

**IPRO 341 Team Members**

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**What is Nanotechnology?**

Nanotechnology is a technology based on the nanoscale (1/1000000000 of a meter). Scientists are able to construct things from the ground up, by organizing atoms together one by one, until a larger object is made.

**How small is nano?**

- Human hair is 50,000 nm in diameter
- The smallest object visible to humans is 10,000 nm
- 10 hydrogen atoms in line equals 1 nm

**Nanotechnology applications**

- Adhesive bandages, where silver nano-particles mixed in the dressing area help to heal the wound faster
- Drug delivery patches where nano-sized medicine particles are absorbed through the skin
- Socks that contain small silver particles to keep the foot smelling fresh all day
- Sporting goods – tennis balls, golf balls and bowling balls perform better
- Cosmetic products – sunscreen and anti-aging cream

**Why should we care?**

- It is already in use in some common products today, and according to the Woodrow Wilson Report, 54% of the public knows nothing about nanotechnology.
- President Bush said, "I propose to double the federal commitment to the most critical basic research programs. This funding will support. . . promising areas such as nanotechnology, supercomputing, and alternative energy sources."
- Certain possible risks have not been evaluated and accessed by regulatory agencies.

**PROBLEM STATEMENT:**

Our goal is to find a clear, understandable and unbiased provider of information on nanotechnology. We have also taken an extensive look at how information about nanotechnology is distributed to the general public, as well as some possible and current applications of nanotechnology.

**OPPORTUNITIES:**

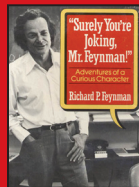
Nanotechnology offers opportunities to improve efficiency and sustainability. The National Nanotechnology Initiative (NNI) established a list of "Grand Challenges", which would be targeted for funding in the first year of the NNI:

1. Nanostructured materials by design-stronger, lighter, harder, self-repairing, and safer
2. Nanoelectronics, optoelectronics, and magnetics
3. Advanced healthcare, therapeutics, and diagnostics
4. Nanoscale processes for environmental improvement
5. Efficient energy conversion and storage
6. Microcraft space exploration, and industrialization
7. Bionanosensors for communicable disease and biological threat detection
8. Applications to economical and safe transportation
9. Applications to national security

1950 1955

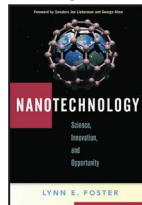
**NANO History Timeline**

**1959:** Richard Feynman's "There's Plenty of Room at the Bottom" milestone speech

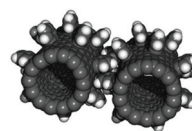


1960 1965 1970 1975 1980 1985 1990 1995

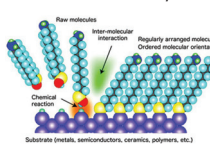
**1974:** Word nanotechnology was first used by a man named Norio Taniguchi.



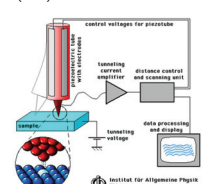
**1974:** Mark Ratner and A. Aviram of IBM proposed that individual molecules may exhibit the behavior of basic electronic devices



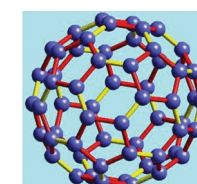
**1980:** Researchers found that a chemical-thiol would spontaneously react with a gold surface to assemble in layers



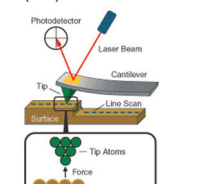
**1981:** Scanning Tunneling Microscope (STM) was invented



**1985:** The buckyball discovered



**1986:** the Atomic Force Microscope (AFM)



**1997:** Zyvex, the first nanotech company was founded



**1999:** National Nanotech Initiative

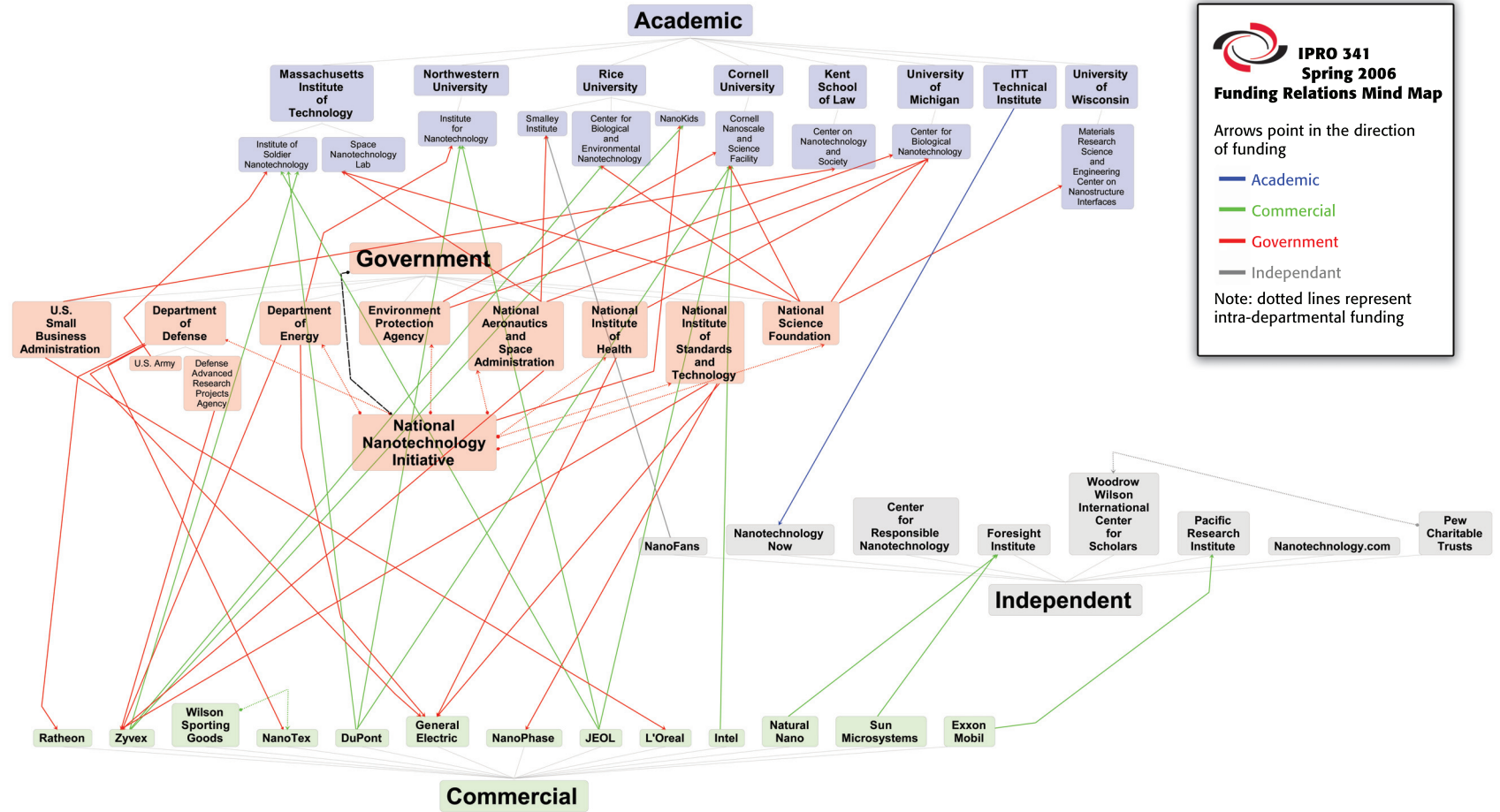

## CONCLUSION:

Our research leads us to conclude that nanotechnology needs information sources that take a step back from the disjointed and inconsistent approach now taken by current stakeholders. Nanotechnology, being such a dynamic technology, possesses the potential to change the way our society functions.

### Common elements identified:

- Each organization and provider of information has its own agenda to promote and support
- The information provided has a bias on some level, whether it is content presented or affiliations recognized
- Almost all funding could be traced back to government money (e.g. NNI) either directly or indirectly

Thus, we conclude that there is a need for a source that generates public awareness as well as participates in public discourse, which does not have influencers that could raise doubt about its integrity and reliability, and shares information that is easily accessible as well as credible.

**IPRO 341**  
Spring 2006  
**Funding Relations Mind Map**

Arrows point in the direction of funding

- Academic
- Commercial
- Government
- Independent

Note: dotted lines represent intra-departmental funding

2000

2005

2010

2015

2020

2025

2030

2035

2040

2045

## NANO History Timeline (Continued)

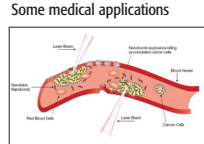
**Pre-2010:**  
Nanotechnology itself revolution  
Low-power, high-density computer memory



**Pre-2010**  
Longer lasting batteries



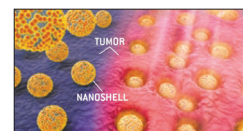
**Pre-2010**  
Some medical applications



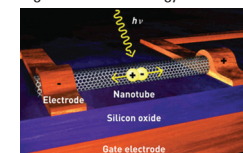
**2015**  
Advances in computer processing



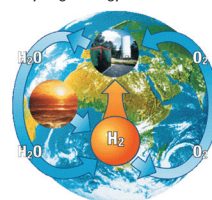
**2020**  
New medical materials



**2025**  
Energy resolution:  
High effective solar energy



**2025**  
Hydrogen energy



**2045:**  
Robotics revolution: Intelligence Robot (as a cheap manual labor)

