

## Congressional Overview

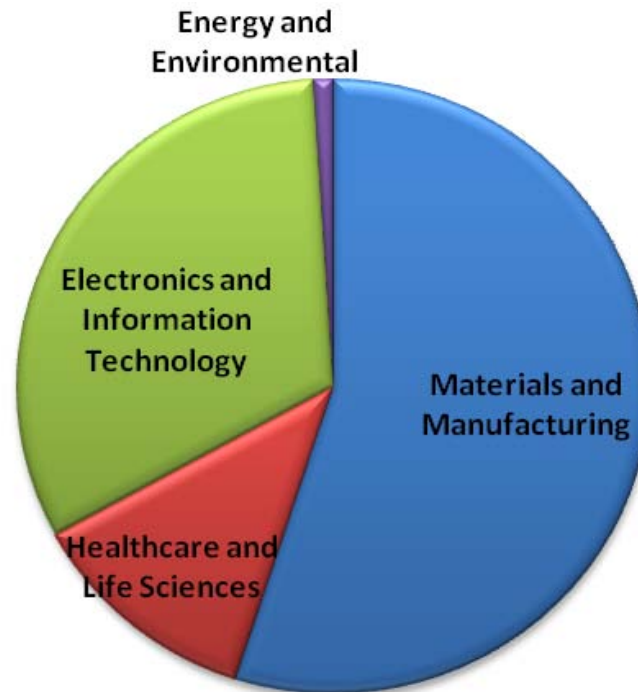
# Liquidia Technologies

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April 2011

# Commercialization of Nanotechnologies

- \$12 billion investment by 25 Federal agencies over the past decade
- Hundreds of nanotechnology products commercialized and in development, incorporated into thousands of products
- Representing \$29B in worldwide revenue in 2009; \$11B manufactured in the United States by small and large corporations

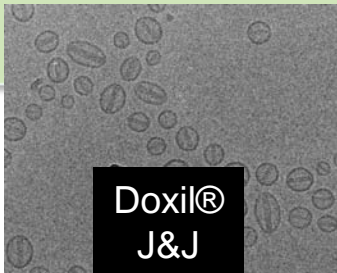


# Impact and Growth Potential for Nanomedicines

- Nanomedicine technologies have potential for ***transformational impact*** on the diagnosis, prevention and treatment of human disease
- Economically, life science applications of nanotechnology represent the largest growth opportunity with the high-margin products

## Therapeutics

- Targeted Delivery
- Delivery of new classes of biologic therapeutics
- Enhanced Efficacy
- Increased Safety



## Vaccines

- Synthetic carriers
- Enabling next generation biologics
- Enhanced immunogenicity
- Increased safety
- Ease of manufacturing

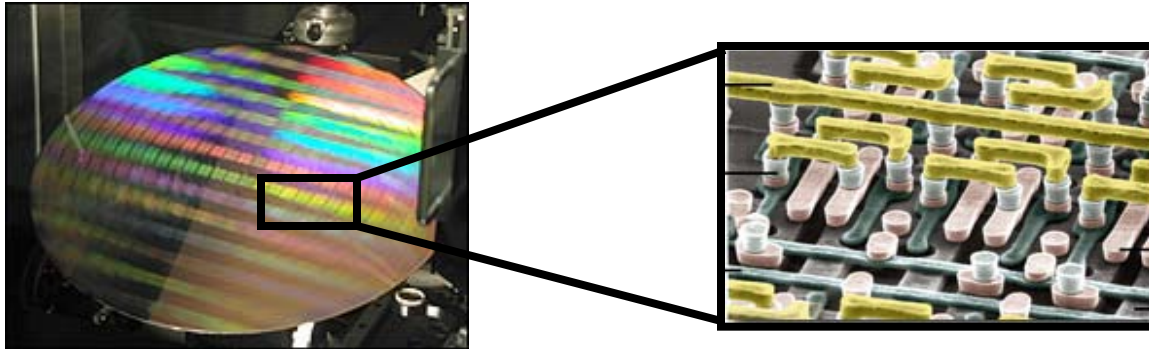


## Diagnostics and Imaging

- Rapid detection
- Inexpensive tools
- Multiplex measurements
- Real-time monitoring
- Early identification





# Technology Advances in Electronics enables Relevant Sizes for Life Science

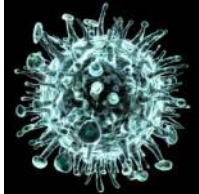


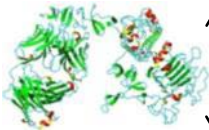
Year	Processor	Number of Transistors	Transistor Size
1971	4004	2,300	10 micron
1974	8080	6,000	6 micron
1978	8086	29,000	3 micron
1985	80386	275,000	1.5 micron
1989	Intel 486	1.2 million	1.0 micron
1993	Pentium	3.1 million	800 nm
1997	Pentium II	7.5 million	350 nm
1999	Pentium III	9.5 million	250 nm
2000	Pentium IV	42 million	130 nm
2004	Itanium 2	592 million	90 nm
2007	Dual-Core Xeon	1.3 billion	65 nm
2010	Core I7	1.3 billion	45 nm

Decreasing Size

Red Blood cell  8  $\mu\text{m}$

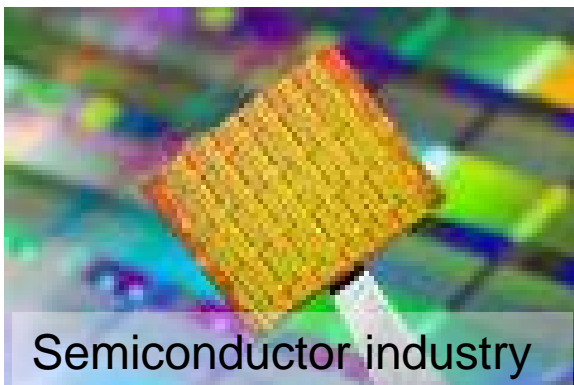
E. Coli bacteria  500 nm x 2  $\mu\text{m}$

Flu virus  80 nm

Herceptin  9 nm

# Liquidia's Core Nanomanufacturing Technology (PRINT<sup>®</sup> Platform)

**Uniquely merging the scale and cost paradigm of the printing industry  
with the precision and uniformity of the semiconductor industry**

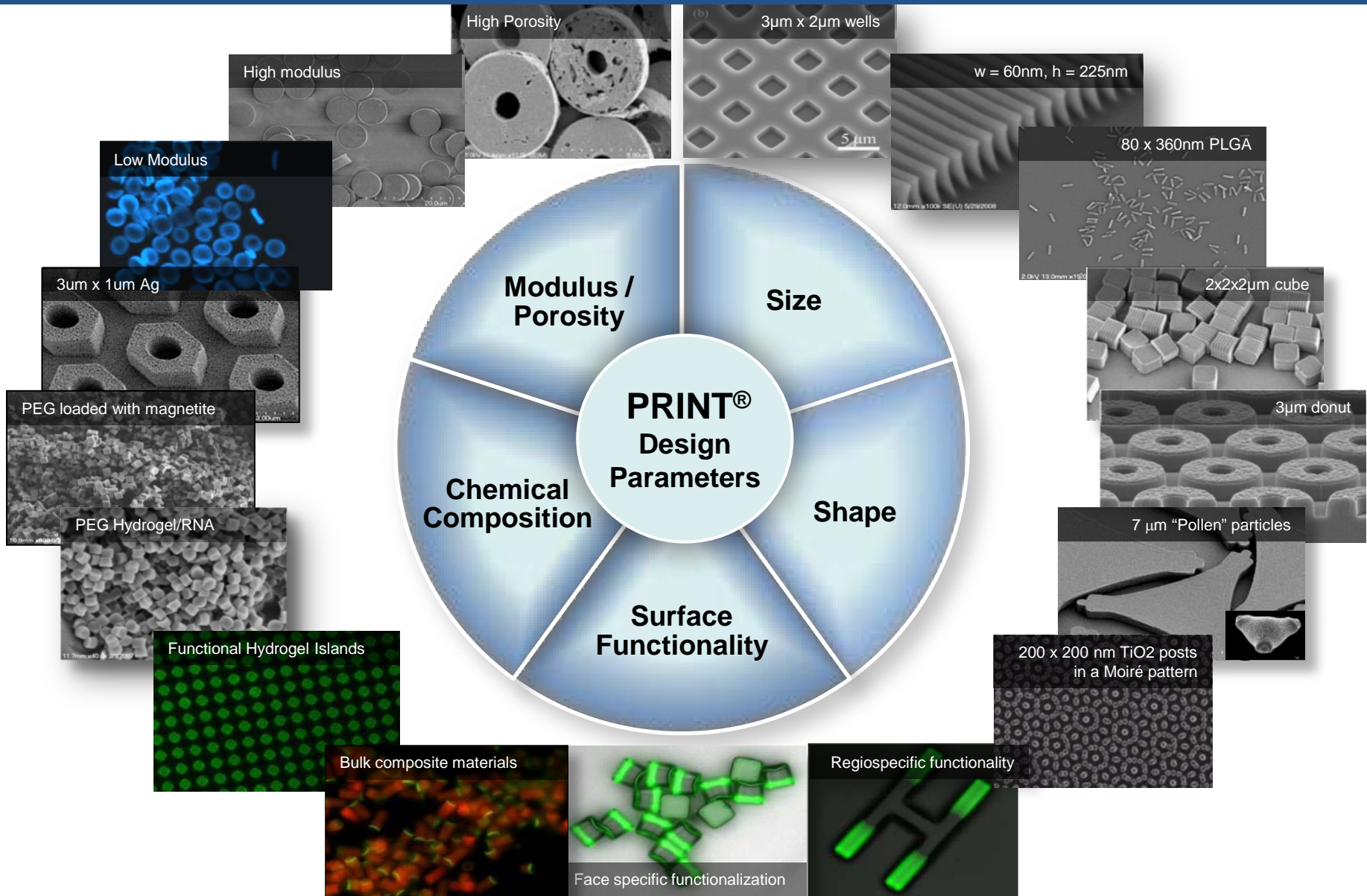


Leveraging  
existing  
US knowledge  
base



**Generating proprietary, scalable US nanomanufacturing capability**

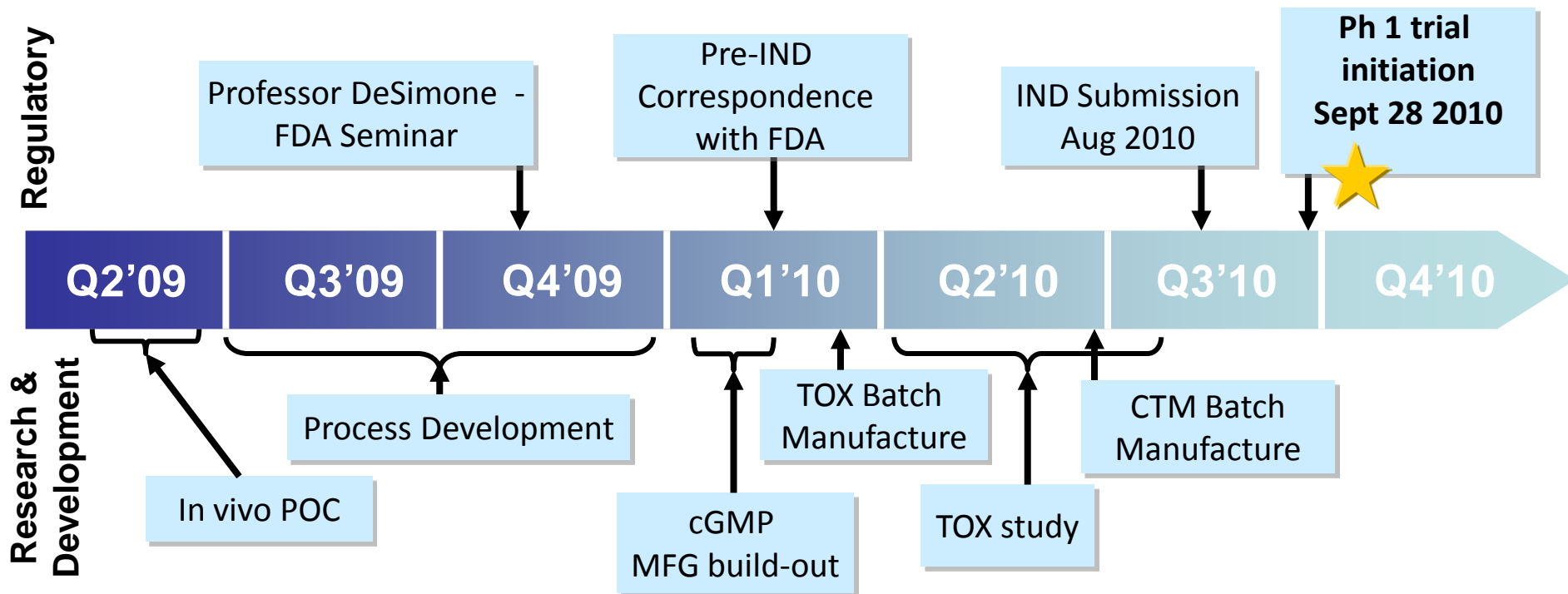
# Extremely Uniform, Shape-Specific Particles with a Wide Range of Chemical Composition



# Nanoparticle Vaccine Development Plan

## Technology Development and Interaction with Regulatory

- From discovery of the basic process to the clinic in 5 years
- Early conversations with the FDA pave the way for a smooth regulatory process
- Success largely attributed to particle precision and uniformity inherent to PRINT process



# PRINT Technology Development Government Agency and Technology Center Support



CAROLINA CENTER of CANCER  
NANOTECHNOLOGY EXCELLENCE

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NCI Alliance for  
**Nanotechnology**  
in Cancer

**NIST**



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*Revolutionary Research . . . Relevant Results*