TRUTH PUBLISHING

THE 10 MOST IMPORTANT EMERGING TECHNOLOGIES FOR HUMANITY

"The ten technologies covered here each hold **tremendous promise** for uplifting our collective quality of life on the planet Earth"

MIKE ADAMS

THE 10 MOST IMPORTANT **EMERGING TECHNOLOGIES** FOR HUMANITY

BY MIKE ADAMS
The Health Ranger

CAT 212632

For information regarding this and other Truth Publishing books,
please contact Truth Publishing International, Ltd:
www.TruthPublishing.com/Contact

Table of Contents

Introduction

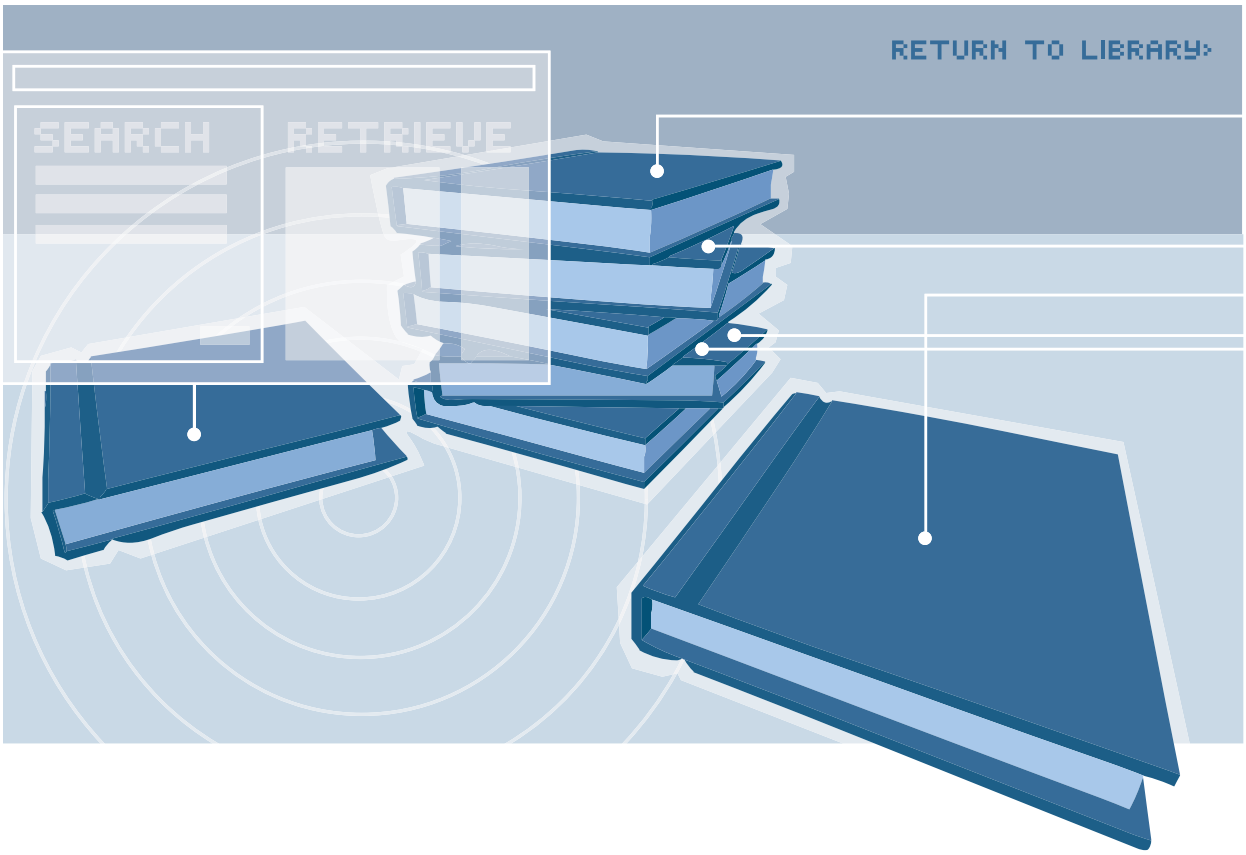
In modern society, there's very little discussion about what's needed to fundamentally improve our collective quality of life. How do we evolve our societies into something more productive, more rewarding, and more in harmony with our natural environment?

Answers are found in many disciplines: psychology, spirituality and religion, health and wellness, and even sociopolitical theory. In this paper, however, I focus on answers that may be provided by technology.

My name is Mike Adams, I'm the president & CEO of Arial Software, the executive director of the Consumer Wellness Research Center, and author of several books and audio programs on nutrition, medical ethics and food toxicology. I'm also the primary contributor to a number of websites covering technology and medicine, including TechnologyNews.info, FutureWheels.com, SpamAnatomy.com, and HealthFactor.info.

The ten technologies covered here each hold tremendous promise for uplifting our collective quality of life on planet Earth. Some of these technologies have already begun to appear; others will take years or decades. A few are stalled out for political reasons or because they threaten the profits of today's influential institutions or industries.

Most of these technologies will, at some point, be hotly debated for their social, economic, and political implications. Like nuclear energy, each of these holds both a promise for creative use and, simultaneously, the risk of abuse by those who seek to gain power and control at the expense of fellow human beings. Taken together, however, these technologies can not only sharply improve the world in which we live, they can alter who we are as human beings, and in this way, they can forever shape and improve our quality of life.



1 The Global Electronic Library

Coupled with Information Search and Retrieval

"A Global Electronic Library would combine all the available knowledge on the planet -- all books, periodicals, newsletters, journals, newspapers, web pages, spoken word, and more -- into a single, searchable resource available to everyone on the planet."

In decades past, intelligence was largely determined by how much an individual could remember. Each person was expected to carry their own personal library in their heads, and a lack of ability in storing or retrieving information from those mental libraries would result in scholastic failure or, in too many cases, being labeled intellectually inferior.

In the near future, the rules will change. Intelligence will be much less about what you can store in your head and much more about your ability to quickly locate, organize and understand information gleaned from global information sources such as the Internet. A person who knows very little about a subject but who can quickly find and organize relevant information on that subject will be far more productive than someone unfamiliar with information search and retrieval technologies, regardless of their mental capacity.

Today, Internet search engines like Google and desktop search software like dtSearch are pioneers that will likely pollinate emerging technologies in this area. Yet even Google, as advanced as it may seem on the Internet, is little more than an early prototype in search technology. Google has no technology to understand the intent of the searcher, for example, other than a rudimentary analysis of a string of text characters. A more advanced search engine would operate through voice queries and be capable of retrieving results deemed relevant to the interests of the particular user. A nutritionist who searches for “pizza,” for example, would likely be interested in something quite different from a hungry college student entering the same search query.

Even as search personalization advances, there’s also the much larger question of what knowledge or content is available to be searched. Google searches only the Internet, and while that may represent a significant quantity of information, it is but a small portion of the total knowledge available on the planet. What’s needed to uplift our civilization is a Global Electronic Library.

The Global Electronic Library

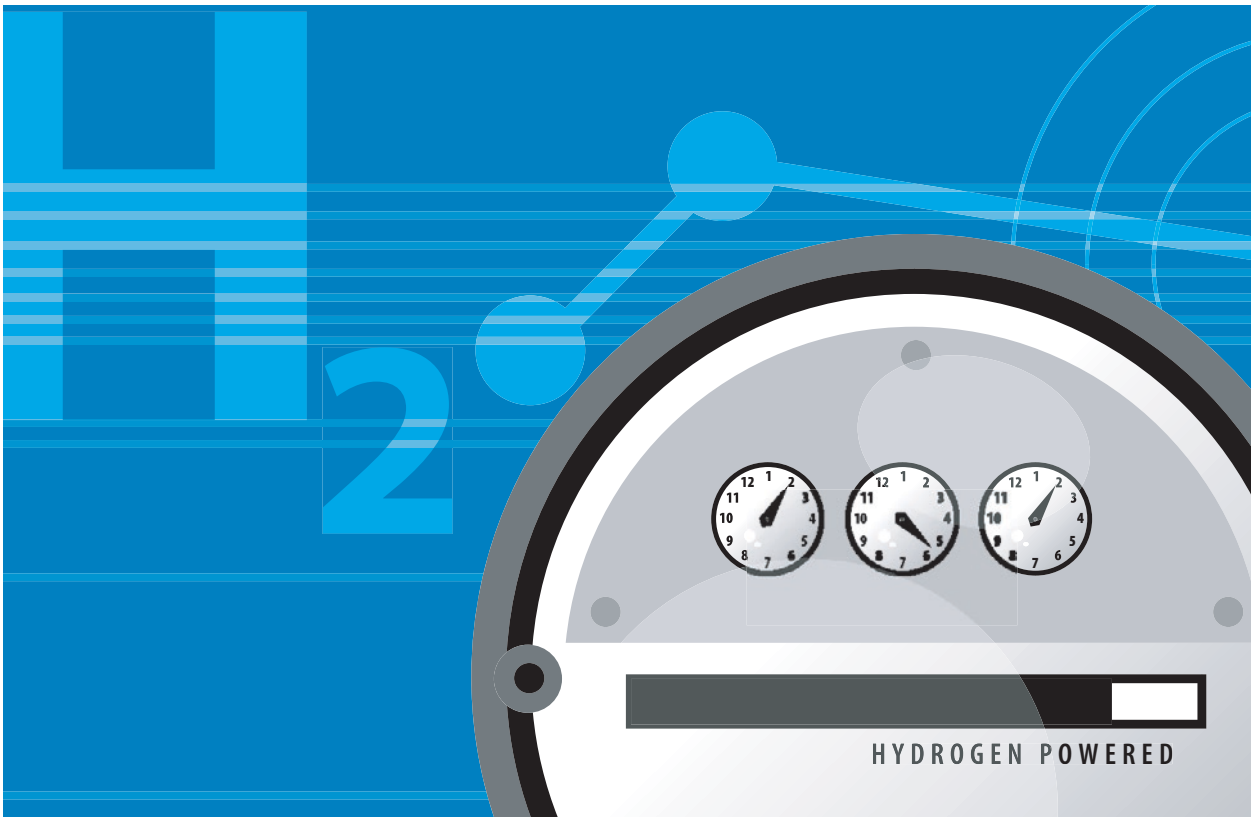
A Global Electronic Library would combine all the available knowledge on the planet -- all books, periodicals, newsletters, journals, newspapers, web pages, spoken word, and more -- into a single, searchable resource available to everyone on the planet.

Presently, we are nowhere close to a Global Electronic Library. Astoundingly, with all the technology available today, we still have no way to access printed books online (other than through limited snippets thanks to Amazon.com). Desire for profitability and control of intellectual content coupled with a lack of a micropayment infrastructure have resulted in most content publishers (magazines, books, science journals, etc.) denying the public access to their content unless they buy their books or pay for subscriptions. This arrangement excludes by default the poorer citizens of the planet and, by doing so, encourages a cycle of global poverty by denying the poor access to educational information that might improve their economic outlook. Making knowledge “open source,” as this

paper is, would offer an opportunity for more people to be more thoroughly educated about the world around them. It offers the promise of uplifting entire societies.

Planet Earth needs to pursue the construction of the modern-day equivalent of the Library of Alexandria (ultimately destroyed by Julius Caesar's military campaigns around 47 B.C.). A freely-available online resource offering instant access to the vast majority of books, publications, and documents on the planet would be considered one of the great wonders of the world and would significantly uplift the intelligence and education of people everywhere. Unfortunately, no one is currently working on such a project.

Of course, the Global Electronic Library it would need to be available in many different languages, too, so that world citizens could view content regardless of their country of origin. Most of all, the Global Electronic Library must be coupled with an advanced search technology so people can find the information they want.



2 Hydrogen Economy Enablers

“By shifting to a hydrogen economy, we will solve a long list of problems resulting from the oil economy while creating a cleaner and more productive society.”

One of the most significant global trends arriving in the near future is a shift away from fossil fuels and towards hydrogen. The term, “hydrogen economy” refers to a global economy powered by hydrogen, not oil.

The hydrogen economy is important for the advancement of humanity for several reasons. First off, the oil economy is fraught with problems:

Pollution: burning fossil fuels generates alarming levels of pollution that affect every living organism on the planet. We pollute our cities the worst, contributing to tens of millions of premature deaths each year due to the disease-causing effects of inhaled by-products from combustion engines, coal plants and other machines powered by fossil fuels. Fossil fuels also contribute to global pollution through oils spills, oil extraction, oil refining, and other processes.

Global warming: although this topic is aggressively debated, there is growing consensus that the burning of fossil fuels contributes strongly to global warming. The true impact of this warming is often lost on the general public, because it seems so remote from modern life. The natural consequences of global warming are quite severe: rising oceans, disappearing coastlines, mass extinction of ocean life, severe and unpredictable climate change, a sharp increase in natural disasters, and so on. Essentially, global warming makes the planet an unfriendly place in which to live.

Control of resources: this is perhaps one of the most damning aspects of our global dependence on oil. Because oil is so vital to the economies of nations, its control escalates to “national security” priority. Accordingly, the 20th century (and now, the beginning of the 21st century) witnessed unprecedented death and destruction in the form of military conquest primarily motivated by control of resources. World War II was largely fought over oil resources. (Japan’s primary motivation for attacking Pearl Harbor, for example, was the U.S. oil blockade.) There is little doubt that today’s military actions in the Middle East are largely motivated by oil interests, regardless of their advertised justifications. (If Iraq were nothing but sand, dirt and huts, do you honestly think anybody would bother fighting over it?) A shift away from the oil economy to a clean, renewable and widely available energy source would ease tensions that have historically surrounded the control of limited resources.

Limited supply: fossil fuels are, indeed, running out. There is a finite supply of oil to be found on the planet, and once that oil is consumed, it simply cannot be recreated without waiting hundreds of thousands of years for nature to create more. Estimates of the number of years remaining for the fossil fuel supply range from 20 to 200 years. Extraction technologies continue to improve each year, so there is little agreement on exactly how much oil we have left as a civilization. What is not in contention, however, is that the supply is finite.

Beyond the problems with the oil economy, there are additional reasons why a hydrogen economy offers unprecedented benefits to the quality of life of people everywhere:

Hydrogen is everywhere: Hydrogen is in water and can be easily extracted with solar power. Hydrogen is found in abundance at the bottom of the ocean in frozen *gas hydrates* (see below). Hydrogen is in natural gas, petroleum, and the byproducts of microbial activity. Hydrogen isn't limited to a few geographic regions of the planet, and that makes it a resource that automatically reduces geopolitical tension over the control of limited oil resources.

Hydrogen is clean: Through fuel cell technology, hydrogen can be converted to electricity with no harmful waste products. Hydrogen doesn't pollute cities, rivers, streams or oceans. Hydrogen doesn't cause global warming. Shifting to a hydrogen economy could save millions of lives each year in terms of human health effects alone, not to mention its effects on the health of the planet and its various forms of life.

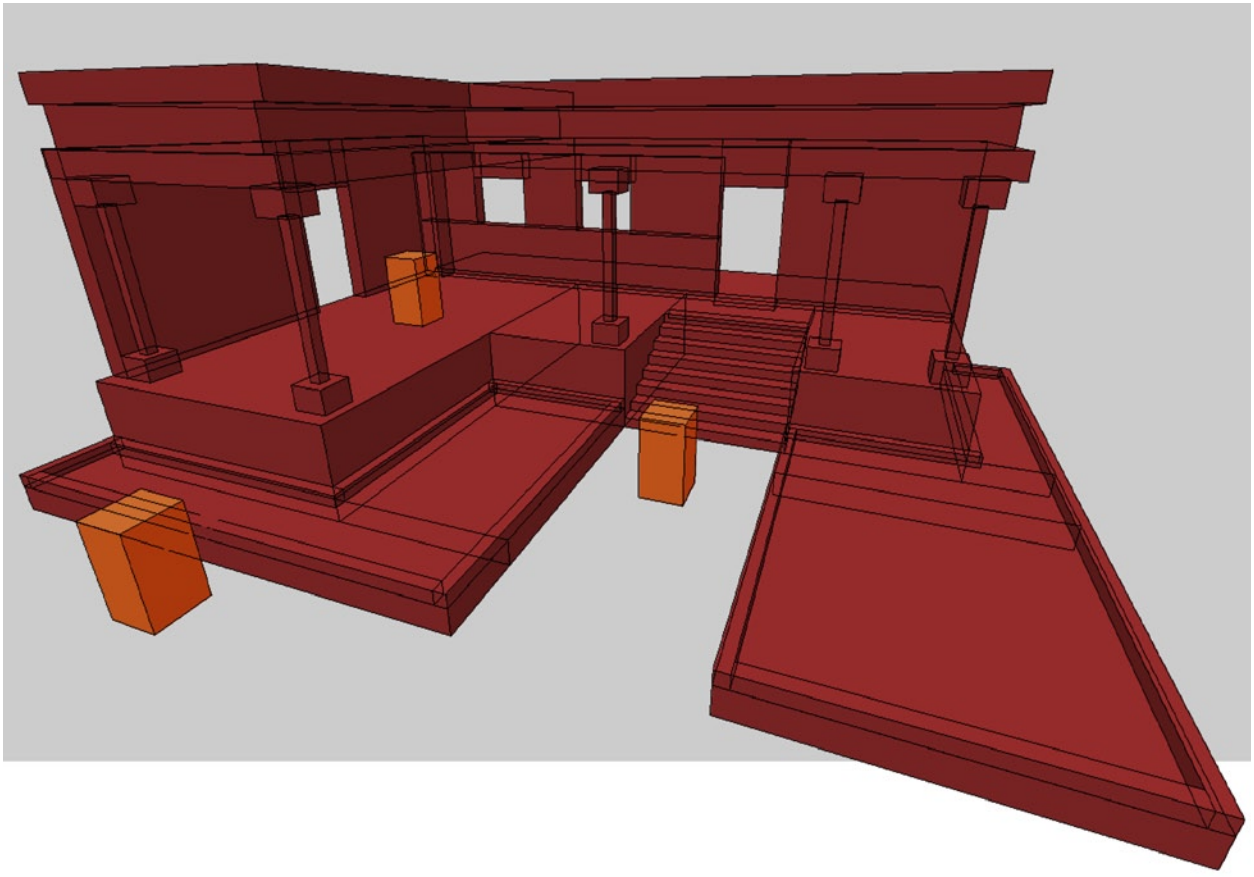
Gas hydrates are abundant: At the bottom of the colder regions of the world's oceans, gas hydrates are plentiful. These are frozen ice-like crystals of frozen hydrogen. They're found off the coasts of Canada, Japan, Alaska, Russian, China, Iceland and the countries of Northern Europe. Technology now exists to harvest these gas hydrates, store them at liquid nitrogen temperature, and easily convert them into usable hydrogen gas by allowing them to melt at normal atmospheric pressure. The entire process is clean, energy efficient, and technically feasible. The available supply of gas hydrates is enormous, far exceeding the known supplies of all fossil fuels on the planet.

Hydrogen is renewable: Unlike fossil fuels, hydrogen is renewable. Converting hydrogen gas to electricity in fuel cells doesn't "destroy" the hydrogen; it just alters the state of the hydrogen. As a result, hydrogen molecules can be used over and over again to store and release electrical potential. For example, solar panel electrodes immersed in water cause the water to give off hydrogen gas. When that hydrogen gas is fed into a fuel cell, the byproduct is water. No hydrogen is destroyed in the process, it is simply transformed. In this way, hydrogen operates like a battery that transforms energy from the sun into usable electricity. This is just one of many examples of a hydrogen energy cycle that produces usable electricity.

Hydrogen solves serious global problems

By shifting to a hydrogen economy, we will simultaneously solve a long list of problems tied to the oil economy (pollution, limited resources, global warming, etc.) while creating new opportunities with hydrogen (clean, renewable, plentiful energy).

Applications for hydrogen are widespread: automotive (hydrogen powered fuel cell vehicles), industrial (hydrogen powered factories), municipal (powering cities with large-scale hydrogen power plants) and residential (home-based hydrogen power plants that convert natural gas to electricity).



3 Augmented Reality

> *Like many technologies, augmented reality holds both tremendous creative potential and a truly horrifying potential for abuse. Augmented reality can either enslave the world, or it can set it free.*

One of the greatest problems now facing humanity is the worrisome lack of quality education for each new generation. In industrialized nations, a quality education is attainable by very few people, and public schools -- especially in the United States -- suffer from a chronic lack of funding and education reform. In non-industrialized nations, education is even worse: the vast majority of children have no access to education, illiteracy is rampant, and the outlook for better schools is dim.

Clearly, no civilization can uplift itself unless a significant proportion of its individuals have access to a quality education. The present educational environment on planet Earth is but a shadow of what it could be if aided by proper funding, political determination and new technologies.

An emerging technology promises to radically enhance both the quality and "bandwidth" of educational processes. To understand how this works, however, we must first examine what's wrong with the current educational process.

What's wrong with today's schools

Even our most modern, advanced educational institutions (universities) are frustratingly outmoded in terms of teaching students. The entire process of giving lectures, taking notes, reading facts from books, and taking final exams is a throwback to institutions of learning dating back to the Renaissance. Remarkably, very little has changed today: with notable exceptions, the vast majority of university professors continue to bore students with ineffective, non-interactive approaches to education that result in little more than the professor's notes becoming the students' notes without passing through the minds of either.

True learning is experiential. Humans learn best by doing, not by reading or listening to lectures. The more senses are involved (sound, sight, touch, emotions, etc.), the more powerful the learning experience. That's why today's best teachers are those pioneering individuals who take the effort to engage their students in meaningful activities that reach students at multiple levels.

The promise of immersive technology for education

An emerging technology promises to make "educational immersion" available to practically everyone. This technology is called augmented reality, and it works by overlaying seemingly-real experiences on top of a person's local environment. Let me explain:

A person who wishes to experience a learning session via augmented reality would don a pair of see-through glasses that also host two tiny video cameras and a pair of earphones. A tiny computer, perhaps worn on the wrist or around the waist, would recognize the geometry and content of the

user's immediate environment and overlay that environment with meaningful images and sounds for a specific purpose.

From the user's point of view, he or she would apparently see and hear other people, objects, or events taking place right in front of or around them. These augmented perceptions would appear to be completely real. In technical terms, they would be rendered by the wearable computer with light shading that takes into account both the ambient and directional light sources found in the user's immediate environment.

Put simply, the augmented reality system is "projecting" people, objects, environments or other elements onto the environment around you.

In its most simple form, an augmented reality system could, for example, project a different colored carpet or wallpaper as you stroll through your house. On a slightly more advanced level, it could project memory icons and appear to place them strategically throughout your house so that, for example, you would see a certain icon (with an attached note, perhaps) as you open your front door or medicine cabinet. In practical terms, this might serve as a personal reminder to make sure you pick up something at the grocery store or remember to take medications.

But these rudimentary applications are just the beginning. The more advanced applications of augmented reality have to do with learning. Augmented reality technology holds the promise of immersing individuals in experiential learning environments. Instead of reading about the Civil War in a textbook, a student could observe battles or conversations as if they were there. Animated, lifelike historical figures would seemingly appear right in front of them. The student would see and hear events at a level unmatched by today's outmoded lecture formats.

The applications are tremendous: students could learn anatomy by walking through a human body and observing the functioning of biological systems. Students could learn geography by "flying" around the globe, visiting any city they wished, zooming in and out of detailed renderings of geopolitical regions. Students could learn chemistry by observing, at a simulated microscopic level, chemical structures and reactions. These are but a few of the many potential applications.

Interactive learning

And yet even this does not explore the full potential of augmented reality. The best application comes from allowing students (the user) to interact with projected characters. For example, a student could see, hear and actually converse with historical figures such as Albert Einstein or Charles Dickens. Projected virtual characters could become teachers and coaches who hold ongoing mentoring conversations with the student and physically demonstrate skills and activities.

This level of augmented reality requires tremendous computational power. The systems and technologies needed to accomplish this include:

- Real-time vision recognition (three-dimensional geometry mapping and more)
- Voice recognition
- Real-time overlay display technology (built in to the wearable glasses, must cover light shading, depth of field considerations, etc.)
- Sound and voice rendering, including spatial considerations
- Human character rendering (covering body mechanics, adherence to physical laws, etc.)
- AI (artificial intelligence) technology for understanding user speech and creating intelligent, meaningful dialog
- Miniaturization advances for wearable CPUs and sensory devices
- Improvements in portable power

(Interestingly, several of these areas are being pushed forward through interactive gaming technology. First person games such as Microsoft's Halo are outstanding demonstrations of real-time visual and auditory rendering technology.)

Augmented reality: a massive global industry

I predict a tremendous augmented reality industry is waiting to emerge. This industry will dwarf today's software and computing industries and become one of the most influential technological shifts yet experienced by our civilization. With this technology in place, users could simply obtain different program modules and plug them into their standard augmented reality hardware systems. Available programs would certainly include:

- Educational: Personal coaches, trainers and teachers enhance the knowledge of users through demonstrations, conversations and enactments.
- Entertainment: Augmented reality systems offer unprecedented opportunities for entertainment. Imagine interactive theatrical presentations, augmented multiplayer gaming, "fly-through" movies, and other similar applications.
- Mental health: Virtual mental health consultants can help users face and overcome challenging situations such as conversations with relatives, public speaking, relationships with the opposite sex and many others.
- Reference: A virtual reference library would allow users to physically explore areas of interest by moving through a projected knowledge set and picking out images, movies, sounds or text.
- Computer / human interfaces: Augmented reality opens up a whole new world of possibilities in computer / human interfaces. There's much more on this in a later section, but consider the possibility that a computer could potentially be located anywhere in your environment.

Your living room wall could be rendered as a giant 2D display, or your back yard could become a giant interlinked Internet search result set that you could explore at will.

- Personal environment enrichment: Don't like your office environment? Add plants, waterfalls, and hummingbirds to your office with the "sounds of nature" software module. Is your significant other unbearably ugly? Overlay their natural face with any character you want with the "augmented people" module. Want to bring a relative back from the dead and tell them something? Plug in the "reborn relatives" module and chat with them in your living room. The possibilities are endless.

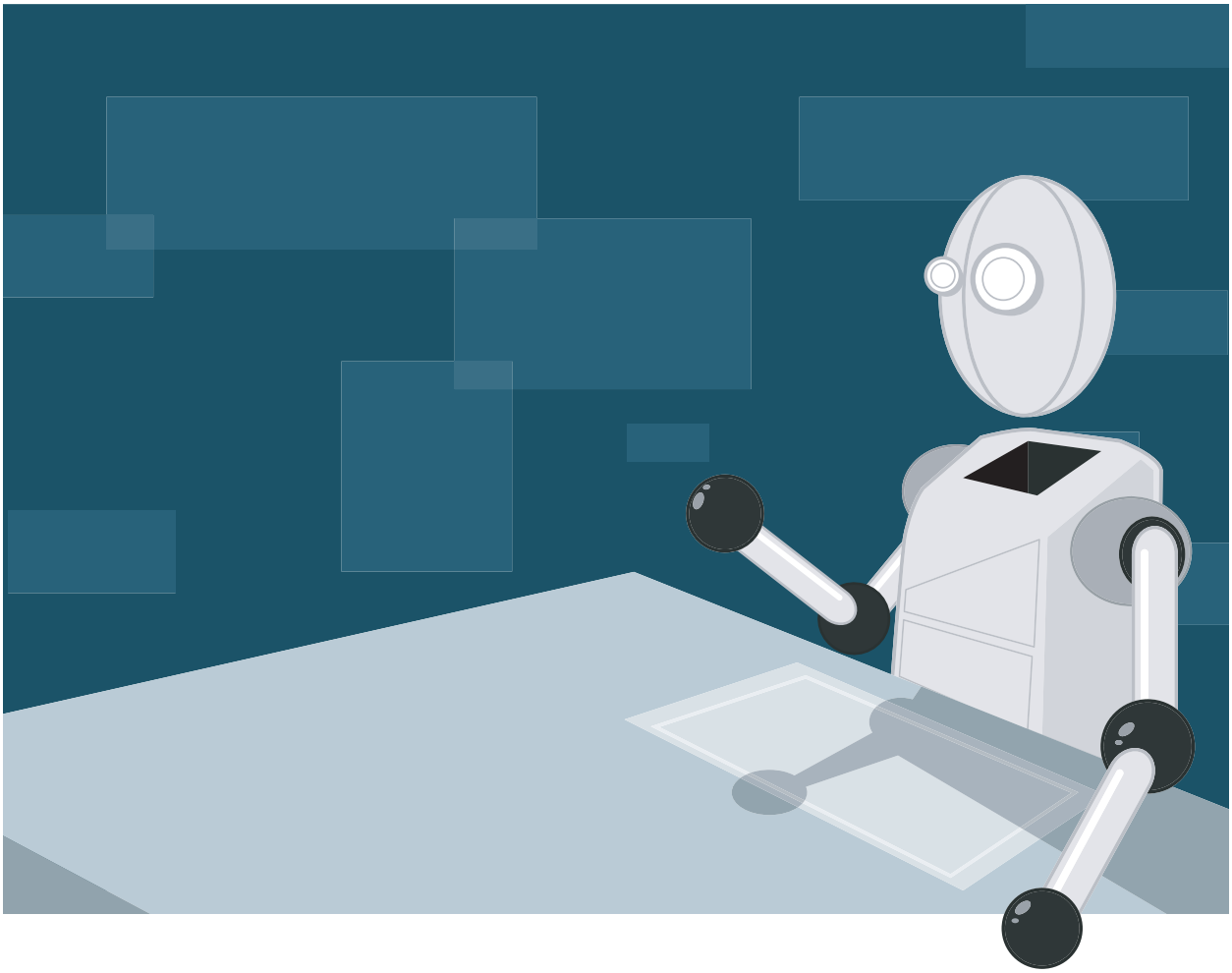
Hopefully, you see the potential for this sort of technology in terms of uplifting humanity. The examples I've mentioned here barely scratch the surface.

The dangers of augmented reality

Yet this technology shares something in common with television: TV was originally thought to be a tremendous tool for education and learning, but in reality it became little more than a propaganda machine and a promoter of commercial consumption that ultimately *decreased* the quality of life for most people (just witness today's epidemics of obesity and diabetes, largely caused by aggressive soft drink marketing and unbridled consumerism). Augmented reality technology holds the potential to be the darkest, most powerful system for mass control of the population ever invented. If people use augmented reality systems to tune in to experiential broadcasts created by corporations and centralized governments, the result will likely be a system approaching "total mind control." If advertisers and governments can project anything they want into a person's immediate environment and make it seem real, there is no limit to the control that could be exercised over the general public.

Infants could be brought up in "augmented reality schools" and literally brainwashed into accepting practically any interpretation of history or current events that the program controllers desired, for example.

Let this be a warning. Like many technologies, augmented reality holds both tremendous creative potential and a truly horrifying potential for abuse. Augmented reality can either enslave the world, or it can set it free.



4 Practical Robots

“Practical robots can greatly enhance our collective quality of life by freeing us from daily labors, serving as true companions and multiplying the realization of our creativity and intentions.”

Practical robots offer tremendous potential for enhancing the quality of life for humans everywhere. The robotics industry is emerging now, and progress is steady. The world leader in robotics is Japan, which has invested heavily in *social robots* -- robots that interact with people.

The United States, in contrast, is focused primarily on robots that kill people. The vast majority of robotics research in the U.S. is underwritten by military interests. The Pentagon essentially wants to develop a Terminator: a battlefield robotic soldier that can accomplish political or military objectives without resulting in human casualties that cause troublesome dissent back home.

Once again, we see that a promising area of technology can be both constructive and destructive, depending entirely on the intent of its creators. For this section, however, I will focus on the far more peaceful Japanese approach to robots, because this is the area that holds promise for enhancing the lives of human beings.

Social robots already exist

Early social robots are already on the market: AIBO, Japan's cute robotic dog, is owned by more than fifty thousand people. AIBO offers basic interaction with humans such as face and voice recognition, cute-looking movements, and simple environmental navigation (it can walk around).

In the U.S., the household robot Roomba (developed by a Russian researcher, by the way) sweeps the floors of hundreds of thousands of homes. Roomba is one of the first few practical robots to be widely available, and it is, indeed, rather useful. I own one myself. However, its interactive capabilities are extremely limited. It has no vision system, for example, no voice recognition, and seems to operate more on random walk theory than any sort of intelligent navigation pattern.

The real promise in robotics will come from humanoid robots, most likely from Japan. Honda, Toyota and Sony are all working hard on humanoid robots and have working, walking prototypes right now. Why humanoid? As humans, we've created environments built for humanoid creatures. Our physical environments (cities, houses, stores, etc.) have been constructed for the convenience of people with a certain height, a certain eye level, and a certain stride length. As humanoid robots are developed, the more easily they can navigate our environments the more helpful they can be to humans.

It is the "helpful" category in which humanoid robots offer the greatest promise. At a basic level, these robots promise to free us from physical labor (factory work) and household chores such as doing the dishes, taking out the trash, folding laundry, cooking, etc. This alone, as gimmicky as it may seem, would free people from time-consuming chores. (None of these chores are simple from a robotics point of view, by the way. The technology needed for robots to engage in such tasks is still many years away.)

Such robots would probably never be cheap to build, but they will quickly pay for themselves in terms of reclaimed time for their owners. A professional earning $100,000 / year, for example, might easily waste $25,000 / year worth of her time handling household chores that could be managed by a practical household robot. If the robot costs $50,000, the payoff would be just two years. That's makes a $50,000 robot a reasonable investment for most professionals.

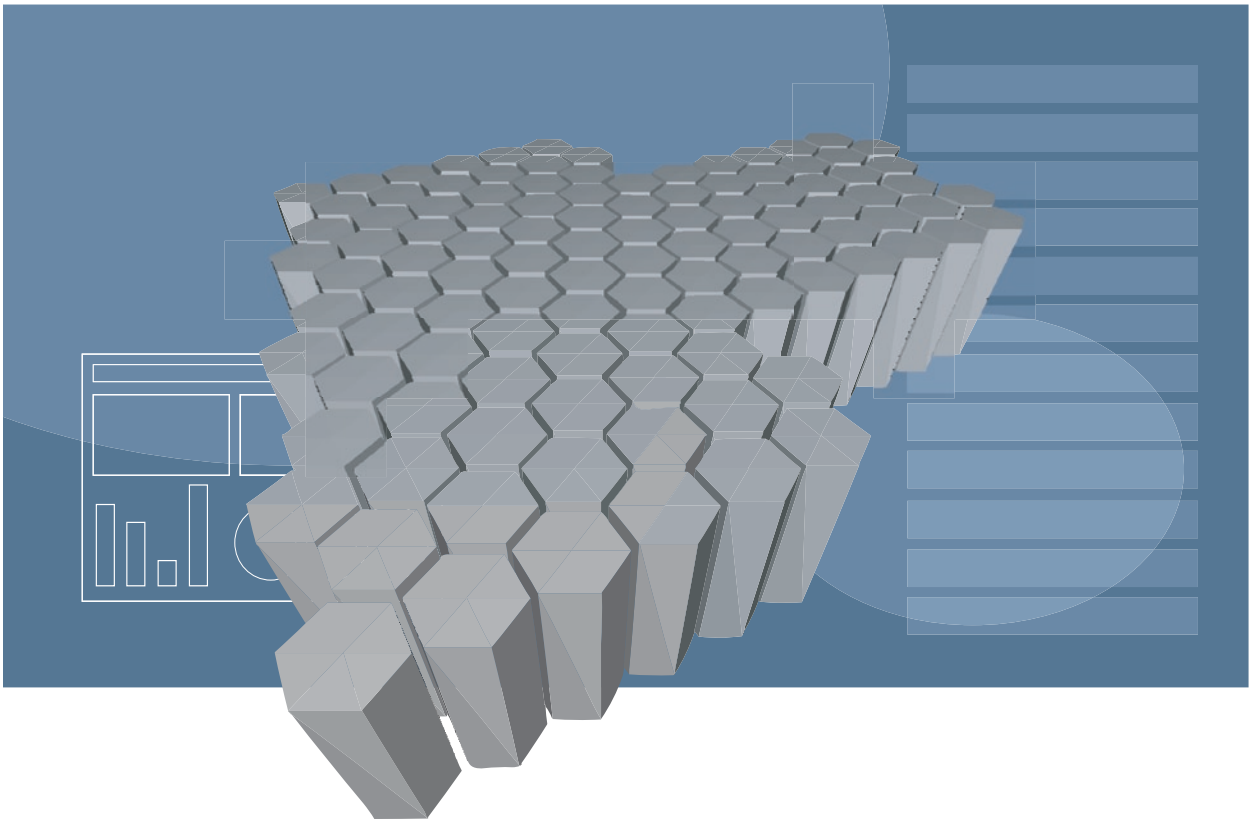
Robotic companions

Practical robots will no doubt start out as workers or "practical assistants." But this is only the beginning. The next level up, in terms of enhancing the quality of life of humans, is for robots to serve as *companions*. Are you the parent of an only child? A companion robotic pet or robotic child could teach your child a lot about social interaction, responsibility, friendship, and even help the child learn academic subjects like mathematics, reading, history, literature and science.

Are you a lonely retiree? A robotic companion could add a lot to your life through conversations, games, physical activity, and coaching.

You see, robotic companions won't argue, won't betray you, won't divorce you, won't die, won't fall asleep when you want to talk, and they won't even eat the favorite food out of your refrigerator. As humorous as these points may sound, they are serious considerations for companionship. In time, many humans may choose robot companions over human friends for these (and other) reasons.

Meaningful companionship with robots requires significant leaps in AI, portable power, vision and voice recognition systems, and many other technologies. These technologies are steadily moving forward. In time, robotics engineers will be able to deliver companion robots that do far more than household chores: they will actually add meaning to our lives.



5 High - Density Portable Power

“Today’s chemical batteries are holding back promising applications for emerging technologies, and only a breakthrough in portable power can overcome those limitations.”

It seems that no matter how advanced notebook computers get, their battery life remains at a standstill: 2-3 hours from most models, regardless of price. From electric vehicles to portable electronics, today's battery capacity lags far behind the steady improvements in other areas of technology. Despite the hype and advertising from battery manufacturers, today's chemical batteries are virtually identical to ones sold three decades ago.

It's not that battery manufacturers aren't trying to develop something better: efforts to improve battery capacity and power density have been underway for years. Despite the research, arguably the best technology they've produced yet is the ingenious battery testing strip that you can use to check how quickly your batteries have gone dead.

Today's battery technology is simply outdated. The chemicals are extremely hazardous to the environment (Nickel-Cadmium, for example, is made from two heavy metals that are toxic to practically all forms of life on the planet), dangerous to nearby users (risk of explosions), heavy (standard car batteries can weigh 70+ pounds) and unreliable. They charge slowly, their output voltage wavers, and their size becomes a major limiting factor when designing portable electronics like digital cameras. Did I mention they also leak acid from time to time?

Clearly, the world needs a breakthrough in portable power. But what does this have to do with uplifting humanity and improving our collective quality of life? Portable power is a crucial enabling technology for a vast array of applications that promise to improve our lives and our planet. Some of these applications include:

Wearable computers: Smaller batteries will make wearable computers more comfortable and convenient. A power pack the size of a matchbox might power a wearable computer for an entire day.

Personal robots: Autonomous robots require an enormous amount of electrical power for the operation of motors, artificial muscles and CPUs. Today's chemical batteries just don't deliver the horsepower. AIBO, Sony's robotic pet, only barks for 2-3 hours on a typical charge, and the working prototypes of humanoid robots from Japan only have enough juice for brief public performances.

Medical devices: The miniaturization of medical devices depends heavily on increasing the power density of batteries. From portable monitoring systems to handheld diagnostic devices, the medical industry would benefit greatly from a breakthrough in power density and portability.

Electric vehicles: To date, electric vehicles have bombed in the market due primarily to their lack of range (power density). That's the fault of the battery technology: it requires a thousand pounds of batteries to drive a vehicle the same distance delivered by four gallons of gasoline. While hybrid vehicles are finding tremendous success in the marketplace by packing both batteries and

combustion engines under the same hood, tomorrow's vehicles could run off batteries alone if high density power storage systems were available.

Space exploration: The limitations of portable power are critical when it comes to space exploration. Battery requirements shape the scope of entire missions. The primary factor limiting the life and utility of the 2004 Mars rovers, for example, was battery life. With the help of higher density power systems, space exploration takes a quantum leap forward and unleashes spectacular new possibilities in remote sensing vehicles and manned missions.

Help for third world populations: Today, all over the world, hundreds of millions of people suffer from the devastating health consequences of nonfunctioning sewage systems, lack of running water, lack of communications technologies like radio, and other critical infrastructure failures. Many of these issues can be addressed with portable power systems, but not at today's price / performance ratios. If portable power can be made significantly less expensive, it can allow the dollars and efforts of international aid to produce greater results.

Solar power systems: Solar power is clean, renewable, safe, reliable and environmentally friendly. Unfortunately, it's expensive to install, and the single greatest cost often comes from the batteries, not the solar panels. Batteries for solar systems are typically large, heavy, dangerous (risk of explosions), expensive and short-lived (many need replacing in a mere five years). A breakthrough in power density and storage costs could revolutionize the solar industry, making residential and commercial solar systems far more affordable. If battery costs could be halved, it would subtract five years from the average twenty-year return on solar systems.

These are just a few of the many important applications of high density portable power. Remember, though, it's not just the density that matters: it's the cost as well. To herald a genuine breakthrough, the next wave of technology needs to be better on all counts: size, weight and cost.

Fuel cells look promising

The most promising candidate technology that meets this requirement is fuel cell technology. Fuel cells are clean, small and lightweight, and will eventually be cheap to produce. The choice of fuels for those fuel cells, however, remains undecided.

One of the promising contenders is zinc -- one of the most abundant minerals on the planet (or, more precisely, "in" the planet). With the help of fuel cell membranes, zinc particles release electricity when oxidized by exposing them to air. Once all the zinc is oxidized, the zinc particles can be quickly "recharged" (reversing the oxidation process with the help of electricity) and used again. This process can be endlessly repeated, since the zinc never wears out.

Zinc is promising because it offers high density portable power (far greater power density than chemical batteries), a widely-available element, and outstanding safety (zinc won't explode if exposed to flames or high temperatures). The industry leader in portable zinc power is Metallic Power (http://www.metallicpower.com)

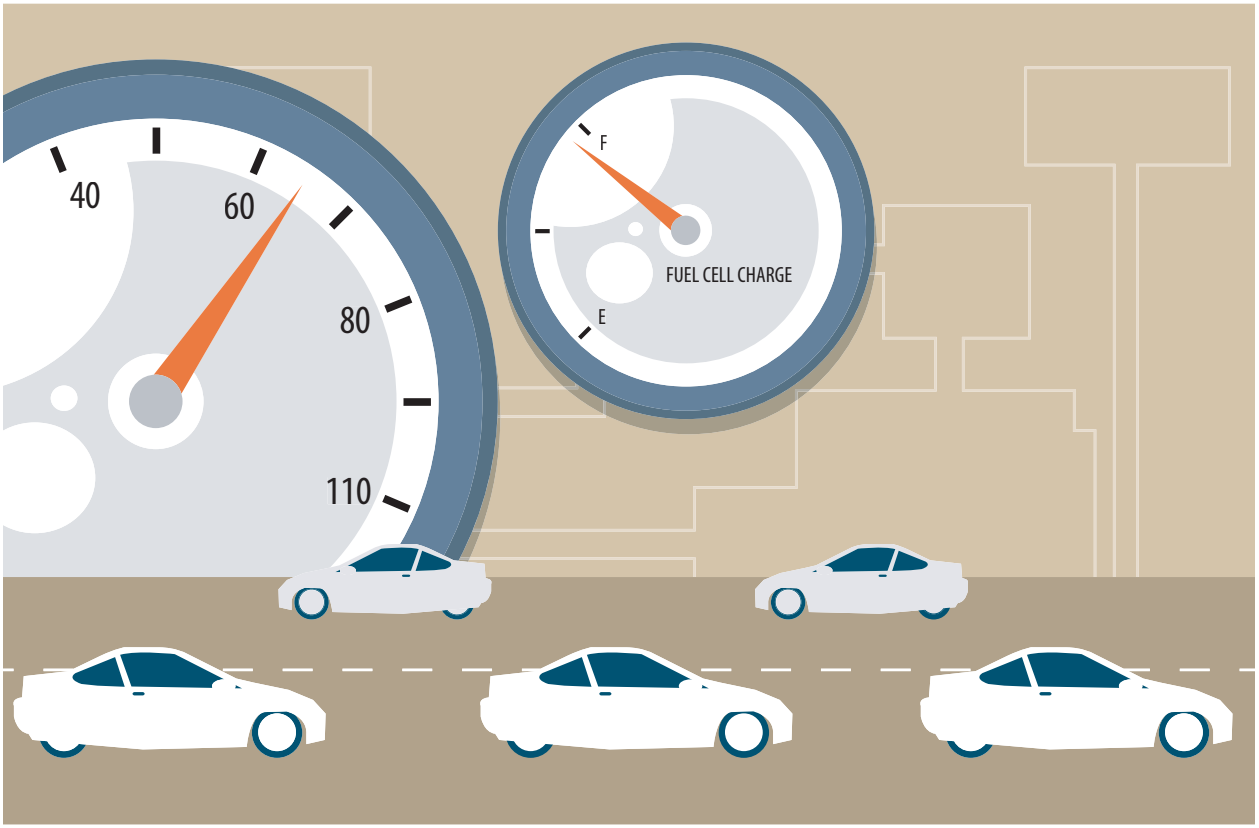
Methanol fuel cells

Zinc power isn't seeing many headlines these days. Much of the news about portable fuel cells seems focused on methanol. These so-called Direct Methanol Fuel Cells (DMFCs) convert methanol (a common alcohol that can be derived from corn, among other renewable sources) into electricity. NEC, Samsung, and Hitachi already have working prototypes of DMFCs for notebook computers or portable electronics.

The problem with methanol is its combustibility: methanol ignites easily and has a flash point ranging from room temperature to 130 degrees (F), depending on the concentration of water in the mixture. That makes it an illegal explosive according to the FAA (Federal Aviation Administration), meaning that DMFCs would not be allowed on airplanes unless existing regulations are changed.

Methanol also has the drawback of not being easily renewed by consumers. Few people have the know-how to distill methanol in their own garage, meaning that consumers would be dependent on DMFC manufacturers for methanol recharge kits. Like ink jet printer refill kits, this is where DMFC manufacturers will probably make the bulk of their profits.

In the end, however, the choice of fuel isn't as important as the widespread adoption of a fuel cell battery standard. Today's chemical batteries are holding back promising applications for emerging technologies, and only a breakthrough in portable power can overcome those limitations. Fuel cells can make the leap, and their adoption by consumers and manufacturers alike is all but assured.



6 Fuel Cell Vehicles

“Fuel cell vehicles hold the promise to clean up our cities, halt the chronic disease caused by air pollution, slow global warming and once again make personal transportation an enjoyment rather than a burden on society.”

The personal automobile is the source of both fantastic benefits to modern life and terrible consequences. Those consequences range from devastating public health effects due to automobile emissions (asthma, lung cancer, throat infections, etc.) to the rapid alteration of our planet's own atmosphere (global warming). But what if a new technology could bring us all the benefits of personal transportation without these drawbacks?

Fuel cell vehicles may deliver on precisely that promise. Fuel cell vehicles (FCVs) don't burn fossil fuels and emit toxic fumes, they take a hydrogen fuel source such as methanol, propane gas or hydrogen gas and convert it directly to electricity to power the vehicle. Like fuel cell battery technology, it's clean for humans, clean for the environment, and safer than carrying around highly explosive liquids like gasoline.

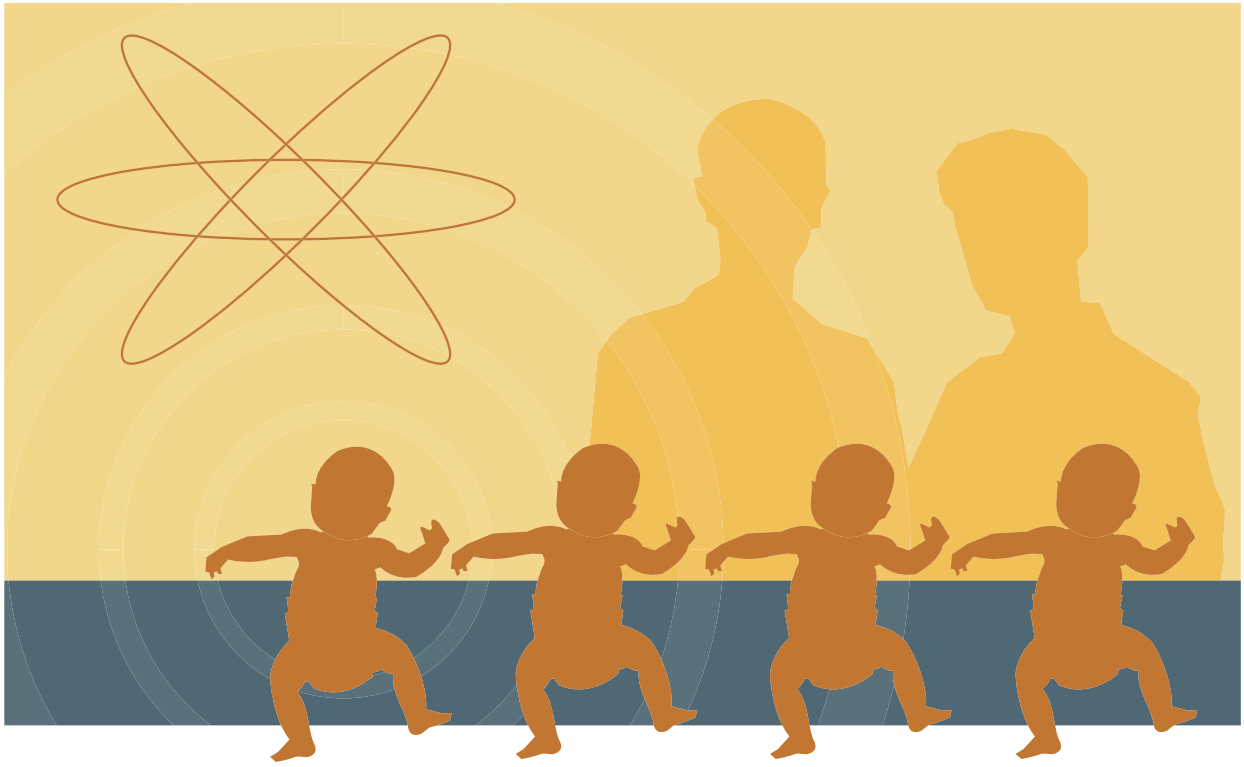
Perhaps even more importantly, it would spearhead the shift away from the global oil economy and free the United States and other nations from their heavy dependence on oil -- the source of tremendous global strife.

There are considerable obstacles to fuel cell vehicles, however: infrastructure obstacles, primarily. Whatever fuel is ultimately chosen for FCVs, we will need an infrastructure of refueling stations ("gas stations"), fuel distribution systems (tanker trucks), fuel refineries, mechanics who can work on such systems, and so on. It's akin to reinventing the entire automobile infrastructure from the ground up. These enormous startup costs remain the primary obstacle to the widespread adoption of fuel cell vehicles, and it's a catch-22 situation: people won't buy the vehicles if there are no refueling stations, and no company will build refueling stations if there are no vehicles waiting to use them.

Hybrid vehicles offer a smart interim solution to this dilemma. While today's hybrid vehicles derive all their power from a gasoline engine, tomorrow's hybrids could be made to run on either fuel cells or gasoline, depending on what's available. Both the gasoline engine and fuel cell would be used to recharge the primary vehicle batteries that provide the operating power. Or the battery could be scrapped and replaced with a zinc fuel cell system where the gasoline engine could kick in when the zinc needs to be recharged. This configuration would eliminate the battery altogether and could still take advantage of the regenerative recharging ability during vehicle braking.

Today's hybrid vehicles like the Toyota Prius have made great strides in the technology needed to mass produce such vehicles. In fact, the Prius is a shining achievement in the marriage of combustion engines and battery technology. Without question, Toyota has the technical mastery and foresight needed to build a fuel cell hybrid vehicle if the public infrastructure will support its use.

We can expect Japanese automobile manufacturers to stay in the lead on fuel cell vehicles, by the way. American car companies are years behind and have resorted to licensing Japanese fuel cell technology rather than creating their own. There are many potential explanations for this lack of vision on the part of American car companies, but there's no denying the fact that the Japanese are leading the field and seem well positioned to continue doing so.



7 Genetic Engineering of Humans

“With the proper technology, maturity and ethics, we could accomplish tremendous outcomes through genetic engineering.”

One of the greatest problems facing our civilization goes largely unnoticed. The problem is that we, as human beings, are haphazard creations designed to thrive and reproduce in an environment that shares little in common with the global uplifting of civilization. From a physical standpoint, we are merely little more than great apes (we share some 98% of their genetic code). We are born with physical structures that were designed to help us survive harsh, prehistoric environments, and they did their job well (we're here, aren't we?), but this genetic blueprint doesn't serve our modern lifestyle. In essence, we are walking museums of outdated hardware.

What concerns me the most is the "software blueprint" with which we are all born. Human males, in particular are born with an innate desire to dominate limited resources and control others. From an anthropological viewpoint, this is largely due to the fact that these behavioral traits create reproductive options for males, but the explanation of why that is the case goes well beyond the scope of this paper. The point is that males are "born takers" and they seek power and control. This is part of the reason why males dominate positions of power, both in politics and private business, and it helps explain why so many wars are fought between nations headed by men who seek power.

Women are born with "social software." They innately seek to understand the individual members of social groups, and they tend to be far more interested in the overall social good than men. Once again, this is well explained through anthropology by the fact that a balanced, well-functioning social group provides an environment conducive to the raising of successful offspring, to which females contribute a far greater personal investment of time and resources than males.

The point here is that planet Earth is presently dominated by power-seeking males running outdated software (genetically influenced behavior) that does very little to uplift civilization as a whole. Males are primarily interested in what they, personally, can accumulate and control, not what they can do for the common good. It is this innate greed and self-interest that limits possibilities of uplifting civilization as a whole through attention to the common good.

Rewriting our own software

To change this, we must re-engineer our own software. We must, as conscious beings, decide what kind of beings we truly wish future generations to be. With the technology of genetic engineering, we are not limited to the blueprint provided by Darwinian evolution (or God, from another point of view). Instead, we can design ourselves to be whatever sort of beings we wish.

As a simple example, we could genetically engineer subsequent generations of children to hate the taste of sugar. This simple step would practically eliminate the problem with obesity, since generations would no longer grow up on soft drinks, candy and refined carbohydrates (the leading causes of Type-II diabetes and obesity).

At a more advanced level, genetic engineers could alter behavioral programming, producing a new generation of beings whose primary motivations were based on sharing and working for the common good.

The dangers of genetic engineering

Hopefully, you are at this point considering the flipside of genetic engineering. As a civilization, we are nowhere near the level of maturity that should be required before we start toying with our own genetic code. Altering the genetic code of our offspring is no small matter: we are indeed “playing God” and, potentially, violating laws of nature.

Even if we had the maturity to approach genetic engineering with wisdom and compassion, we currently have neither the understanding of how DNA actually controls human behavior, nor the technology to selectively replace undesirable behaviors with ones we would prefer. There is no “violence” gene, for example, that could be reconfigured into a “peace” gene.

So we are nowhere close to being able to accomplish meaningful genetic engineering of humans even if we wanted, and that’s a blessing, since we aren’t mature enough as a civilization to deal with its implications.

But make no mistake: if we are to move beyond the genetic blueprint handed down to us by the great apes, we must at some point consciously and deliberately begin improving our own genetic code. In fact, “evolution” is strangely the correct term here, since genetic engineering is the only mechanism by which any further human evolution can conceivably take place. That’s because human evolution has largely stalled out from a survival point of view. (From a global perspective, very few human die off due to predators or lack of food, for example.) To achieve any further genetic evolution, we must eventually become engineers of our own genetic code.

With the proper technology, maturity and ethics, we could accomplish tremendous outcomes through genetic engineering. Some of the more obvious advances might include:

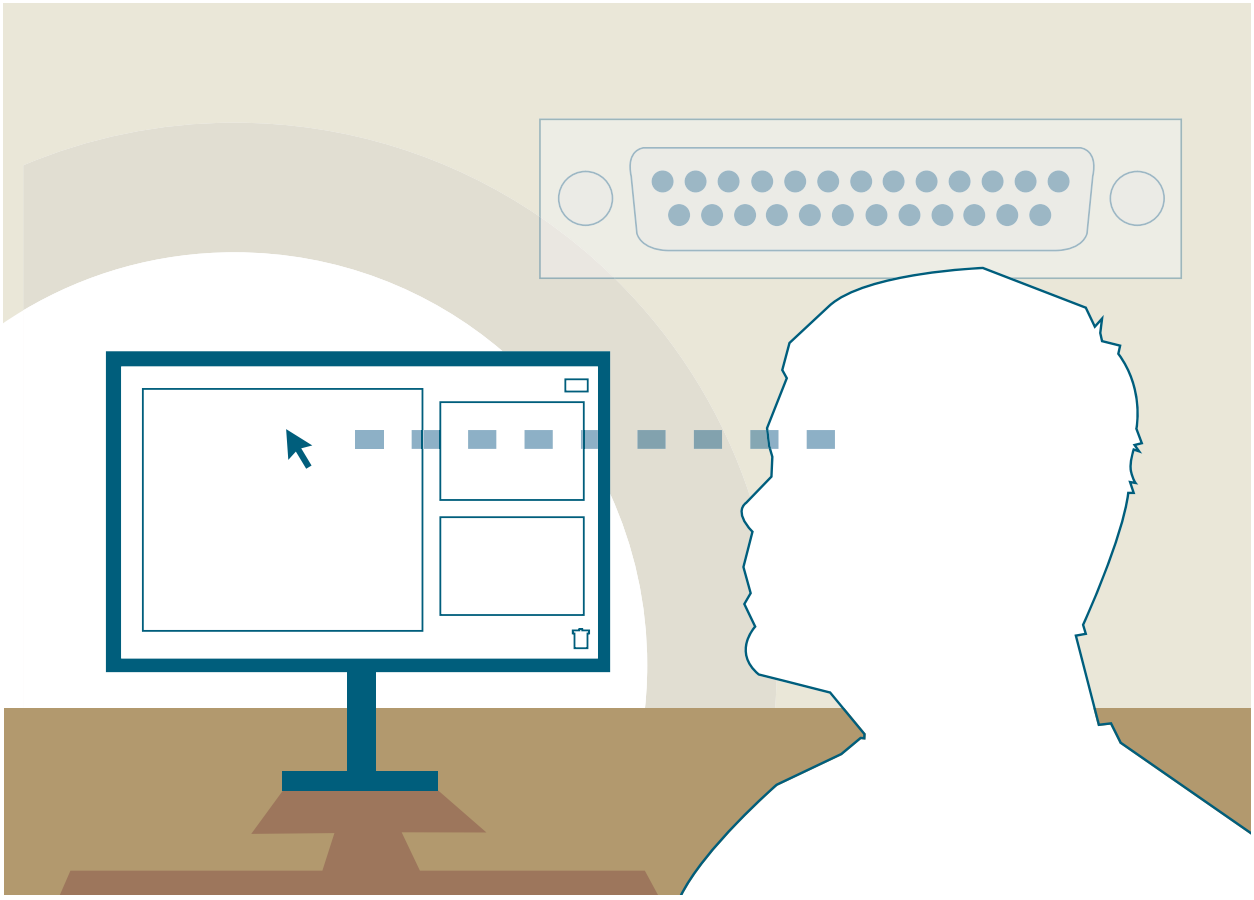
- Larger brains: humans could be born smarter thanks to larger brains. (Very large biological neural networks are very smart.) Make them too large, though, and giving birth becomes a real problem...
- Foods and health: humans could be engineered to "like" the taste of healthful foods and dislike the tastes of unhealthy foods. They could also be engineered to biochemically produce their own antioxidants, vitamins (like vitamin C, for example, which other species create for themselves), or other healthful chemicals.
- Longevity: humans could be engineered to live longer, so people would have more

"productive" years in their lives. The fact that society spends so much time educating and training people who later die off and take all their knowledge and experience with them imposes a tremendous hidden cost on society as a whole. Population problems aside, by doubling the lifespan of humans, we could triple or quadruple the number of productive years in the average human life.

- Peace, not conflict: through alteration of genetically influenced behaviors, humans could be born with the innate tendency to get along with each other. If we could eliminate males' desire for control over resources and people, as one example, we would eliminate one of the primary underlying catalysts of geopolitical conflict in the world.
- Sensory enhancements: biologically, it is quite possible to build eyes with a hundred times the sensitivity of human eyes. (Baby eagles do it all the time.) With proper genetic engineering, baby humans could have super sensitive eyes, enhanced hearing, expanded range of perception of wavelengths of light (they could see infrared radiation, for example), higher density nerve bundles on their fingertips, or a long list of other enhancements.

The mere discussion of all this justifiably brings up a long list of very spooky themes like eugenics, "Master Race" philosophies, Frankenstein babies, and of course the movie, "GATTACA." I'm not at all saying this technology will be easy to grapple with from ethical, social and philosophical perspectives. What I am saying is that modern day humans are walking museums. Our souls inhabit outdated hardware, and our brains are running software meant for a long-gone era. Genetic engineering offers us the potential to consciously improve our core design. It allows us to decide who we want to be as conscious beings. It simultaneously presents the potential for truly horrific abuses.

In my view, we are presently nowhere near the level of global wisdom and spiritual understanding required to justify experimenting with the genetic code of our own offspring. And yet genetic engineering of the human race remains an essential step to uplifting our species.



8 Computer/Human Interface Systems

“Breakthroughs in computer / human interface technologies will multiply the speed of personal computing, eventually approaching the speed of thought.”

There's no mistaking the significant influence of personal computers and the Internet on our modern way of life. Many of us have so quickly adapted to regular use of search engines and web surfing that it's difficult to imagine life without the Internet.

The Internet allow us to research products and companies, share ideas with the public, research nutritional supplements, find articles on historical figures, and do a million other things that simply weren't possible a mere two decades ago.

And yet our interface with the Internet remains the lowly personal computer. With its clumsy interface devices (keyboard and mouse, primarily), the personal computer is a makeshift bridge between the ideas of human beings and the world of information found on the Internet. These interface devices are clumsy and simply cannot keep pace with the speed of thought of which the human brain is capable.

Consider this: a person with an idea who wishes to communicate that idea to others must translate that idea into words, then break those words into individual letters, then direct her fingers to punch physical buttons (the keyboard) corresponding to each of those letters, all in the correct sequence. Not surprisingly, typing speed becomes a major limiting factor here: most people can only type around sixty words per minute. Even a fast typist can barely achieve 120 words per minute. Yet the spoken word approaches 300 words per minute, and the speed of "thought" is obviously many times faster than that.

Pushing thoughts through a computer keyboard is sort of like trying to put out a raging fire with a garden hose: there's simply not enough bandwidth to move things through quickly enough. As a result, today's computer / human interface devices are significant obstacles to breakthroughs in communicative efficiency.

The computer mouse is also severely limited. I like to think of the mouse as a clumsy translator of intention: if you look at your computer screen, and you *intend* to open a folder, you have to move your hand from your keyboard to your mouse, slide the mouse to a new location on your desk, watch the mouse pointer move across the screen in an approximate mirror of the mouse movement on your desk, then click a button twice. That's a far cry from the idea of simply *looking* at the icon and *intending* it to open, which would of course be the desired level of computer / human interface as I'll discuss below.

Today's interface devices are little more than rudimentary translation tools that allow us to access the world of personal computers and the Internet in a clumsy, inefficient way. Still, the Internet is so valuable that even these clumsy devices grant us immeasurable benefits, but a new generation of computer/human interface devices would greatly multiply those benefits and open up a whole new world of possibilities for exploiting the power of information and knowledge for the benefit of humanity. Let's take a closer look at those emerging technologies now.

Emerging Computer / Human Interface Technologies

The idea of eliminating the gap between human thought and computer responsiveness is an obvious one, and a number of companies are working hard on promising technologies. One of the most obvious such technologies is *voice recognition software* that allows the computer to type as you speak, or allows users to control software applications by issuing voice commands.

The most advanced and accurate software in this category is *Dragon Naturally Speaking*, and I've spent a considerable number of hours with this software. Its accuracy is impressive, and the technology is far ahead of voice recognition technology from a mere decade ago, but it's still not at the point where people can walk up to their computer and start issuing voice commands without a whole lot of setup, training, and fine tuning of microphones and sound levels. For many people, that's just way too much configuration.

This situation is no doubt recognized by the developers of *Dragon Naturally Speaking*. Nevertheless, widespread, intuitive use of voice recognition technology still appears to be years away.

Hand-controlled computers

Another recent technology that represents a clever approach to computer / human interfaces is the iGesture Pad by a company called *Fingerworks* (http://www.FingerWorks.com). With the iGesture Pad, users place their hands on a touch sensitive pad (about the size of a mouse pad), then move their fingers in certain patterns (gestures) that are interpreted as application commands. For example, placing your fingers on the pad in a tight group, then rapidly opening and spreading your fingers is interpreted as an **Open** command.

This technology represents a leap in intuitive interface devices, and it promises a whole new dimension of control versus the one-dimensional mouse click, but it's still a somewhat clumsy translation of intention through physical limbs.

For more intuitive control of software interfaces, what's needed is a device that tracks eye movements and accurately translates them into mouse movements: so you could just *look* at an icon on the screen and the mouse would instantly move there. Interestingly, some of the best technology in this area comes from companies building systems for people with physical disabilities. For people who *can't* move their limbs, computer control through alternate means is absolutely essential.

Head movement tracking technology

One approach to this is tracking the movement of a person's head and translating that into mouse movements. One device, the *HeadMouse* (http://www.orin.com/access/hme/index.htm), does exactly that. You stick a reflective dot on your forehead, put the sensor on top of your monitor, then move your head to move your mouse. I haven't tried the technology, so I can't say how well it works, but the company (Origin Instruments) has a reputation for providing assistive technologies to physically disabled persons, and the HeadMouse is their latest technology.

Another company called Madentec (http://www.Madentec.com) offers a similar technology called *Tracker One*. Place a dot on your forehead, then you can control the mouse simply by moving your head.

In terms of affordable head tracking products for widespread use, a company called NaturalPoint (http://www.NaturalPoint.com) seems to have the best head tracking technology at the present: a product called SmartNav, priced at a mere $199, allows for hands-free mouse control via head movement. Add a foot switch and you can click with your feet. I've used this product myself, and while it definitely presents a learning curve for new users, it works as promised.

Tracking eye movements

While tracking head movement is in many ways better than tracking mouse movement, a more intuitive approach, it seems, would be to track actual eye movements. A company called LC Technologies, Inc. is doing precisely that with their *EyeGaze* systems (http://www.lctinc.com/PRODUCTS.htm). By mounting one or two cameras under your monitor and calibrating the software to your screen dimensions, you can control your mouse by simply *looking* at the desired position on the screen.

Once again, this technology was originally developed for people with physical disabilities, yet the potential application of it is far greater. In time, I believe that eye tracking systems will become the preferred method of cursor control for users of personal computers.

Eye tracking technology is quickly emerging as a technology with high potential for widespread adoption by the computing public. Companies such as Tobii Technology (http://www.tobii.se), Seeing Machines (http://www.SeeingMachines.com), SensoMotoric Instruments (http://www.smi.de), Arrington Research (http://www.ArringtonResearch.com), and EyeTech Digital Systems (http://www.eyetechds.com) all offer eye tracking technology with potential for computer / human interface applications. The two most promising technologies in this list, in terms of widespread consumer-level use, appear to be Tobii Technology and EyeTech Digital Systems.

Mind control for your PC

Moving to the next level of computer / human interface technology, the ability to control your computer with your thoughts alone seems to be an obvious goal. The technology is called *Brain Computer Interface* technology, or BCI.

Although the idea of brain-controlled computers has been around for a while, it received a spike of popularity in 2004 with the announcement that nerve-sensing circuitry was implanted in a monkey's brain, allowing it to control a robotic arm by merely thinking. This *Washington Post* article gives a fascinating account of the breakthrough and training required by the monkey to learn how to use the brain implant:
http://www.washingtonpost.com/ac2/wp-dyn/A17434-2003Oct12?language=printer

The lead researchers in the monkey experiment are now involved in a commercial venture to develop the technology for use in humans. The company, Cyberkinetics Inc. (http://www.cyberkineticsinc.com) hopes to someday implant circuits in the brains of disabled humans, then allow those people to control robotic arms, wheelchairs, computers or other devices through nothing more than brain behavior.

A key obstacle to widespread use is, of course, the requirement that circuitry be surgically implanted in the brain. If the technology can take a quantum leap and work its magic without needing the surgery -- by wearing a sensing helmet, for example -- it will suddenly be a lot more interesting to the population at large, and not just those with severe physical disabilities.

Imagine the limitless applications of direct brain control. People could easily manipulate cursors on the screen or control electromechanical devices. They could direct software applications, enter text on virtual keyboards, or even drive vehicles on public roads. Today, all these tasks are accomplished by our brains moving our limbs, but the limbs, technically speaking, don't have to be part of the chain of command.

Tactile feedback

Another promising area of computer / human interface technology is being explored by companies like Immersion Corporation (http://www.Immersion.com), which offers tactile feedback hardware that allows users to "feel" their computer interfaces.

Slide on Immersion's *CyberGlove*, and your computer can track and translate detailed hand and finger movements. Add their *CyberTouch* accessory, and tiny force feedback generators mounted on the glove deliver the sensation of touch or vibration to your fingers. With proper software

translation, these technologies give users the ability to manipulate virtual objects using their hands. It's an intuitive way to manipulate objects in virtual space, since nearly all humans have the natural ability to perform complex hand movements with practically no training whatsoever.

Another company exploring the world of tactile feedback technologies is SensAble Technologies (http://www.sensable.com). Their *PHANTOM* devices allow users to construct and "feel" three-dimensional objects in virtual space. Their consumer-level products include a utility for gamers that translates computer game events into tactile feedback (vibrations, hitting objects, gun recoil, etc.).

On a consumer level, Logitech makes a device called the *IFeel Mouse* that vibrates or thumps when your mouse cursor passes over certain on-screen features. Clickable icons, for example, feel like "bumps" as you mouse over them. The edges of windows can also deliver subtle feedback. The mouse sells for around $40, but it hasn't seen much success in the marketplace. Reviews from users reveal that the vibrating mouse is considered more annoying than helpful, so don't expect to see this technology taking over the world of computer mice.

But tactile feedback has potential for making human / computer interfaces more intuitive and efficient, even if today's tactile technologies are clunky first attempts. The more senses we can directly involve in our control of computers, the broader the bandwidth of information and intention between human beings and machines.

Three-dimensional displays

The long-promised 3D computer monitor finally seems to be close to reality. Manipulating complex windows, documents and virtual objects on a two-dimensional display -- as is standard today -- is rather limiting. With a 3D monitor, we could work in *layers* or position documents and objects in 3D space rather than squeezing them down to a tiny toolbar at the bottom of one screen.

For human beings, 3D space is intuitive. *We get it* without training. That's because we live in a world of 3D objects and space, and our perception is hard-wired to understand spatial relationships. That's why gamers who play first-person shooters like Quake can mentally retrace their way through enormous maps (levels) in their heads, eyes closed, without even trying: the human brain was built to remember and navigate 3D space.

Recent breakthroughs in 3D displays promise to make computing more intuitive and powerful. Companies like LightSpace Technologies (http://www.lightspacetech.com) are already selling desktop 3D display monitors that display true 3D images without the need for special glasses.

The trouble is, Windows and Mac operating systems weren't written with 3D displays in mind. So

there's no capability to stack windows or view the depth of objects. It's a classic chicken-and-egg conundrum: who's going to buy 3D displays if the software can't support them, and why would software makers write 3D layering logic if nobody owns the displays?

In time, thanks to the "cool" factor of 3D displays, the technology will eventually receive enough attention to warrant the necessary R&D investment by operating system developers like Microsoft and Apple. No doubt, future generations will conduct all their computing with the aid of 3D displays, and the very idea of 2D displays will seem as outdated as black & white movies do to us today.

Another new 3D display device is the Perspecta Spatial 3D globe, seen at: http://www.actuality-systems.com/index.php/actuality . This device displays 3D objects or animations inside a globe. Users can walk around the globe and view the objects from any angle. It's a rather expensive item, of course, so early applications for this product focus on medical and research tasks. In time, however, the technology will drop in price, bringing it within reach of more consumers.

In the category of the more familiar, a German company called SeeReal Technologies (http://www.SeeReal.com) offers a 20" LCD 3D display that uses eye tracking combined with unique left/right display technology to create a true 3D image on a flat panel monitor without the need for special viewing glasses. These monitors are typically used in the CAD/CAM industry where the visualization of 3D objects is especially helpful. The lack of support for 3D space in the Windows operating system, however, makes these monitors useless for everyday users... at least for the moment.

What would 3D displays do for us?

So what should a flat panel 3D display actually do for a typical Windows or Mac user? At the most basic level, operating systems would need to support fundamental 3D features like:

- **Layering of windows:** Background windows would appear further away, while foreground windows appear closer.
- **Pop out elements:** Certain elements of a document or page could appear to "pop out" of the screen a half inch or so. This might be used similarly to **bolding** or *italicizing*.
- **Floating cursors:** the mouse cursor appears to float above the screen and then, when clicked, it actually buries itself in the button being clicked, then quickly returns to its hover status.

Note, however, that a 3D flat panel monitor is not the same as a true 3D display system: you can't walk to the side of the monitor and see the windows behind it. It's still essentially a 2D system in that it can't display true volumetric shapes and objects that are viewable from multiple angles.

Tabletop 3D displays

For that, we'll ultimately need a *tabletop 3D display system* that lays flat on your desk (like an LCD monitor laying down) and projects 3D images into the space above the panel. This would be a true volumetric 3D display system, and it's here that the technology truly represents a breakthrough. Program application windows could literally be stacked from the rear to the front, and if you peeked around the side of the display, you could see a side view of all the windows at once.

With proper software control, objects or documents could be placed in true 3D space: desktop icons, for example, could be lined up along the very back row. Games could display true 3D scenes *as if you're actually in them*, and CAD engineers would have the ability to observe their designs in true 3D space.

Better yet, if coupled with a motion tracking glove or similar technology, users could use their hands to grasp, move, resize or otherwise manipulate elements in 3D space. This, of course, opens up an unlimited universe of possibilities for computer / human interaction.

Closing the gap

This brief tour of computer / human interface technologies is really only a glimpse of what's possible. It's all about *closing the gap* between human intention and computing systems. Today, the gap is very large: a typical keyboard and mouse setup is essentially a two-channel interface system. But tomorrow, the gap could be very small: add a head tracking system, hand-sensing glove, foot pedal switches, voice recognition system, 3D display and a brainwave-sensing helmet, and you've created layers of multi-channel interface technologies that allow infinite expression.

In time, as this technology is developed and adopted by mainstream users, the gap will continue to shrink. This has enormous positive implications in the workplace, medicine, science, education, social interaction, entertainment and many other areas, which is why it earns such a lengthy discussion in this report. And it's not technology that's "way out there," either: it's technology that's emerging now and will continue to be developed in the years ahead.

9 Vibrational Medicine

> “Vibrational medicine is the future of healing. While the eras of physical and chemical medicine are now fading, vibrational medicine is emerging as a far superior model for accelerating healing in patients everywhere.”

Vibrational medicine is a promising area of "technology" (it's difficult to call it that) that covers a variety of pioneering healing modalities now known to be far more powerful than drugs and surgery in improving the lives of patients. These modalities include:

- **Phototherapy:** harnessing the healing power of natural sunlight to prevent cancer, reverse clinical depression, alter moods, increase bone density and much more.
- **Color therapy:** using selected wavelengths of natural sunlight to create a physiological, psychological or energetic response in a patient.
- **Homeopathy:** using the "memory of water" to imprint a patient with the healing properties of selected substances.
- **Sound therapy:** the therapeutic use of sound waves to create a healing response in the patient. Music therapy is one branch of sound therapy.
- **Spiritual healing:** harnessing the power of prayer and focused intention to alter the health outcome for a patient. Also called "non-local medicine." It is well supported by double-blind placebo studies.
- **Mind/body medicine:** harnessing the power of the patient's own mind to affect healing. This is typically accomplished through meditation exercises, laughter as medicine, or creative visualization exercises. The proven power of the placebo effect demonstrates the enormous healing potential of this modality (in tens of thousands of medical studies, the placebo effect has been proven more effective than any prescription drug known to mankind).
- **Acupuncture:** the use of tiny needles to alter the flow of chi (energy) through the body for a specific health reason.
- **Magnetic therapy:** the use of permanent magnets or electromagnets to catalyze a healing response in the patient. Some magnetic therapies attempt to augment the Earth's magnetic field; others deliver high-energy magnetic bursts in an attempt to destroy cancer tumors.
- **Crytals, gems and rocks:** the harnessing of vibrations from crystals and other rocks for healing purposes. All crystals vibrate. In fact, if you are reading this report, you're using crystal vibration right now! (The CPU clock in your computer operates on a timing signal generated by a crystal.)
- **Electromedicine:** applying small electrical currents to selected points on the body to accelerate healing, repair broken bones, create changes in muscle training and body tension, destroy invading bacteria, and other uses. The body already relies on electromedicine for internal healing. All bones, for example, are piezo-electric devices that create an electric charge when stressed, attracting minerals like calcium to the site of the charge. In addition, a continuous electric current, when applied to the skin over a blood vessel, kills bacteria present in the blood. Electromedicine has great potential for healing.

There are many other areas as well, but these represent some of the most popular vibrational medicine technologies being used today.

Unlike the other technologies mentioned in this report, *much of the technology already exists for vibrational medicine*. Every therapy mentioned above is being used right now in the United States and around the world. The challenge is to see their use become widespread and accepted by practitioners of western medicine. Unfortunately, most practitioners of modern (western) medicine are steeped in an outdated mindset of drugs and surgery and tend to shun any therapy that isn't sanctioned by the pharmaceutical industry.

Let's take a closer look at the kind of paradigm shifts that will be required in modern medicine in order for vibrational medicine to earn increased credibility.

A brief history of western medicine

Looking at the history of western medicine, the modalities and belief systems are readily divided into three chronological phases:

1. **Physical medicine.**
2. **Chemical medicine.**
3. **Energetic medicine.**

Physical medicine describes the sort of medicine practiced by the western world in the 19th early 20th centuries. If a foot became infected, the doctor cut it off. Surgery was regarded as a "heroic" procedure (to a very large degree, it still is), and disease was understood to be caused by the physical malfunctioning of physical organs.

Chemical medicine emerged in response to the discovery of penicillin and the realization that certain chemicals -- prescription drugs or antibiotics -- could target and destroy infectious disease. This belief continues to this day, where diseases are now commonly described as "chemical imbalances" that must be treated with a lifetime of prescription drugs. Today, western medicine is firmly seated in the belief system of chemical medicine. Pharmaceutical companies, which dominate today's medical landscape, rely exclusively on this paradigm to market their products and convince patients they need potent chemicals in order to be happy, healthy or sane. This is why nearly all diseases and symptoms are presently described as chemical imbalances that can be corrected with expensive drugs. This belief is a distortion, however.

Energetic medicine (vibrational medicine) is just starting to be explored by the medical mainstream. In energetic medicine, the powerful effects of subtle energy systems are explored and leveraged

for healing. Energetic medicine recognizes the whole of the patient rather than the parts (as in physical medicine). Energetic medicine also believes that the human body is not a chemical dumping ground, and that both disease and health have core underlying causes that go far deeper than mere symptoms.

The future of medicine is vibrational

Tomorrow's medicine will no doubt increasingly rely on vibrational medicine. Not only is it a more advanced perspective on the true causes of disease and health, but it can be offered to patients with virtually no side effects and at very low cost. As one simple example, if a doctor can help a patient laugh heartily for five minutes, the patient will be significantly helped in all three areas: physical, chemical and vibrational.

From a physical point of view, the very act of laughing moves lymph fluid, promotes the oxygenation of body cells and organs, and improves circulation. From a chemical point of view, laughter results in the creation of literally tens of thousands of dollars worth of healthful brain chemicals (if you had to buy them, that is) that improve mood, enhance alertness, etc. From an energetic point of view, laughter helps relax the patient's body and mind, opens them to enjoying interaction with others, and literally restructures their internal energies. That's just one reason why Dr. Patch Adams, popularized in the movie with Robin Williams, relied so heavily on laughter as a powerful healing tool. In a very real way, laughter is perhaps one of the most powerful healing tools available to mankind, and yet today's hospitals and doctors' offices are hardly places that inspire unbridled joy.

The power of placebo

Interestingly, vibrational medicine has already been proven by literally tens of thousands of clinical studies to be the single most powerful healing tool known to western medicine, and yet it remains largely ignored by the very same people conducting the studies. Let me explain: in most clinical trials, there is something called *the placebo effect* which describes the level of healing that takes place in patients who were given no drugs and no surgery *but who thought they received the drugs or surgery*. For example, they would be given inert pills or subjected to a "sham surgery" that actually resulted in no real surgical operation. This is standard practice in clinical trials.

But even though the patients don't receive the drugs or surgery as part of the study, *they routinely show permanent improvements in their health*. One study of Parkinson's patients proved that this genuine health improvement remained strong even twelve months after the placebo surgery, and the measure of improvement was objective: even the medical staff agreed that patients showed measurable improvements.

Obviously, if patients are getting better thanks to the placebo effect, it can't be the drugs or surgery that's causing the improvement. *The healing effect is caused by the mind of the patient*. Their belief in the drug or surgery is what's causing them to get better, not the actual drug or surgery (since they didn't receive either).

Now here's the amazing part: if you take a closer look at these tens of thousands of studies, you'll find that *the placebo effect has been proven effective in treating approximately 30% of all disorders and diseases*. That's right: this single mind/body tool has been scientifically proven to reverse or improve 30% of all diseases and symptoms: heart disease, stroke, arthritis, cancer... you name it. The proof is right there in the studies.

This is astonishing: mind/body medicine offers us a powerful healing tool that works with no negative side effects and zero cost... and it's effective against practically any disease or condition. So what does western medicine do with this knowledge? They discard it. The placebo effect is routinely tossed or ignored. It's considered a "false" result by medical researchers, even when the numbers prove it to be not just real, but perhaps the most powerful healing tool of all.

Truth is whatever agrees with your beliefs

Why does this happen? Doctors, researchers, surgeons and others in the medical community function like everyone else: when presented with evidence that contradicts their firmly held belief systems, they discard the new evidence because it doesn't fit their internal model of the way the world works. Accordingly, the mountain of evidence supporting the placebo effect gets routinely discarded not because it isn't compelling and scientific, *but because modern medicine doesn't understand how it could work*. It doesn't fit the model.

And it's not just the placebo effect that gets ignored. Homeopathy is also routinely ignored or even attacked by western medicine for the simple reason that western medical technology doesn't understand how it works, either. In a homeopathic remedy, an extract from a particular element such as a flower, a plant, or even a poison like arsenic, is mixed with water and then diluted to such extremes that there's not a single molecule of the original element remaining in the final mixture. Yet the final mixture holds the "memory" or the "vibration" of the original element that was used, and it exhibits scientifically measurable and verifiable effects on biological systems (both humans and animals) when consumed.

The evidence showing that homeopathic remedies work is not merely compelling, it is scientifically robust. An honest researcher reviewing the clinical evidence on homeopathy can only reach one of two conclusions: either homeopathy works, or controlled, double-blind placebo clinical trials don't work. In other words, if you measure the effect of homeopathic remedies using the same

science and scrutiny as clinical drug trials, you get a significant result that proves homeopathic remedies work. And yet western medicine continues to throw out this scientific reality, *not because it hasn't been scientifically proven, but because it doesn't fit the model*.

Homeopathy is one of the most promising areas of vibrational medicine. Homeopathic remedies can help people fight infectious disease, reverse cancer and diabetes, improve their brain function, detoxify their systems, recover from wounds more quickly, increase fertility, and accomplish a long list of other health benefits.

Phototherapy

Phototherapy represents a rapidly emerging branch of vibrational medicine, and it's being slowly accepted by the scientific community. In experiments with infrared light, NASA (National Aeronautics and Space Administration) has shown that flesh wounds like scrapes, cuts and burns, *heal 40% faster* when exposed to a few minutes of infrared LED light each day. The mere presence of the light causes the body to accelerate its healing.

Light is a powerful healing tool, and no light is more available than our own sun. The sun is a source of tremendous healing potential. With natural sunlight, people can reverse prostate cancer and breast cancer, reverse clinical depression, enhance their bone density and prevent osteoporosis, vastly improve circulation, accelerate wound healing, and experience a long list of other significant health benefits. And yet, remarkably, nearly the entire population of the western world has been taught to believe that sunlight is dangerous.

People are warned to "stay out of the sun!" They slather on sunscreen, they wear heavy clothing, and they avoid the sun at all costs. Meanwhile, rates of prostate cancer are skyrocketing and vitamin D deficiency is now one of the most common nutritional deficiencies in America, Canada and Europe. With daily exposure to natural sunlight, the body creates its own vitamin D and puts it to work preventing prostate cancer, breast cancer and a long list of other disorders.

People need natural sunlight. It seems so obvious that it's almost ridiculous having to point it out. And yet fear of the sun is so deeply ingrained in western societies that merely mentioning the phrase, "sunlight is good for you..." earns you gaping stares from practically everyone. Clearly, the human species didn't evolve under fluorescent lighting: it evolved under the natural sun, and as human beings, we depend on frequent exposure to the sun for optimum health. Without sunlight, in fact, we cannot function in a healthy way. The growing problem of *Seasonal Affective Disorder*, where people experience deep depression due to lack of sunlight, is just one of the many clues pointing to the reality that people need natural sunlight in order to be healthy.

Lack of sunlight is even part of the reason we're seeing an epidemic of obesity: sunlight exposure

diminishes cravings for carbohydrates and sweets by balancing levels of serotonin in the brain.

Surgical sound waves

Another promising area of vibrational medicine involves the use of sound waves for manipulating both physical tissues and energetic fields in the body. For this discussion, I'll stick with the physical tissues.

I first discussed this technology concept in 2001 with Jonathan Goldman, a sound healing pioneer working more on the spiritual side than the medical side of sound therapy (http://www.HealingSounds.com). By using standing waves of low frequency sound combined with subtle variations in the frequency and wavelength, we can directly control fluids (like blood and lymph) and even manipulate tissues in the human body *without needing invasive surgery*. How?

Cymatics = the study of sound on physical matter

Sound restructures physical matter. This is evidenced by observing the effect of sound waves on grains of sand spread across the top of a large drum. If you hum into the drum, the sand will form physical patterns that coalesce across the drum head according to slight variations in pitch and amplitude. The science is called *cymatics*, and much of the original work in this area was conducted by the late Hans Jenny. (See http://www.cymaticsource.com for information.)

In cymatics, we see that sound creates waves of force that can move physical objects either towards or away from the source of that sound. In my own experiments using tone generator software, home speakers, sheet metal, and dirt from my back yard (how's that for high-tech?), I was able to propagate grains of dirt and sand along a radiating path from the source of the sound by simply altering the frequency of the sound. (You have to watch the amplitude, however, because if the sound waves are too strong, the grains of sand will leap right off the sheet metal.)

For example, if you start with a sound frequency of 300 hertz (300 cycles per second), and then slowly *reduce* the frequency (pitch down the sound), it will elongate the wavelength of the sound and the grains of sand will slowly move away from you. If you start at a low frequency and *increase* the pitch, the grains of sand will move towards you as if on a conveyer belt.

This same technology, I proposed in 2001, could be used in the bodies of patients to move body fluids and massage organs, among other uses. Diabetic patients, for example, frequently experience a critical lack of blood supply to their feet due to diabetic neuropathy. By using sound generators under the soles of their feet and broadcasting a sound sequence that slowly increases pitch (then repeats from the original low tone after ramping up), you can actually *draw blood into*

the feet and minimize damage from neuropathy. The same approach can be used for any organ or limb in the body. Sadly, such medical devices do not exist today.

Yet this merely scratches the surface of potential for sound therapy. Imagine using two sound sources and coordinating their configuration of standing waves so that peaks of force can be pinpointed along the X and Y axis. Now add a third sound source so that you can operate in three dimensions. With such a system, doctors or surgeons could manipulate internal organs or biological structures with precision without needing to slice into the patient's body with scalpels. It's non-invasive surgery through the miracle of sound.

To date, no such system exists, but they are theoretically possible. There has been, however, some exciting new research emerging in the world of "medical acoustics." Dr. Alexander Sutin at the Stevens Institute of Technology in New Jersey recently presented six papers at the Acoustical Society of America where he described a phenomenon known as time-reversal acoustics that promises to revolutionize modern medicine. Time-reversal acoustics will allow a whole new approach to imaging (seeing inside the body), destroying kidney stones, targeting tumors and even conducting surgical procedures without needing to invade the body.

Such technology blends the often mysterious world of vibrational medicine with today's so-called "hard core science" to bring significant new healing modalities to the world of medicine. If sound can be widely accepted as a healing technology by organized medicine, further exploration into phototherapy, homeopathy and acupuncture is likely to follow. And that's how modern medicine graduates from a stage two (chemical medicine) paradigm and moves into stage three (vibrational medicine).

Wrap up

In all, vibrational medicine represents the next phase in the evolution of healing technology. It delivers powerful healing with no negative side effects and at very low cost. When fully embraced by the medical community, vibrational medicine will make chemicals and prescription drugs virtually obsolete.

When it comes to vibrational medicine, the science is already here: reliable studies prove its efficacy. But what's needed is the acceptance of this technology by the medical community, and that acceptance will take time to achieve.

10 Superlearning Systems

"Superlearning systems will allow our civilization to take a quantum leap in the transfer of knowledge and wisdom to each successive generation."

One of the great failures of modern society is public education. In the United States, the public education system has been denied adequate funding for so long that teachers frequently resort to buying textbooks for their students with their own money. Many schools lack even fundamental instructional tools like desktop computers, and much about public education remains mired in bureaucracy and political power grabs.

The advancement of modern civilization will require a quantum leap in the approach of public education. It's not simply about giving more money to the schools, raising teachers' salaries, or buying textbooks for students; it's about changing our entire approach to teaching our next generation of human beings the knowledge and skills they need to succeed in tomorrow's world.

Superlearning systems offer the ability to rapidly accelerate the learning process for children and adults alike. But what is a superlearning system? Today, it's a largely fictional technology that's perhaps best described in the sci-fi movie *Brainstorm*, released in 1983 and starring Christopher Walken. In Brainstorm, a brain monitoring device could record the thoughts and sensory experiences of one person, then replay them into the brain of another person. The promise of the device was perhaps best described by one character in the film who said, "How would you like to learn the entire fifth grade in ten minutes?"

It may have been science fiction in 1983, but today the exploration of superlearning is underway. In the last two decades, there has been a tremendous amount of research conducted on multi-sensory learning theory. Researchers have found that the human brain learns best through multi-sensory association, not rote memorization. A child will learn best, for example, when she is engaged in a learning activity that uses sight, sound, emotions, tactile feedback, spatial orientation, and even smell and taste. Learning has also proven to be far more effective when subjects are in a relaxed mental state.

Compare this to modern day schools and universities, where to this day, tenured professors mumble over a collection of notes to an auditorium full of students who learn little more than how to take notes and pass rote memorization tests. Sadly, many of today's institutions of learning aren't very good at their only mission.

Advances in superlearning will require the radical reformation of our learning institutions and yet will simultaneously usher in a new era of prosperity and quality of life. To believe this idea, you have to believe that it is the lack of education that's largely responsible for the problems of society. And that's the point I'll explain next.

Lack of education causes hardship

If you take all the people with the most pronounced hardships in life -- the working poor, the criminals, the drug addicts, and so on -- you find they all have one thing in common: a lackluster education. Nearly all the people who fall between the cracks in society share a childhood education crisis: they didn't get the same education that others received. Or they couldn't learn in the same way that others learn.

Multiply that situation by twenty or thirty years and you get someone who falls between the cracks of modern society: a petty criminal, a homeless person, a drug addict, or, if you're lucky, people working from one minimum wage paycheck to the next, just barely surviving, usually with the help of public assistance.

Simultaneously, lack of education also affects everyone I haven't mentioned yet: the working middle class and wealthy. If they never learned about the real history of the world, they're likely to repeat the same mistakes today. If they never learned about other countries, populations, and cultures, they will undoubtedly emerge from public schools with an ethnocentric viewpoint and demonstrate a disturbing intolerance for people of different ethnic backgrounds. If they didn't study the great authors, the great artists, or the great poets, they will act in soulless ways, or without an open heart and mind. If they didn't learn about the history of the universe, our planet, the evolution of the species, and ancient man, they will never come to appreciate the sanctity of their own lives, nor of others' lives.

See, education does more than just keep people out of the gutter: it transforms an ordinary, closed-minded human being into a world citizen. Studying the great masters -- the philosophers, the healers, the poets, the political figures, the artists, the scientists, the revolutionaries -- is the pathway to being a great citizen of our world.

Education is everything to society. Without it, we are all just berry-hunting primates. Education is what allows us to carry memories, lessons and advances from one generation to the next. And it's a short window: the blink of a human life. In the span of a single lifetime, we as a society must transfer the entirety of our knowledge and wisdom to the next generation. Inevitably, each of us will pass on.

Education is the keystone of civilization. And superlearning brings us the promise of accelerating our education processes so that we can, in a sense, multiply the "bandwidth" of information and wisdom being passed to our children.

What is learning?

So what kind of superlearning systems might work for us? Answering that requires a closer look at what "learning" is in the first place. At a biological level, learning is simply the building of new associative pathways in the human nervous system. As we learn new things, we don't increase our brain matter, we simply make new neural pathways in the brain cells that are already there. A "smart" person has more interconnected neural pathways than a "dull" person, although they may possess the same physical brain matter.

The human brain will create these new neural pathways in response to external stimuli -- the more diverse, the better. So a child who is given the definition of the word "weightless" in a verbal format gets that information in one channel: the audio channel. That creates a one-dimensional association in their brain.

But take the same child and show them a movie of a person floating in space while you're saying the word "weightless," and you now have a two-dimensional learning experience: the child both sees and hears the word.

Better yet, take the child to a trampoline and start bouncing up and down. Make it fun, because that invokes the emotional channel. Between bounces, when you're in the air, happily shout, "Weightless!" Now the child gets the word in two more channels, and the understanding of that word is firmly implanted in their brain. They'll probably *never* forget the word.

That's a simplified example of how learning can be made more effective: use *immersion* and engage multiple channels of experience to introduce people to new concepts.

So getting back to the superlearning machine, *how can we use this process of learning to create a superlearning experience?* One answer is something I've already presented in this report: **augmented reality**!

Superlearning with augmented reality

Augmented reality can provide a multi-channel, high-immersion learning experience that teaches new concepts to children or adults at many times the speed and efficiency of today's standard teaching approaches. Augmented reality systems can provide the imagery, sounds, user feedback mechanisms (like using your hands to control virtual objects that appear to be floating in front of you) and even the tactile sensations that accelerate learning. Properly programmed, these wearable augmented reality systems could guide students through an unlimited series of educational exercises that are experiential, multi-channel, self-paced, fun, and highly effective.

As one example, consider the walkthrough history lesson presented earlier in this report: with augmented reality systems, students could physically explore historical events, hold conversations with historical figures, and see, hear and feel history with their own senses. This represents a quantum leap over today's public school lessons: "Read chapters two and three for tomorrow, there will be a quiz..."

Good teachers are always needed

Of course, having good teachers involved in this superlearning process is absolutely essential. A good teacher, by this definition, is one who can properly assess the learning potential of each student, assign the appropriate augmented reality learning programs, keep the students challenged and motivated, and when necessary, enter each student's own augmented reality to provide assistance with the learning process.

In my own early drafts of such a system, the teacher is networked into each student's augmented reality feed and can flip from one student's reality to another like clicking on software screens in the Windows operating system. Being fully networked with all the students, the teacher can serve as an active mentor to either observe or assist the student, depending on the lesson context. The teacher need not even be physically present: a virtual representation of the teacher will suffice, as long as both the teacher and the student share the same rendering of the augmented reality.

Also important to superlearning is social collaboration among students. This, in fact, represents the best first step into the world of superlearning until augmented reality technology comes along. By engaging in group problem solving, group tests, and group discussions, students can *learn from other students' associations*. As learning theory research has shown, individuals in a group tend to automatically integrate ("learn") things originally known by only a few members of that group. Put simply, if one student knows the solution to a problem, and that answer is shared with other students in a team setting, the other students tend to quickly grasp the solution very quickly.

Superlearning, then, has two promising fronts so far: technology (augmented reality) and social learning (group learning environments). Yet there's another important factor to consider when it comes to enhancing our society's ability to do a better job of passing information and knowledge from one generation to the next... and this is something we can tackle right now: *nutrition*.

Better learning through better nutrition

Nutrition, it turns out, is a strong determining factor in the ability of any human being to make new neural pathways. Unfortunately, the nutritional habits followed by most people today -- and especially children -- present significant obstacles to learning. In fact, it's accurate to say that the diet of most American children today is a diet that automatically results in a very low level of intelligence. Let's look at this more closely.

The human brain is a delicate organ. It requires a precise mixture of water, blood sugar, temperature, electrolyte minerals, essential fatty acids and a whole host of other nutrients to function correctly. Alter even one of these just slightly, and brain function suffers dramatically. For example, a 30% drop in blood sugar -- the inevitable result of consuming a breakfast of refined white flour and sugar as found in practically every brand-name breakfast cereal -- causes brain "fuzziness", moodiness, a drop in the ability to concentrate and even tendencies towards violent behavior, especially in young men.

The lack of sufficient hydration -- a condition affecting the vast majority of Americans -- also affects the brain. Since electrical impulses are impeded by even a slight dehydration of the brain, not getting enough water literally interferes with proper brain function.

Making matters worse, most Americans simply don't eat enough of the critical nutrients needed to build and maintain the brain from infancy. One of the most common deficiencies is GLA (gamma linolenic acid), an essential fatty acid found in abundance in human breast milk, but entirely missing from cow's milk. Baby cows don't have quite the need for brain matter that human babies have. Fortunately, nature has made sure that human breast milk provides the nutrients needed to build large, healthy brains. Not surprisingly, clinical studies have shown that babies raised on cow's milk score lower on intelligence tests than those raised on human breast milk. (But don't expect the dairy industry to remind you of this little fact...)

Beyond the lack of essential nutrients found in the American diet, the brain function of children is especially susceptible to the influence of destructive dietary ingredients such as refined white flour, white sugar and high-fructose corn syrup (the primary sweetener in soft drinks). The regular consumption of these ingredients, researchers have now demonstrated, leads to alarming changes in the behavior of adolescents. Such behavior is typically described as "hyperactive" or having a "short attention span." These children, as you may have now guessed, are typically diagnosed as having ADHD and are frequently dosed with narcotic drugs such as Ritalin. This treatment protocol is entirely unnecessary, since dietary changes alone bring nearly all children back into the realm of "normal" behavior. Studies in the UK with so-called hyperactive children have demonstrated this quite convincingly: change the child's diet, and their behavior shifts in a matter of days. Read more about this at http://www.SugarFactor.org

So there's more to superlearning than merely inventing some cool new technology: we have to start getting serious about preparing the bodies and brains of our children to be ready for learning in the first place. *As a society, we cannot have both a quality education system and an adolescent population that acquires nearly 30% of its dietary calories from junk foods and soft drinks.* A child who regularly consumes soft drinks and junk foods is a child who is not biologically prepared to learn.

We can address this problem in several ways, but some of the more obvious starting points are to ban all junk food vending machines in public schools, outlaw all advertising of junk foods to children (including television, magazines, and retail merchandising), and start educating parents on the fundamentals of nutrition so that they can make informed choices about what to feed their children.

Ultimately, in an advanced civilization, the production, distribution and marketing of ingredients like high-fructose corn syrup, refined white flour, refined white sugar, hydrogenated oils, aspartame, sodium nitrite and other metabolic disruptors would be outlawed altogether. These substances have no place in a society of intelligent, healthy human beings. (Read more at http://www.DangerousFoods.org)

In conclusion, advances in superlearning hold tremendous promise for uplifting our civilization, but only if we are biologically prepared for learning (good nutrition). Until the technology arrives, group learning, total immersion learning, and fundamental improvements in health education can deliver great improvements over the current system of teaching and learning.

Where is Nanotechnology?

You probably noticed that nanotechnology isn't on the top 10 list. This is no oversight. Nanotech isn't on the list because nanotechnology isn't a specific technology in the first place. The term "nanotechnology" has been so distorted by the popular press and researchers who add "nano" to their projects in order to get funding that, today, it essentially means "anything that's really tiny."

Makers of artificial joints drill tiny holes into the surface of the joint structures and call it nanotechnology. Why? The holes are nano. Makers of pants that resist stains claim to use nanotechnology, too: pant fibers are coated with "nano whiskers" which are, essentially, tiny cloth fibers. Sunscreen makers claim to be using nanotechnology, too. By producing sunscreen lotion particles smaller than ever, the easier it can be dispersed on the skin and block UV rays.

These are just three of the many examples where manufacturers are jumping on the nanotech bandwagon with items that fundamentally have nothing to do with the original definition of

nanotechnology. Based on the examples above, a household blender is a nanotech device, because it can blend foods into very tiny particles.

This isn't to say that these innovations aren't useful. They are. But they're not nanotech. Yet the hype surrounding nanotechnology has reached insane proportions.

When I was a kid, a friend and I created an imaginary pet dog named Super Mutt. Super Mutt was an all-purpose companion who could perform miracles. He could not only mow the lawn, he could actually take shape as an apparent clone of one of us and go to school for us. When our cars ran out of gasoline, we could just stuff Super Mutt into the gas tank and use him as fuel. Super Mutt could do anything we wanted.

Nanotechnology is the world's Super Mutt. Anything you can dream up, somebody will tell you that nanotechnology can do it, regardless of its merit. Need to clean up all that nuclear power plant radiation? No problem: nanotech robots will reconfigure the materials so they don't radiate. Is your body's immune system failing? No problem: little tiny robots will be your immune system for you. Concerned about global warming? Don't fret. Airborne nano-robots will process the atmosphere and make sure the greenhouse effect never kicks in.

The popular press stories about nanotechnology are filled with such promises. Nanotechnology has become, essentially, the scientific community's Moses. Need a miracle? Call Nanotech Moses.

The upshot of all this is that expectations about nanotechnology are off the charts. People expect it to work miracles. The same hype was once observed about ceramics or even superconductors, but neither panned out. The dot-com Internet hype didn't pan out, either. Nanotechnology will be no different.

Beyond the issues already mentioned here, there are other problems with the concept of nanotech that I'd like to point out:

Everything is nano: The physical world around us is made up of molecular building blocks. Nature is already nano. As human beings, the vast majority of our biological processes operate at the nano level. Everything is already nano, and has been for a long time. Saying that things are suddenly nano and using the term "nanotechnology" is akin to saying that things are made up of matter and claiming to be working on pioneering "matter technology." Well of course!

Big on hype and government funding: If you're a researcher seeking a government grant, just add the word "nano" to your project and your odds of receiving funding quadruple. Dropping the word "nanotechnology" into your research, no matter how irrelevant the concept may really be, is a great way to make your work sound important and advanced. I've seen many examples of this

nanotech hype in the scientific community. All of a sudden, there's nano research everywhere! That isn't because researchers changed their research focus, it's largely because they attached the word "nanotechnology" to their pet projects. Today, there's a lot of money being thrown at nano-sounding projects that aren't nanotechnology at all.

Nanotech may fuel the next big stock market bubble: The discussions about nanotechnology in the mainstream today seem eerily similar to those about the Internet in the mid 1990's. Everybody's excited, everybody wants to get on board as investors, and yet nobody has demonstrated a working application of hard-core nanotechnology (nano machines) that would actually generate revenues and improve peoples' lives. Nano is shaping up to be the catalyst for the next big stock market boom and subsequent crash (like the dot-com crash). It is seriously overhyped.

Nanotechnology in medicine is a sham: One of the most frequently mentioned areas of nanotechnology is in medicine, where researchers promise that an army of millions of nanotech robots will travel through the bodies of medical patients and repair cells, destroy tumors, rebuild damaged tissue, and perform other medical miracles. These researchers forget that the body already has its own nanotechnology that does all this and more! It's called the *immune system* and the best way to improve the quality of life for most people, in terms of health, would be to support their own natural healing abilities. Injecting a swarm of tiny robots into their bloodstream -- which is precisely what is being proposed by medical nanotech pioneers -- is a fundamentally flawed medical strategy that assumes scientists know how to heal people better than the body itself. The true answers to improved health and quality of life are to be found in nutrition, physical exercise, avoidance of disease-causing foods, and a wholesale shift away from pharmaceuticals and Western medicine. Nanotechnology is not a promising solution for health and healing, but it is a great way to rack up funding grants and, someday, charge patients hundreds of thousands of dollars for complex-sounding treatments. But remember, the body already has its own nanotechnology, and it's far superior to anything the human mind can come up with.

Nanotechnology poses a potential danger to humans: One of the few areas in nanotechnology actually completing research and producing results is the study of the *toxicity* of nanotech particles. Experiments headed by Gunter Oberdurster, Ph.D., professor of Toxicology in Environmental Medicine and director of the University of Rochester's EPA Particulate Matter Center recently revealed that inhaled nano-sized particles end up in the lungs and brains of rats. In other studies, nano-particles have been shown to cause extensive brain damage in fish and to disrupt normal liver function. If humans were exposed to such nano-particles, we would very likely start seeing increases in brain disorders or perhaps even cellular malfunctions throughout the body. Nano-particles are so small that they can work their way into the mitochondria (the "power plants" of our cells). The long-term health impact of exposure to these particles is clearly being shown to be very negative.

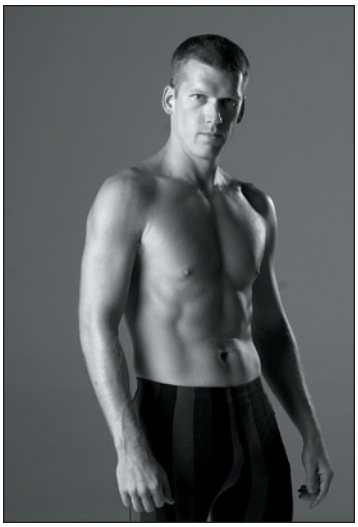
Putting it all together

The top 10 technologies presented here offer a potential roadmap for enhancing our collective quality of life through technology. But as I hinted in the beginning, *technology is not the answer to life*. Without philosophy, the arts, spirituality, experiential wisdom and personal ethics, we are doomed as a civilization, regardless of the technologies we may invent. These technologies only make sense when we are mature enough as a species to wield the powers they offer us.

My intention in authoring this document is the hope that sharing these ideas will stimulate further discussion about technology and its role in our lives. Comments are welcome at feedback@newstarget.com.

Thank you for reading,
- Mike Adams

About the Author



The Health Ranger (Mike Adams) is a holistic nutritionist with over 5,000 hours of study on nutrition, wellness, food toxicology and the true causes of disease and health. He is the author of The 7 Laws of Nutrition, Grocery Warning, Health Seduction, and many other books available at http://www.TruthPublishing.com.

Adams is also the creator of the popular Honest Food Guide, a free downloadable nutritional guide found at http://www.HonestFoodGuide.org. In addition, more than 1,500 free articles on health, nutrition and wellness have been authored by Adams and are available at http://www.NewsTarget.com.

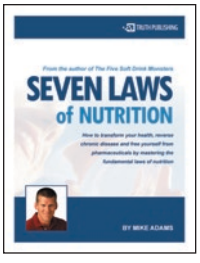
Adams uses no prescription drugs whatsoever and relies exclusively on natural health, whole foods, superfoods, nutritional supplements and exercise to achieve optimum health. To prove the value of nutrition and physical exercise in enhancing health, Adams publishes detailed statistics on his own blood chemistry (with full lab results) at http://www.NewsTarget.com/AdamsHealthStats.html.

Other books by the Health Ranger

The Honest Food Guide
The Honest Food Guide is now available for downloading free of charge and is:

- Free from the corruption and influence of various food industries (dairy, beef, junk foods, etc.)
- Designed to benefit you, not Big Business
- Offers genuine nutritional information, not watered-down information designed to boost the sale of milk, beef and grains

To download your free copy visit http://www.HonestFoodGuide.org



The Seven Laws of Nutrition
Learn how to prevent chronic diseases like cancer, heart disease, obesity and diabetes, and take charge of your health by exploring the fundamental laws of nutrition. Discover how everyday foods actually promote chronic disease and how you can take charge of you health outcome starting today!

For more information visit http://www.TruthPublishing.com/7Laws.html

Take Back Your Health Power!
Would you like to change your health outcome? Would you like to live the rest of your live in a pain-free body, free from disease, full of energy, blessed with lucidity and vibrancy? Thousands of other people are achieving this right now by applying the information revealed in this manual...

For more information visit http://www.TruthPublishing.com/TakeBackHealthPower.html

HealthRanger™
HEALTH THROUGH EDUCATION