

Leading Sectors of Nanotech Opportunities

BioNano encompasses applications in traditional Life Science sectors plus other applications in

- Information Technology
- Energy / Environmental
- Materials.

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NanoBio Enables Revolutionary Products

NanoBio enables bio solar cells, dense bio memory, new structures, etc.

Technology	Devices	Tools	Materials and Molecules	Models & Simulations
Information Technology	MEMS, FPDs, modified semiconductors, sensors, plastic electronics, nanotubes	STM, MEMS, lithography, MBE, AFM, ALD, NMR	Plastic electronics, nanofilms for data, optics, nanotubes, nanowires, cooling, +	Quantum Scale Simulations
Life Sciences	Medical implants, drug delivery, acceleration of clinical trials	STM, MBE, AFM, NMR/ MRI	Pharma production artificial kidney/liver, coated therapeutics, medical implants, organ regeneration	Bio-simulations, drug discovery, acceleration of trials
Energy / Environment	Organic solar cells, sensors	STM, lithography, MBE, AFM, NMR	Enzymes, Catalysts, Solar Absorbers + coatings, Medical implants, membranes	Weather & Global Warming
Industrial	Wear/failure sensors, wireless sensors, other sensors	STM, lithography, MBE, AFM, NMR	Thermal dissipation, wear reduction, electro-chromic paints & glass, window materials, +++	Nanostructure design

Legend Suitable Early Stage Very Long Term
Not for VCs

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Selected NanoBio Opportunities

- Nano for Life Sciences - Enhancing biology
 - Equipment and molecules for disease screening / diagnosis
 - Molecules and organisms to correct environmental problems
 - Targeted delivery of standard therapeutic agents
 - New and customized therapeutic agents
 - Plastic nanoelectronics to provide bioanalysis and display
- Nano for Other Apps using Biology
 - Wireless sensors for biological or chemical process monitoring
 - Cost-effective solar electric devices using bio absorbers
 - Solar energy to direct chemical energy conversion using biological organisms (Biomemetic)
 - Nano membranes with bio-type pores for fluid processing

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NanoBio Advantages

- NanoBio approaches generally provide higher efficiency and/or effectiveness than alternatives
- Many sectors not directly in the life science field will benefit from NanoBio solutions (i.e. biological organisms that digest pollutants).
- NanoBio approaches to solutions usually generate the least quantity of by-products and waste.

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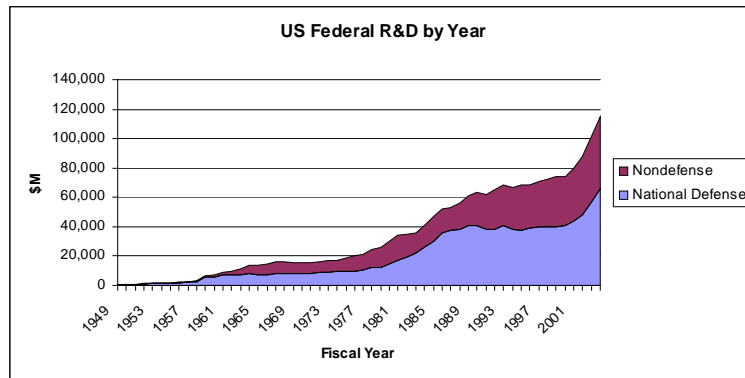
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NanoBio Inventions From Gov't R&D

- Federal R&D funding is good in some areas
- NanoBio is growing its share of federal R&D every year
- Commercializing that R&D provide opportunities



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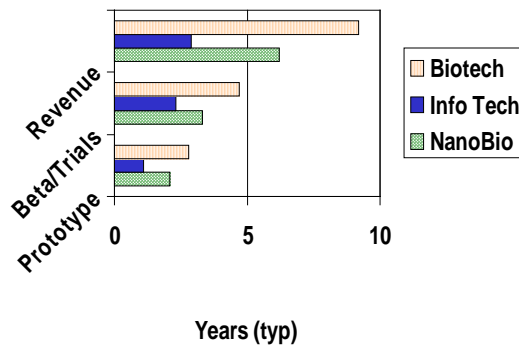
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NanoBio - Longer Time-to-Market

- Products tend to be revolutionary with large markets
- Multiple skill sets required - chemistry, biology, physics, engineering
- Longer testing needed before revenue
- Some applications require Gov't approval

NanoBio Timeline Comparisons



Note: Time from first venture round, or first large corporate investment to each stage based on PwC, Venture Economics, Alameda Estimates

Data from Alameda database for NanoBio with some data forecasted.

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