

Sample Research Projects

This is just a suggested list. You can find other ideas within the pages of the MIT Technology Review and other high tech magazines.

Green Revolution

The Smart Grid

Issue: This is a hot topic! We actually generate enough overall electricity, but it's the "peak demand" that kills us. Sooner or later, electricity will be charged like rapid transit: you'll pay more for peak hours and less during the night.

Key Technologies: New meters, "smart machines"

Key Companies: Pacific Northwest Labs (Richland, WA), Itron,

Solar Energy

Issue: We're getting closer to making it competitive. We also need to store enough electricity for "peak demand" or it's worthless.

Key Technologies: Energy Storage, 2nd and 3rd generation solar, Quantum Dots

Key Companies: Many

Alternative Biofuels: Making Friends with Pond Scum

Issue: Screw corn. We need something much better. We appear to be able to make high grade petrol from algae – can we do it in large quantities? Cellulosic ethanol is about the dream of much better alcohol yields than corn.

Key Technologies: Algae Tech of all kinds, Cellulolytic enzymes

Key Algae Companies: Greenfuel Technologies, Solarzyme, Soliix Biofuels, Live Fuels, Aurora Biofuels, etc.

Local Algae Companies: Blue Marble Energy, Inventure Chemical, Bionavitas

Key Cellulosic Ethanol Companies: Poet, Verenium, Bluefire Ethanol, Abengoa, Alico

Local Cellulosic Ethanol Company: Zechem

Nuclear Power

Issue: Guess what? We may actually need the formerly dreaded Nu-cu-lar reactors (Bush English). No new plants have been built in the USA since 1996 (started in '82) but the carbon footprint from reactors is extremely small.

Bleeding Edge Technologies: Traveling-Wave Reactors, "Fast" Reactors, Fusion,

Key Companies: Intellectual Investment (Bellevue, WA), DOE, Nuclear Fuel Cycle Project (MIT), Idaho National Labs,

Health Care

As semiconductors were the “hot industry” of the 80s and 90s, some are calling the 21st century “The Biotech Century”. Advances in biotechnology, biomedical devices, and revolutionary surgical techniques have begun to make giant headlines. Below are some examples that you can choose.

Stem Cells

Issue: What’s all the fuss about? Will we be able to make the lame walk and the blind to see?

Key Companies: Stem Cell Institute (University of Minnesota), PPL Therapeutics, Advanced Cell Technology, Infigen, Nextran, Aastrom Biosciences (Blood Stem Cells), Neuronx (Nerve Stem Cells), Nexell Therapeutics (Blood), Osiris (Connective Tissue), StemCell (Blood, Nerve), Geron and many many more.

Cheap Diagnostics

Issue: This is related to printing circuits over an inkjet. We can soon use even postage-stamped sized paper for advanced diagnostics. A drop of blood and off we go! This is also enabling personalized medicine.

Key Technologies: Microfluidics, paper chips, Cheap Chips.

Key Companies: Diagnostics for All, Affymetrix, Micronics (Redmond), BioManomatrix

Personalized Medicine (related topic: Nutritional Genomics)

Issue: Which treatments are effective for whom? We’re getting closer to giving drugs tailored to your biology!

Technologies: Biomarkers,

Key Companies: Perlegen Sciences, Kirin, Merix, and many others.

Local Company: Institute for Systems Biology

Telecommunications and Computing

The Next Telecommunications Revolution

Just when we thought everything was settled, everything in telecom is changing again! The cable companies are getting into telephone service. The phone companies are offering video on demand.. The utility companies are talking about redoing their entire system and entering into video entertainment. The home internet speeds are about to make a huge jump. Game and entertainment companies are drooling. It’s wild out there!

Key Technologies: Voice over IP (VoIP)

Key Companies: Vonage, Verizon, Comcast, etc.

Virtual Project Teams

Issue: Telecommuting, Massive projects, Global projects

Key Technologies: Collaborative software, New Videoconferencing, Skype

Key Companies: Several telecom, software, and collaboration companies

The Future of Wireless Broadband

There's lots of technologies out there. You are forecasting the market size and drivers for the winning technologies and winning companies.

Key Issues: The cost of the mobile wireless broadband buildout, added value services, the dismal market for raising money.

Key Technologies: 3G Wireless, 802.??, Wi-Max

Key Companies: Verizon, Sprint, NextLink, ClearWire

Key Local Companies: Chameleon, etc.

The War of the Last Mile (related: The Digital Divide)

Key Issue: We have a surplus of fiber optic bandwidth except to that crucial last mile to the building or to the house. The last mile is the most expensive.

Key Technologies: Wi-Fi, Cable, DSL, Fiber Optic, Utility Grid

Key Companies: Verizon, Sempra Energy, Personal Telco

Entertainment and Media

The Future of Consumer Entertainment

Key Issue: Some newspapers are going the way of the dodo bird, but traditional television is scrambling. The market share is smaller than ever. The game industry is taking people's time. Casual games are winning non-traditional markets, while traditional games remain strong with young men and boys. Sony is dying, but Apple is thriving. Lastly, what is the device of the future? A tiny iphone? A huge screen?

Key Technologies:

Key Companies: Hulu, Microvision, ABC/Disney

Smart Home (related: Home Entertainment, Pervasive Computing)

Key Issue: Will people even want home that anticipate your needs? Do you want to stick a light switch wherever you want, even without wires?

Key Technologies: Wireless, Home Networks

Key Companies and Demos: Microsoft Smart Home, ZigBee, Apple

The Future of Mobile Applications and Entertainment

Key Issues: Some people thought this was old when the palm pilot was passé. The iphone has signaled a coming tidal wave: air hockey brings \$20K per day. What will be the ultimate form factor? A netbook? Or an iphone sized device?

Key Companies: Apple, etc.

Other topics

Nanotechnology – any part of it

Issue: Nano this and Nano that. You can choose almost any topic in nanotechnology. Nanowires are a key part of making working nanodevices. Amazing products can be made if nanowires are a reality.

Key Entities: UC Berkeley, Nanosys, QuMat Technologies.

Local Companies: UW Center for Nanotechnology