVANCED CELL TECH - Yahoo! Finance.mht](#)

[..\Fa June10, 2010 SIG Mtg HYPERLINKS\100608 ISCO OB Technical Analysis for INTL STEM CELL CORP - Yahoo! Finance.mht](#)

[100513 Yahoo SUF Basic Chart for Sulphco, Inc Common Stock - Yahoo! Finance.mht](#)

Investment in Break-through Technologies

Should one invest?:

Got a Flashy letter in the mail advising you of the potential riches awaiting you if you invest in a specific stock they author is promoting?

- [Breaking Mainland Resources finds 2.5 trillion cubic feet of natural gas.eml](#)

- ◆ Ever think of why he could afford to send out such a promotion?
- ◆ If he can get enough people to buy in, it will drive the price of the stock up then he can sell it at a huge profit, recoup his promotion expenses and let the new stock owner worry about the accuracy of the predictions.

- ◆ Where can you find candidates for breakthrough technology companies?
 - Scientific American Magazine
 - Discover Magazine
 - New Scientist Technology news and new technology highlights from New Scientist
 - [100511Breakthrough Technology Alert subscription page.mht](#)
 - [100503 Agora Financial Breakthrough Technology Alert.htm](#)

Investment in Break-through Technologies

Suggestions

- ◆ A place in your portfolio for Break-throughs?
- ◆ What are the odds?
 - If you bet on 20 of these high risk candidates, perhaps one will pay off with a 500% increase. But then again it may not
- ◆ Perhaps you should have a small part (5%?) of your portfolio set aside as a Speculative Portfolio.
- ◆ Put your high risk bets on Break-throughs and other high risk/high reward potential winners in it.
- ◆ In the end, as with all security purchases, you or your advisor must make the evaluations and make the decisions.

Investment in Break-through Technologies



The End

By Larry McKee
May 13, 2010