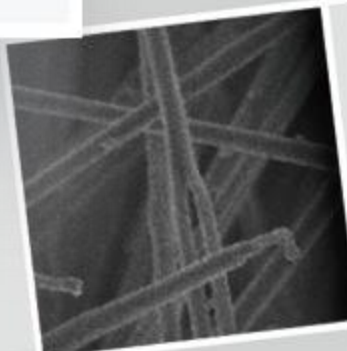
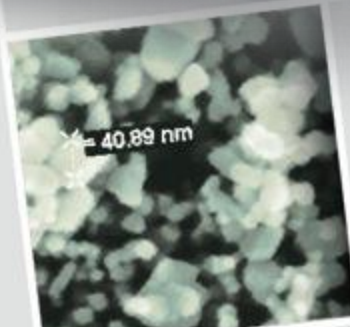


Building College-University  
Partnerships for Nanotechnology  
Workforce Development

# Nanotechnology in Consumer Products

October 31, 2014

**The webinar will begin at 1pm Eastern Time**



**Perform an audio check by going to  
Tools > Audio > Audio Setup Wizard**

# Whiteboard

AUDIO & VIDEO



NetWorks Admin

Talk Video

PARTICIPANTS

NetWorks A...  
Moderator

MAIN ROOM (3)

NetWorks Admin  
Moderator (You)

mike mac

mike pc #2

**Participant  
Box**

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**Chat Box**

Room Moderators



# Nanotechnology in Consumer Products

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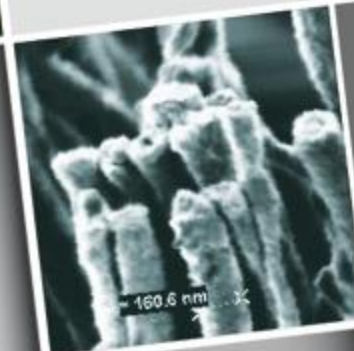
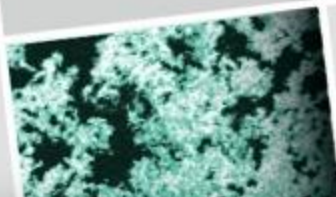
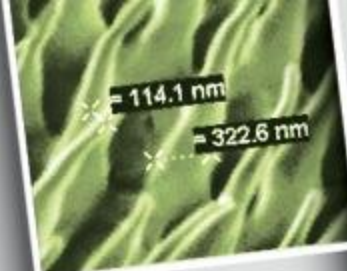
Nanotechnology in Consumer  
Products

October 31, 2014

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POLLS



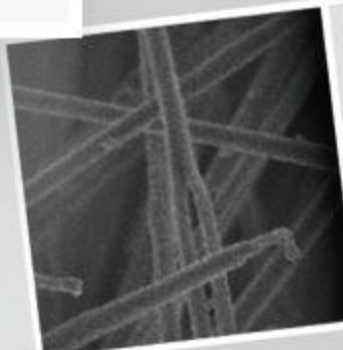
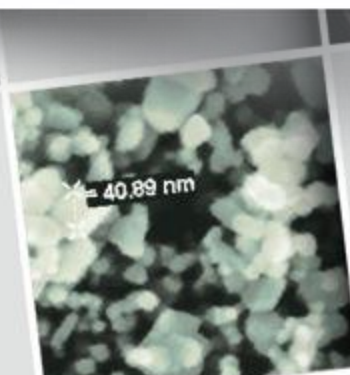


Building College-University  
Partnerships for Nanotechnology  
Workforce Development

# Nanotechnology in Consumer Products

October 31, 2014

**The webinar will begin at 1pm Eastern Time**



**Begin Recording**

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The NACK Network, established at the Pennsylvania State College of Engineering, and funded in part by a grant from the National Science Foundation (DUE 1205105).



Hosted by MATEC NetWorks [www.matecnetworks.org](http://www.matecnetworks.org)

# Today's Presenter



Dr. Marina Vance is the Associate Director of Virginia Tech's Center for Sustainable Nanotechnology (VTSuN). She received her Ph.D. in Civil and Environmental Engineering from Virginia Tech in 2012. Her research interests encompass human exposure to emerging contaminants, such as nanomaterials, and the environmental implications and applications of nanotechnology.



**Moderator: Robert Erhmann,  
NACK Network**



**Moderator: Mike Lesiecki  
MATEC**



# Objectives

Provide an overview of nanotechnology properties and their applications into consumer products.

Present the Wilson Center's Nanotechnology Consumer Products Inventory

## Outline

- Definition of nano
- Some nanomaterial properties
- Nanomaterial applications into consumer products
- Consumer products inventory

[www.nanotechproject.org/cpi](http://www.nanotechproject.org/cpi)

# Who is joining us?

## Poll question

What is your occupation?

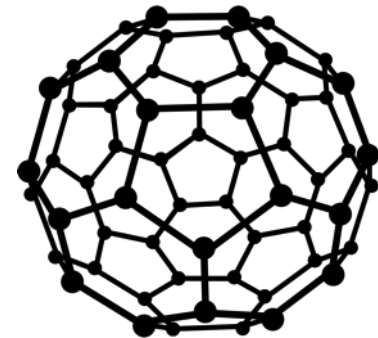
- A. Student
- B. Instructor: K-12
- C. Instructor or researcher: college/university
- D. Industry or other

# Who is joining us?

## Poll question

How familiar are you with nanotechnology?

- A. Nano what???
- B. A little bit familiar
- C. Somewhat familiar
- D. I can teach a course on it!



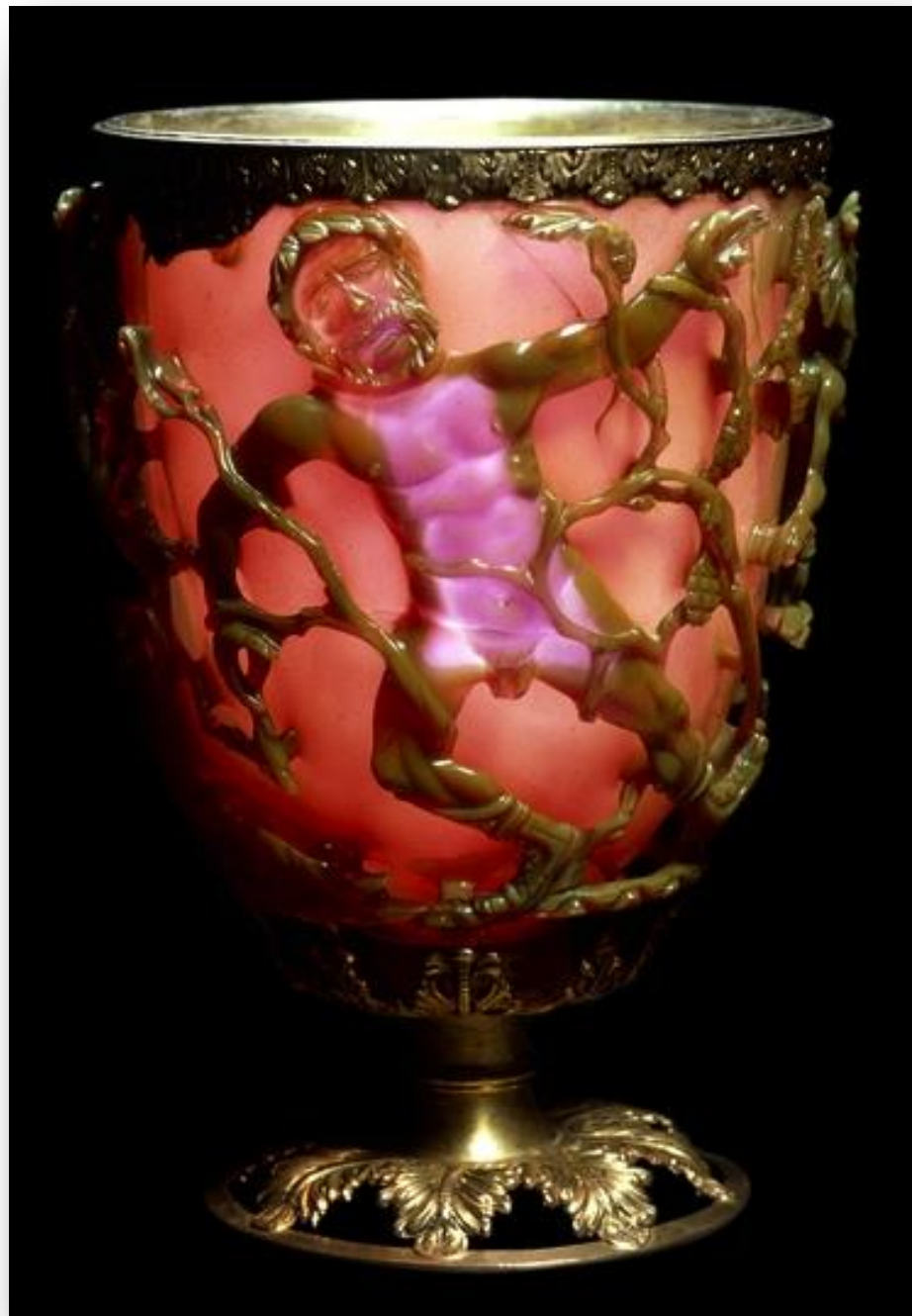
**Lycurgus Cup**  
**4<sup>th</sup> Century AD**  
**Roman**

The British  
Museum



**Lycurgus Cup**  
**4<sup>th</sup> Century AD**  
**Roman**

The British  
Museum





# What is nanotechnology?

## Multiple criteria:

- Scale of approximately 1 - 100 nanometers
- Novel or enhanced properties due to small size

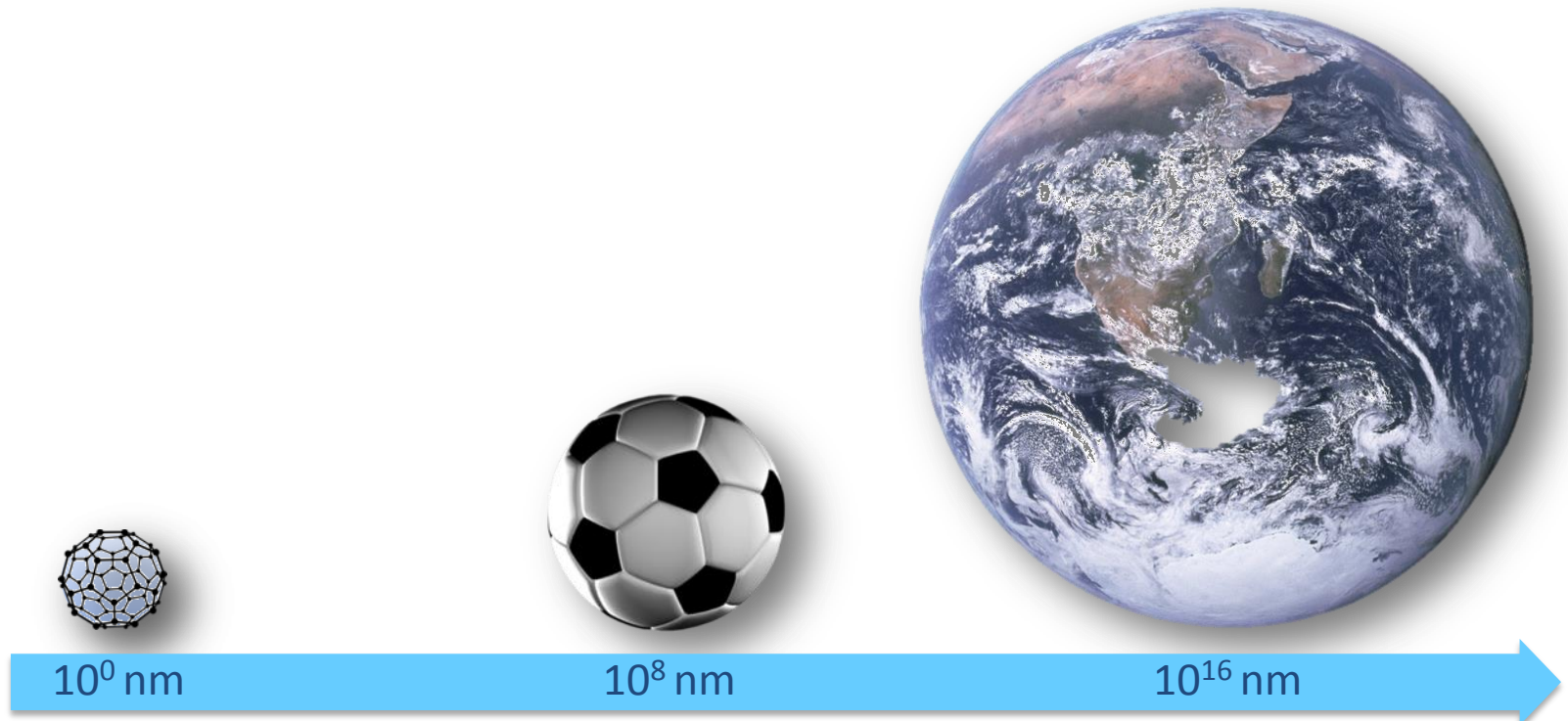


National  
Nanotechnology  
Initiative

# What is nanotechnology?

## Multiple criteria:

- Scale of approximately 1 - 100 nanometers
- Novel or enhanced properties due to small size



# What is nanotechnology?

## Multiple criteria:

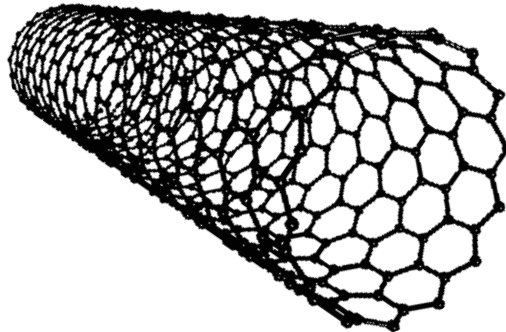
- Scale of approximately 1 - 100 nanometers
- Novel or enhanced properties due to small size

1 D nanomaterial



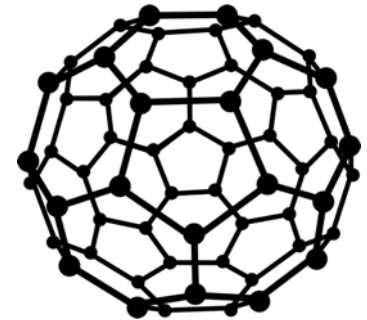
graphene

2 D nanomaterial



carbon nanotube

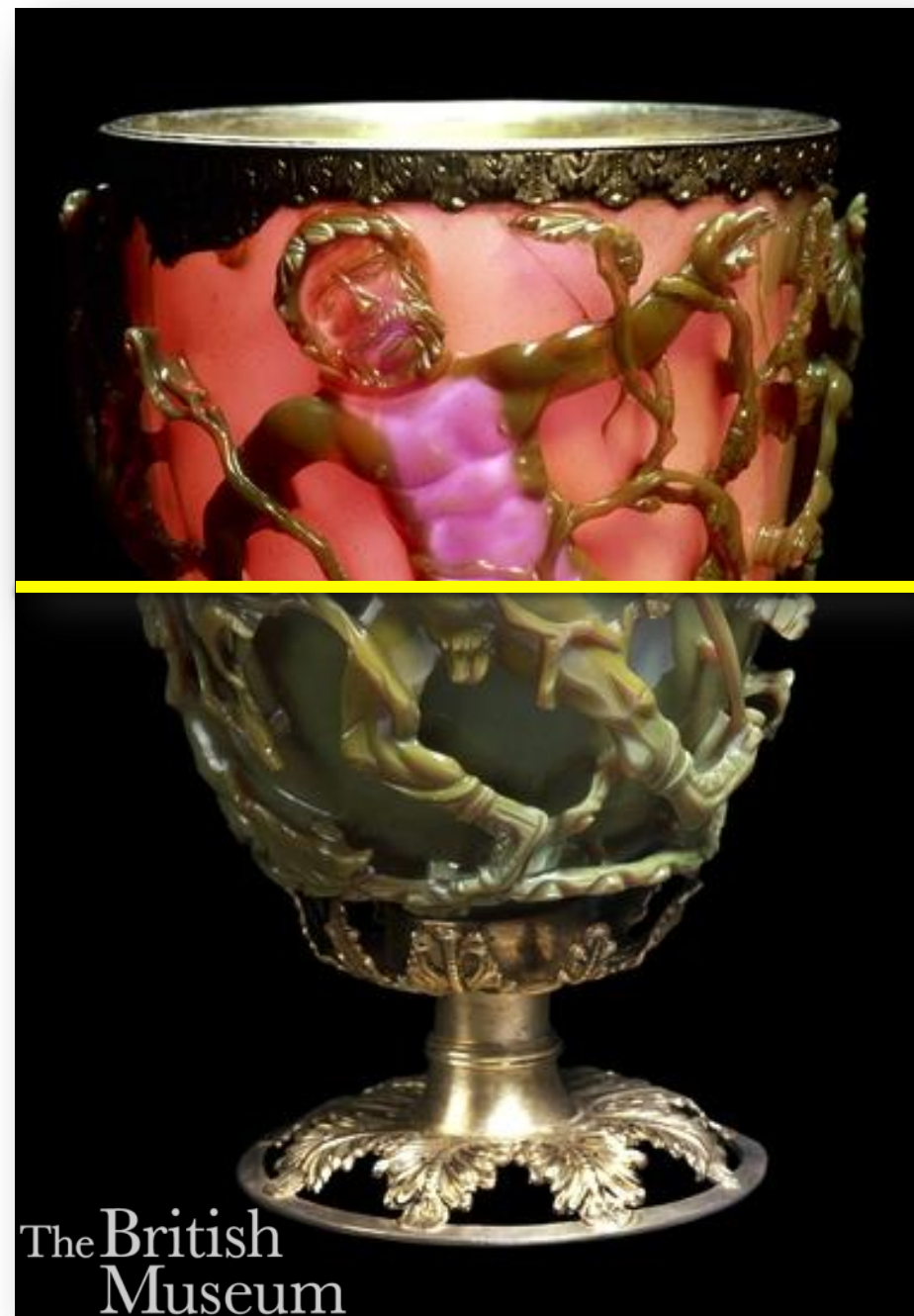
3 D nanomaterial



fullerene

# Lycurgus Cup

4<sup>th</sup> Century AD  
Roman



# Lycurgus Cup

4<sup>th</sup> Century AD  
Roman



[1]

[2]

## Poll question

What nanomaterials are these?

- A. [1] is gold, [2] is mercury
- B. [1] is gold, [2] is silver
- C. [1] is silver, [2] is gold
- D. I have no idea



# Lycurgus Cup

4<sup>th</sup> Century AD  
Roman



silver

gold



The British  
Museum

# Nanomaterials – some properties

- Optical behavior
- Electrical conductivity
- Hardness and Strength
- Enhanced Solubility
- Catalysts
- ... many more



# The Consumer Products Inventory (CPI)

[www.nanotechproject.org/cpi](http://www.nanotechproject.org/cpi)

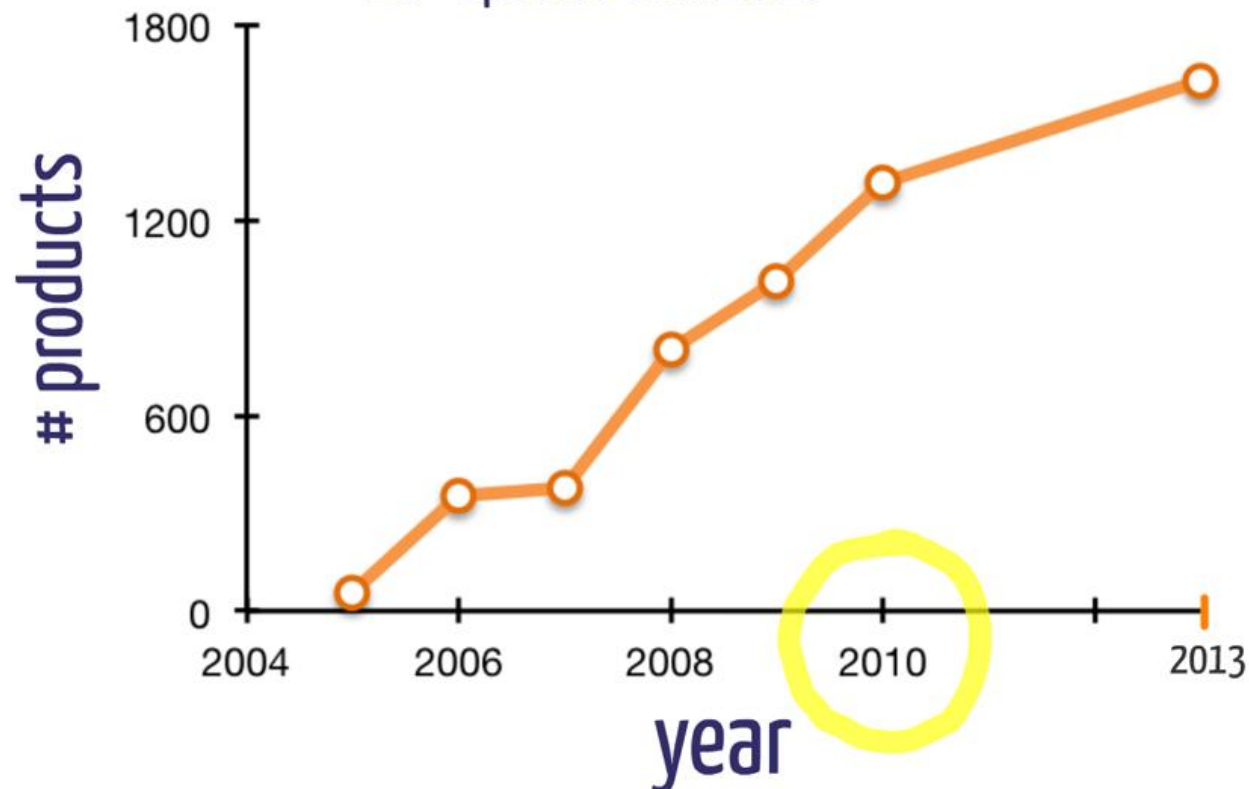


# The Consumer Products Inventory (CPI)



[www.nanotechproject.org/cpi](http://www.nanotechproject.org/cpi)

Developed in 2005

- 200,000+ unique visitors since 2008
- 20+ updates until 2010



# The Consumer Products Inventory (CPI)



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**Scholar**      About 2,360 results (0.06 sec)

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Case law  
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Page 1. Project on Emerging Nanotechnologies [www.nanotechproject.org](http://www.nanotechproject.org) Nature Vol. 444/16 November 2006 pp267-269 ... Page 2. Project on Emerging Nanotechnologies [www.nanotechproject.org](http://www.nanotechproject.org) Nature Vol. 444/16 November 2006 pp267-269 FIVE GRAND CHALLENGES ...  
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[SC Currall](#), [EB King](#), N Lane, [J Madera](#)... - Nature ..., 2006 - [nature.com](http://nature.com)  
... References. A Nanotechnology Consumer Products Inventory <[www.nanotechproject.org/44/consumer-nanotechnology](http://www.nanotechproject.org/44/consumer-nanotechnology)> (2006). ... Maynard, A. Nanotechnology: A Research Strategy for Addressing Risk <[www.nanotechproject.org/file\\_download/77](http://www.nanotechproject.org/file_download/77)> (2006). Maynard, A. et al. ...  
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Sort by date

**Nano-silver-feasibility and challenges for human health risk assessment based on open literature**  
FM Christensen, HJ Johnston, V Stone... - ..., 2010 - [informahealthcare.com](http://informahealthcare.com)  
... The unique properties of many types of nanomaterials have led to their increasing manufacture and use in many promising applications. Nano-silver is already widely used in many applications (<http://www.nanotechproject.org/>). ...  
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☒ include patents  
☒ include citations



# The Consumer Products Inventory (CPI)

Google

Scholar

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Articles

Case law

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Any time

Since 2014

Since 2013

Since 2010

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☒ include patents

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## Safe handling of nanotechnology

[A Maynard](#), [RJ Aitken](#), T Butz, V Colvin... - NATURE- ..., 2006 - [mail.nanotechproject.org](mailto:mail.nanotechproject.org)  
Page 1. Project on Emerging Nanotechnologies [www.nanotechproject.org](http://www.nanotechproject.org) Nature Vol. 444/16 November 2006 pp267-269 ... Page 2. Project on Emerging Nanotechnologies [www.nanotechproject.org](http://www.nanotechproject.org) Nature Vol. 444/16 November 2006 pp267-269 FIVE GRAND CHALLENGES ...  
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## What drives public acceptance of nanotechnology?

[SC Currall](#), [EB King](#), N Lane, [J Madera](#)... - Nature ..., 2006 - [nature.com](http://nature.com)  
... References. A Nanotechnology Consumer Products Inventory <[www.nanotechproject.org/44-consumer-nanotechnology](http://www.nanotechproject.org/44-consumer-nanotechnology)> (2006). ... Maynard, A. Nanotechnology: A Research Strategy for Addressing Risk <[www.nanotechproject.org/file\\_download/77](http://www.nanotechproject.org/file_download/77)> (2006). Maynard, A. et al. ...  
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## Nano-silver-feasibility and challenges for human health risk assessment based on open literature

[FM Christensen](#), [HJ Johnston](#), V Stone... - ..., 2010 - [informahealthcare.com](http://informahealthcare.com)  
... The unique properties of many types of nanomaterials have led to their increasing manufacture and use in many promising applications. Nano-silver is already widely used in many applications (<http://www.nanotechproject.org/>). ...  
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# CPI Before and After



Benny the Bear

# CPI Before and After



The Project on Emerging Nanotechnologies



get  
findNano



[HOME](#) > [INVENTORIES](#) > [CONSUMER PRODUCTS](#) > [BROWSE](#) > [ALL PRODUCTS \(A-Z\)](#) >

## Benny the Bear Plush Toy

Company: [Pure Plushy](#)

[PRODUCT WEB SITE](#)

### What They Say

"With the additive of Silver Nanoparticles, our product has been clinically proven to fight against harmful bacteria, molds and mites."

"This technology is widely seen in the medical industry. Silver Nanotechnology is being used to coat surgical tables and equipment to thwart micro organisms."

[Source](#)

### What Others Say

"Pure Plushy combines the use of Memory Foam and Silver Nanotechnology to form the perfect stuffed toy for children with allergies!"

[Source](#)

*Last Updated 07/14/09*



FEBRUARY 27, 2008



ARCHIVE



CATEGORIES

[Goods for Children](#)

[Toys and Games](#)

COUNTRY OF ORIGIN



USA



Print



E-Mail



[what are these?](#) ↑

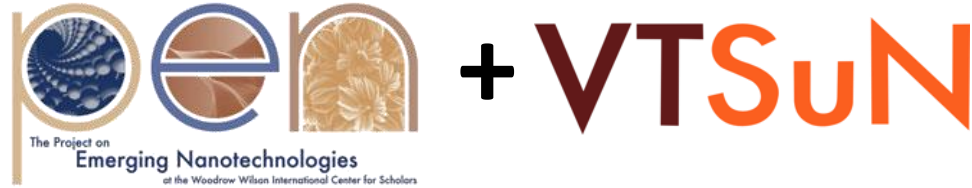
# Our Work



## Objectives:

- Update old entries
- Add scientific validity
- Create a sustainable model

# Upgrading the CPI



## Objectives:

- Update old entries
- Add scientific validity
- Create a sustainable model

### More descriptors:

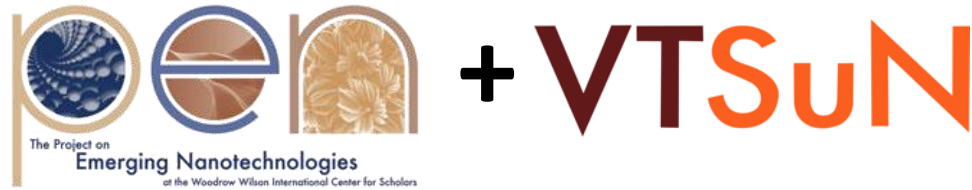
- Type of nanomaterial, size, concentration
- Function of nanomaterial within product
- Location of nanomaterial within product
- Published works from the scientific literature
- Metric to indicate the quality of our own data

*How much do we know?*





# Upgrading the CPI



## Objectives:

- Update old entries
- Add scientific validity
- Create a sustainable model



### Crowdsourcing capability:

- Suggest new products
- Suggest edits to existing products
- Add scientific references
- Post comments



*over 200 users*

*A living, growing tool*



[www.nanotechproject.org/cpi](http://www.nanotechproject.org/cpi)

# Questions?

Please type your questions in the chat box.

  
Advanced Search 🔍

# Benny the Bear Plush Toy

Website [View](#)

Date Added 31 August 2007

Company [Pure Plushy](#)

Country of Origin [USA](#)

Categories [Goods for Children](#)

Subcategories [Toys and Games](#)

## They Say

"With the additive of Silver Nanoparticles, our product has been clinically proven to fight against harmful bacteria, molds and mites." "This technology is widely seen in the medical industry. Silver Nanotechnology is being used to coat surgical tables and equipment to thwart micro organisms." 🔒

## Others Say

"Pure Plushy combines the use of Memory Foam and Silver Nanotechnology to form the perfect stuffed toy for children with allergies!" 🔒

Nina Quadros

[🔗 Suggest edits to this product](#)

[🔗 Suggest a new product](#)

[⚙️ Edit your profile](#)

[🔒 Log-out](#)

## Product Photo



<b>Nanomaterials</b>	Silver
<b>Shape/Dimensions</b>	Nanoparticles, 25 nm
<b>Functions of Nanomaterial</b>	Antimicrobial protection
<b>Location of Nanomaterial</b>	Surface bound particles
<b>Potential Exposure Pathways</b>	Dermal Ingestion
<b>How much we know</b>	Category 2 (Verified claim)
<b>Additional Information</b>	Archive (availability/nano claim can no longer be verified)

## Post a Comment

Your Name

Comments

**Submit**

# How much we know


Classifying products based on what we know about them.

category	claimed by manufacturer	+ supporting information	+ third party information	+ compelling information from multiple sources
1. Extensively verified claim				
2. Verified claim				
3. Manufacturer- supported claim				
4. Unsupported claim				
5. Not advertised by manufacturer				



# How much we know

Classifying products based on what we know about them.

category	claimed by manufacturer	+ supporting information	+ third party information	+ compelling information from multiple sources
1. Extensively verified claim				
2. Verified claim				
3. Manufacturer- supported claim				
4. Unsupported claim				
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# How much we know

Classifying products based on what we know about them.



category	claimed by manufacturer	+ supporting information	+ third party information	+ compelling information from multiple sources
1. Extensively verified claim				
2. Verified claim				
3. Manufacturer- supported claim	✓	✓		
4. Unsupported claim	✓			
5. Not advertised by manufacturer				

# How much we know

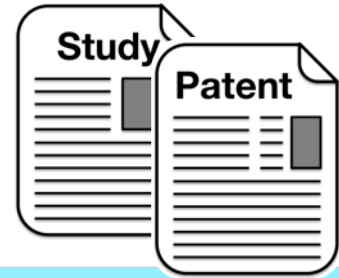
Classifying products based on what we know about them.



category	claimed by manufacturer	+ supporting information	+ third party information	+ compelling information from multiple sources
1. Extensively verified claim				
2. Verified claim	✓	✓	✓	
3. Manufacturer- supported claim	✓	✓		
4. Unsupported claim	✓			
5. Not advertised by manufacturer				

# How much we know

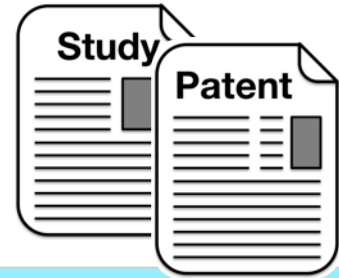
Classifying products based on what we know about them.



category	claimed by manufacturer	+ supporting information	+ third party information	+ compelling information from multiple sources
1. Extensively verified claim	✓	✓	✓	✓
2. Verified claim	✓	✓	✓	
3. Manufacturer- supported claim	✓	✓		
4. Unsupported claim	✓			
5. Not advertised by manufacturer				

# How much we know

Classifying products based on what we know about them.



category	claimed by manufacturer	+ supporting information	+ third party information	+ compelling information from multiple sources
1. Extensively verified claim				
2. Verified claim				
3. Manufacturer- supported claim				
4. Unsupported claim				
5. Not advertised by manufacturer				

<b>Nanomaterials</b>	Silver
<b>Shape/Dimensions</b>	Nanoparticles, 25 nm
<b>Functions of Nanomaterial</b>	Antimicrobial protection
<b>Location of Nanomaterial</b>	Surface bound particles
<b>Potential Exposure Pathways</b>	Dermal Ingestion
<b>How much we know</b>	Category 2 (Verified claim)
<b>Additional Information</b>	Archive (availability/nano claim can no longer be verified)

## Post a Comment

Your Name

Comments

**Submit**



## Related Products (similar nanomaterials and/or categories)

Sort by

### Donny the Dog Plush Toy

**Company:** Pure Plushy

**Category:** Goods for Children > Toys and Games

**Origin:** USA

**Nanomaterial:** Silver

**How much we know:** Category 2 (Verified claim)



### Odor Removal Sticker

**Company:** J International CityM Korea Co., Ltd.

**Category:** Goods for Children > Toys and Games

**Category:** Home and Garden > Home Furnishings

**Origin:** Korea

**Nanomaterial:** Silver



# Consumer Products Inventory: Data Overview

## Poll question

Roughly how many products do you think are listed in the CPI?

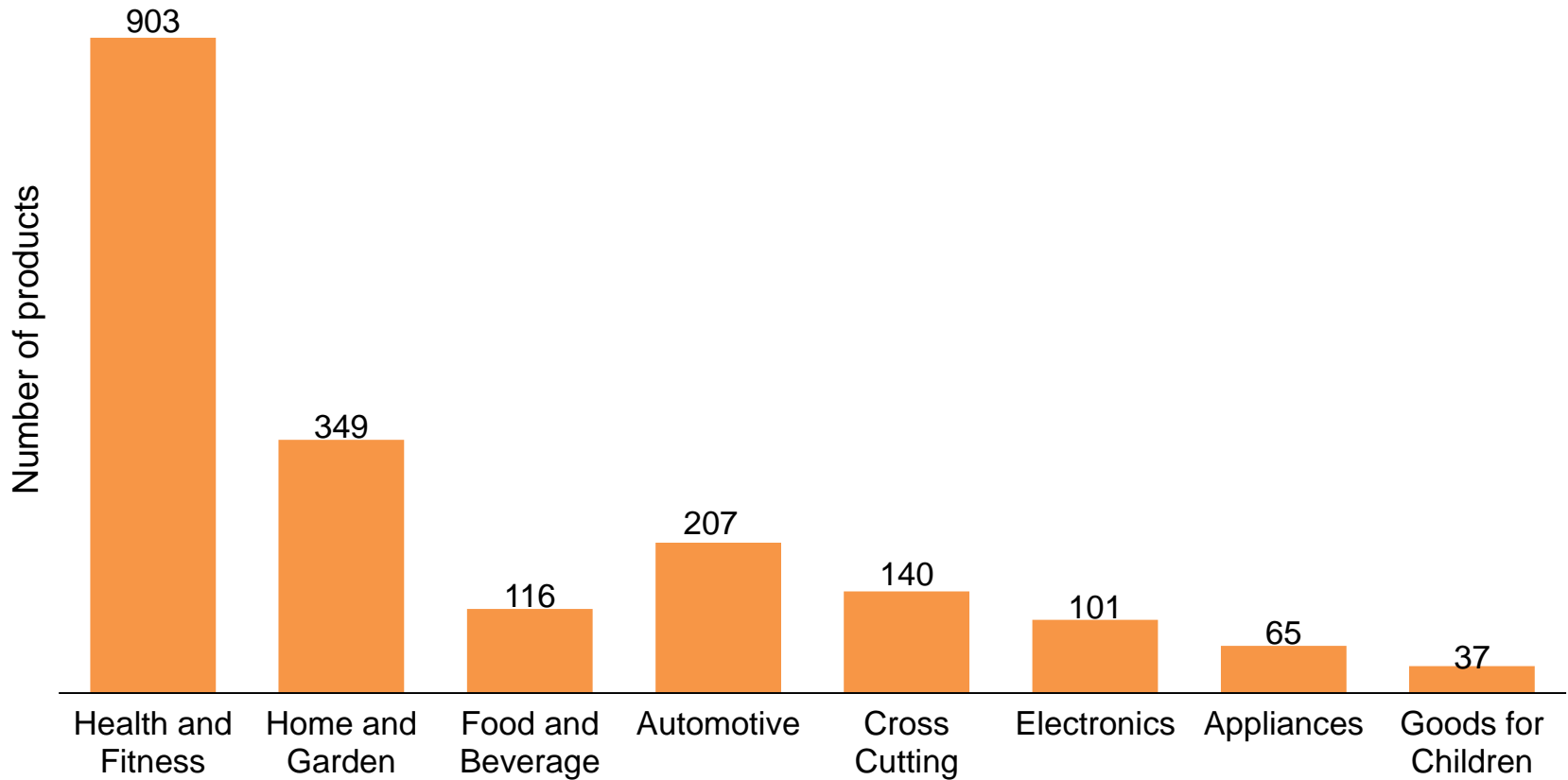
- A.  $< 100$
- B.  $\sim 500$
- C.  $\sim 1000$
- D.  $> 1500$

# Consumer Products Inventory: Data Overview



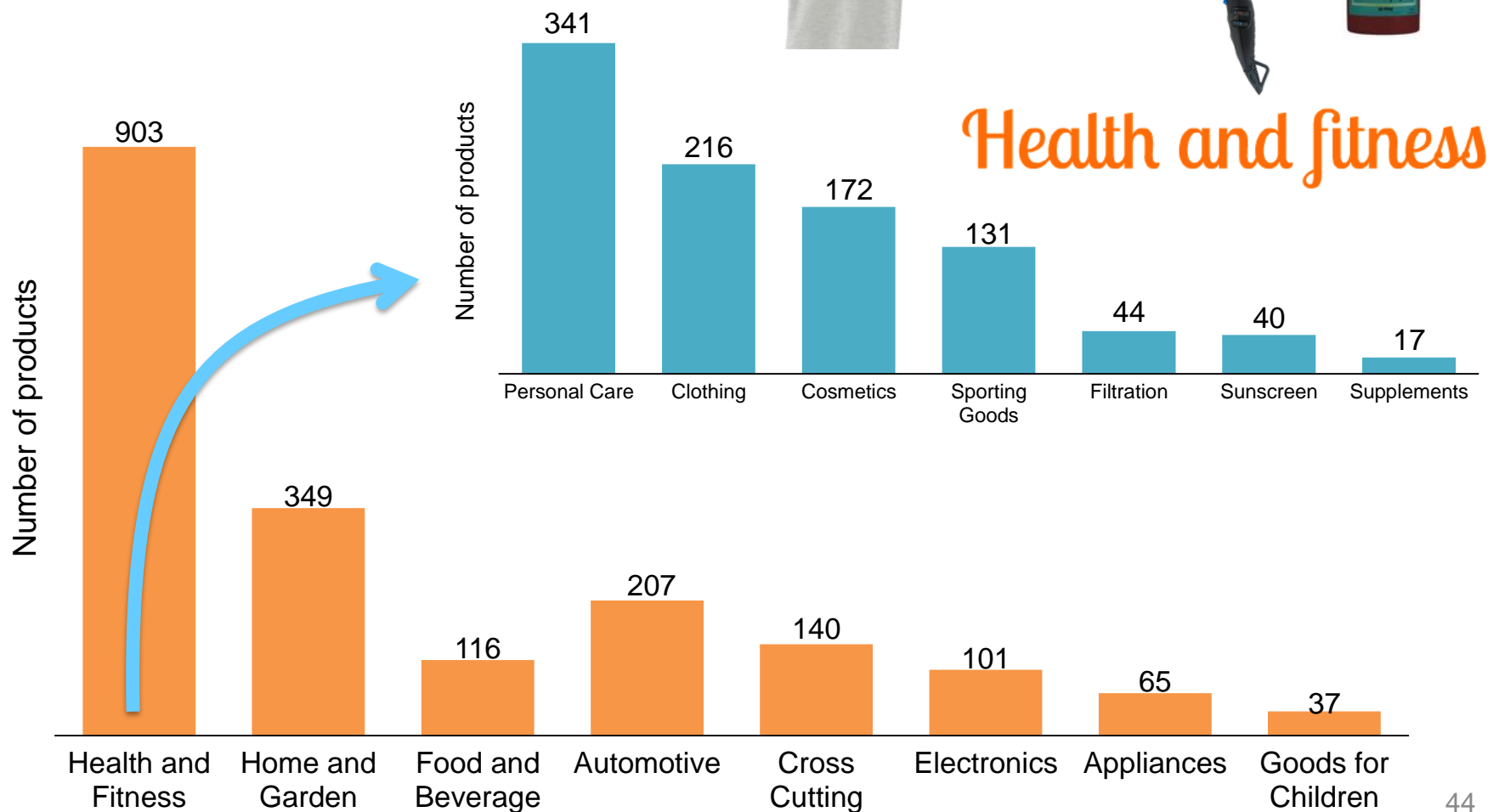
# CPI Overview

## Product Categories



# CPI Overview

## Product Categories



# Consumer Products Inventory: Data Overview

## Poll question

What do you think is the most popular nanomaterial composition in the CPI?

- A. Carbon nanotubes
- B. Silver nanoparticles
- C. Titanium dioxide
- D. Zinc oxide



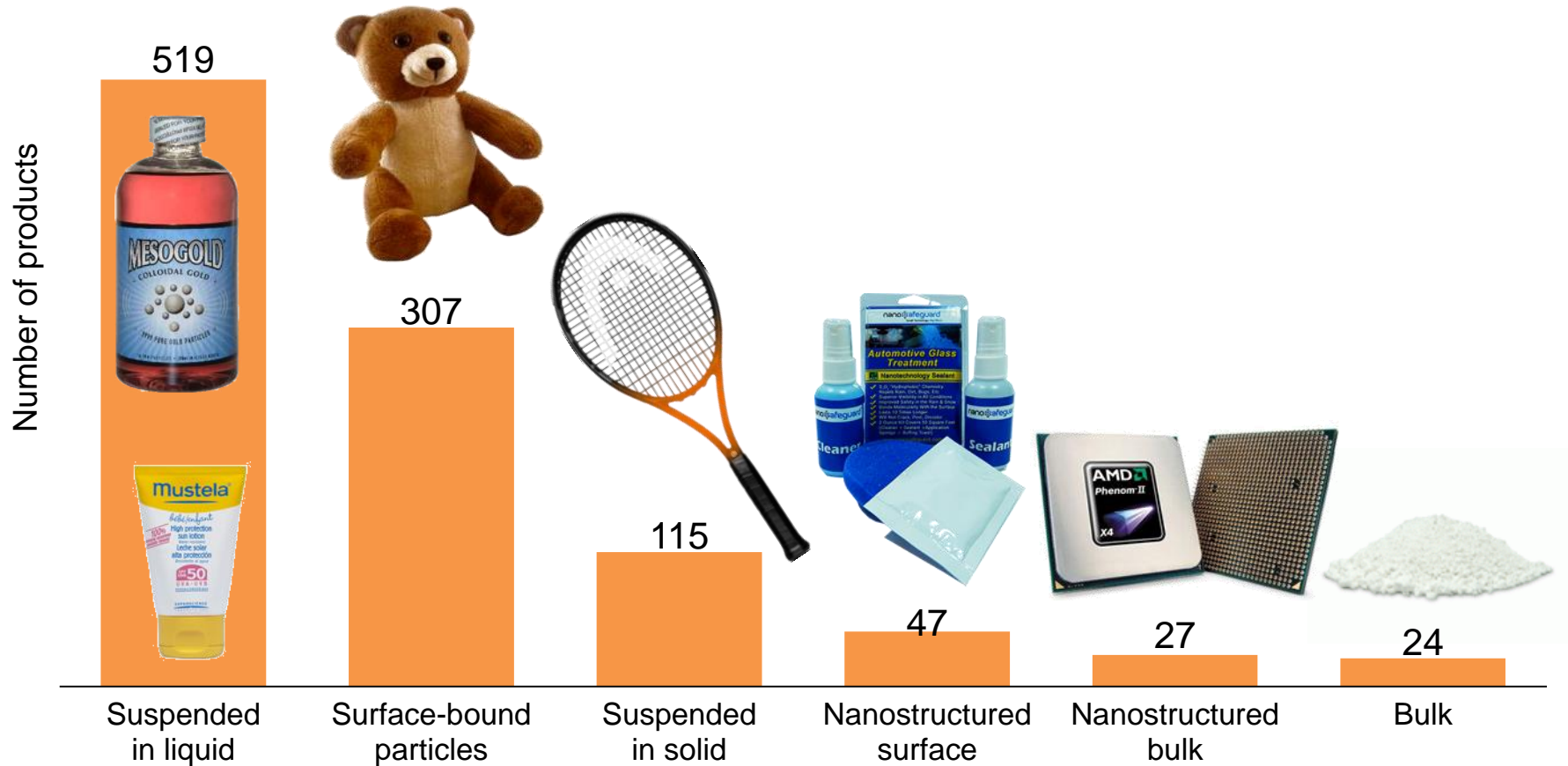
# CPI Overview

## Major materials



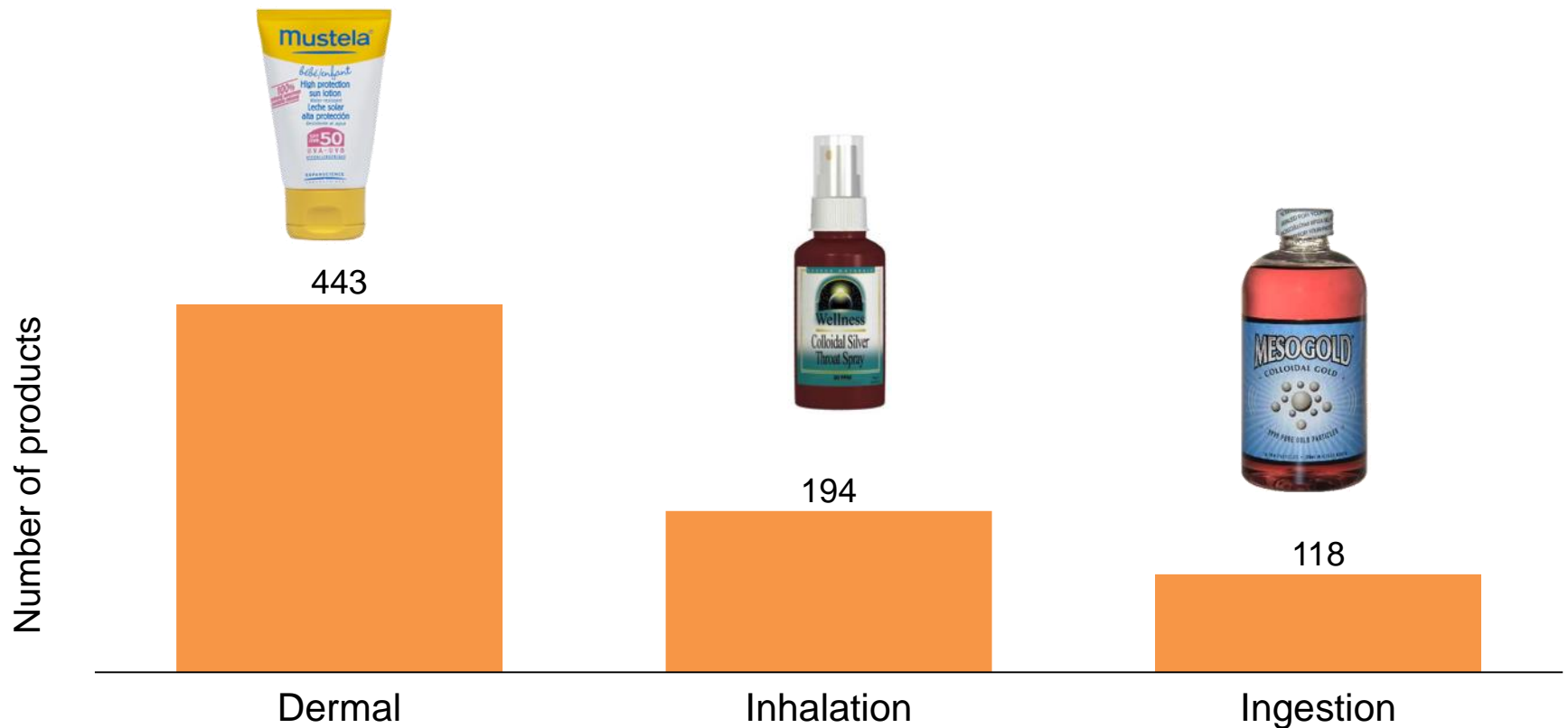
# CPI Overview

## Location of nanomaterials



# CPI Overview

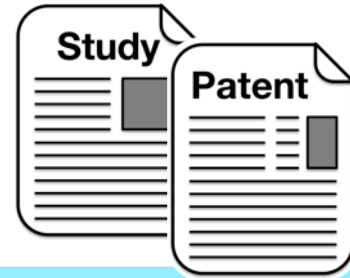
## Potential exposure pathways



*Exposure  $\neq$  Toxicity*

# How much we know

Classifying products based on what we know about them.



category	claimed by manufacturer	+ supporting information	+ third party information	+ compelling information from multiple sources
1. Extensively verified claim	✓	✓	✓	✓
2. Verified claim	✓	✓	✓	
3. Manufacturer- supported claim	✓	✓		
4. Unsupported claim	✓			
5. Not advertised by manufacturer			✓	

# Consumer Products Inventory: Data Overview

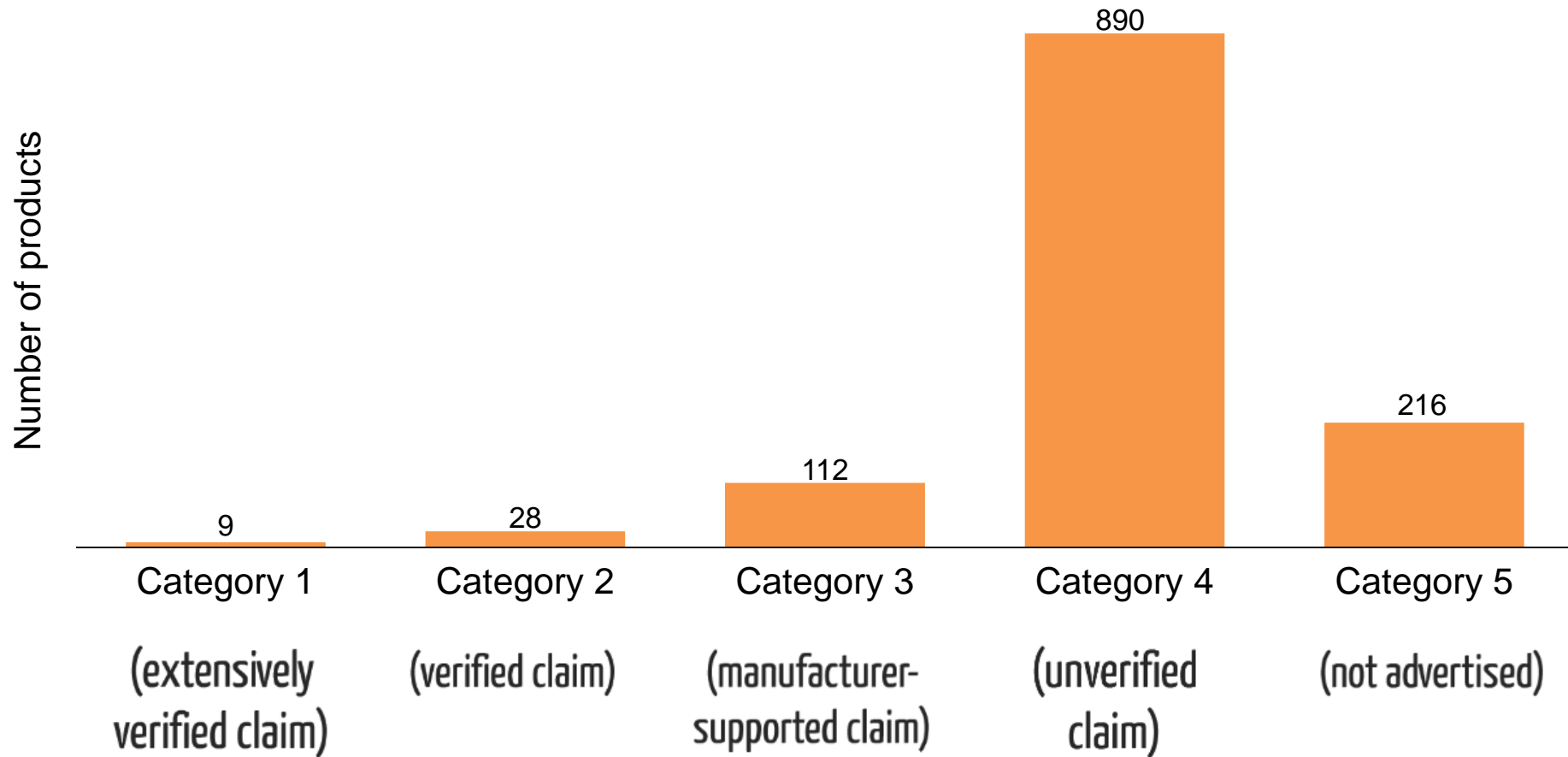
## Poll question

Which of these categories has the most products in the CPI?

- A. Categories 1 or 2. Verified claim
- B. Category 3. Manufacturer-supported claim
- C. Category 4. Unsupported claim
- D. Category 5. Not advertised by manufacturer

# Consumer Products Inventory: Data Overview

## How much we know





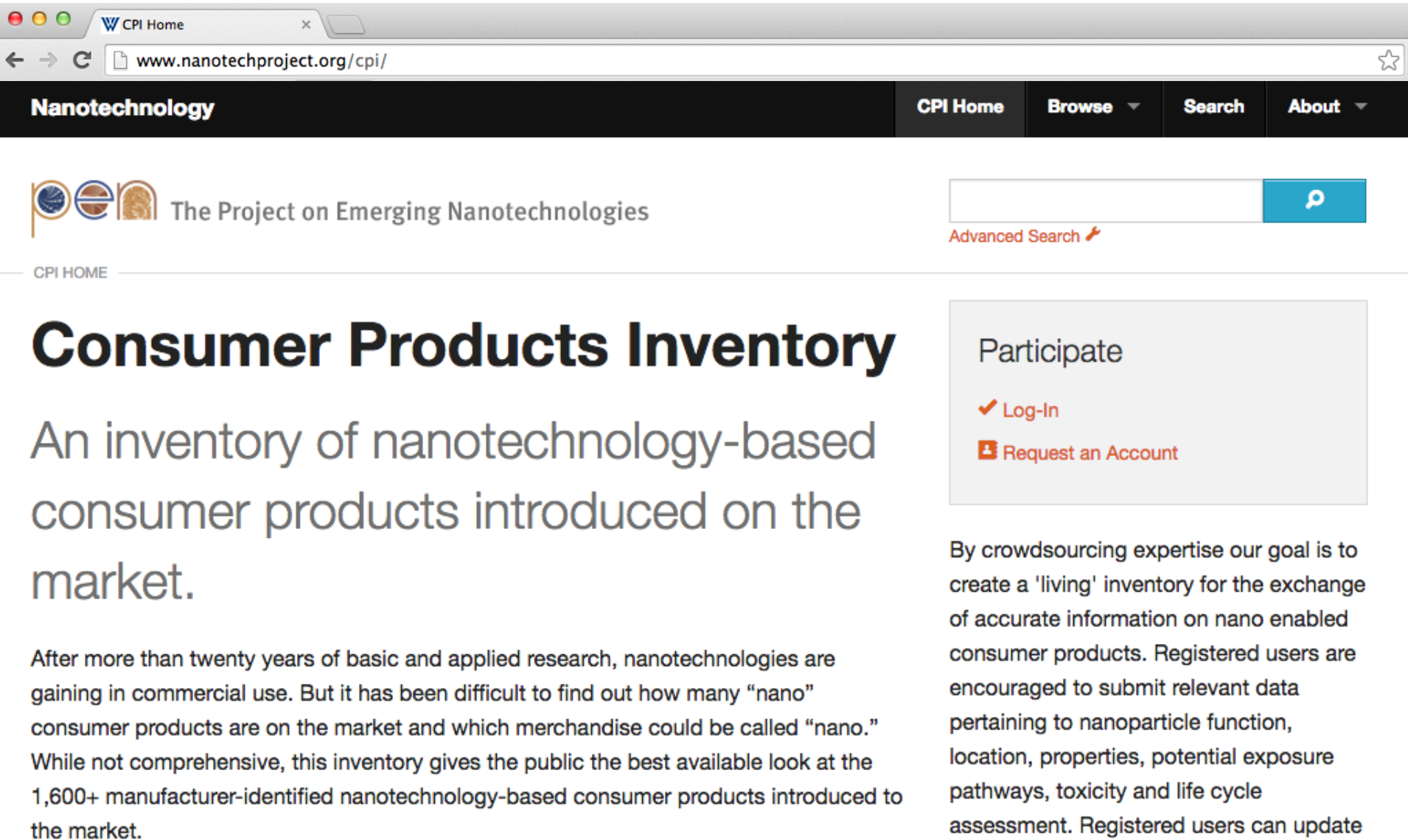
# Consumer Products Inventory: Data Overview

## Poll question

Do you have a nano-enabled consumer product?


- A. Yes, 1 product
- B. Yes, more than 1 product
- C. I don't know
- D. No way! I'm afraid of nanotechnology



# Participate!



The screenshot shows a web browser window with the address bar displaying [www.nanotechproject.org/cpi/](http://www.nanotechproject.org/cpi/). The website has a dark navigation bar with the following links: **Nanotechnology**, **CPI Home**, **Browse** (with a dropdown arrow), **Search**, and **About** (with a dropdown arrow). Below the navigation bar is a header section featuring the logo for 'The Project on Emerging Nanotechnologies' on the left and a search bar on the right. The search bar includes a magnifying glass icon and a link to 'Advanced Search' with a wrench icon. The main content area has a sub-header 'CPI HOME' and a large title 'Consumer Products Inventory'. Below the title is a descriptive paragraph: 'An inventory of nanotechnology-based consumer products introduced on the market.' To the right of this text is a grey box titled 'Participate' containing two links: 'Log-In' (with a checkmark icon) and 'Request an Account' (with a document icon). At the bottom right of the page, there is a paragraph explaining the project's goal: 'By crowdsourcing expertise our goal is to create a 'living' inventory for the exchange of accurate information on nano enabled consumer products. Registered users are encouraged to submit relevant data pertaining to nanoparticle function, location, properties, potential exposure pathways, toxicity and life cycle assessment. Registered users can update'.

**Nanotechnology** **CPI Home** **Browse** **Search** **About**

 The Project on Emerging Nanotechnologies

  
Advanced Search 



CPI HOME

## Consumer Products Inventory

An inventory of nanotechnology-based consumer products introduced on the market.

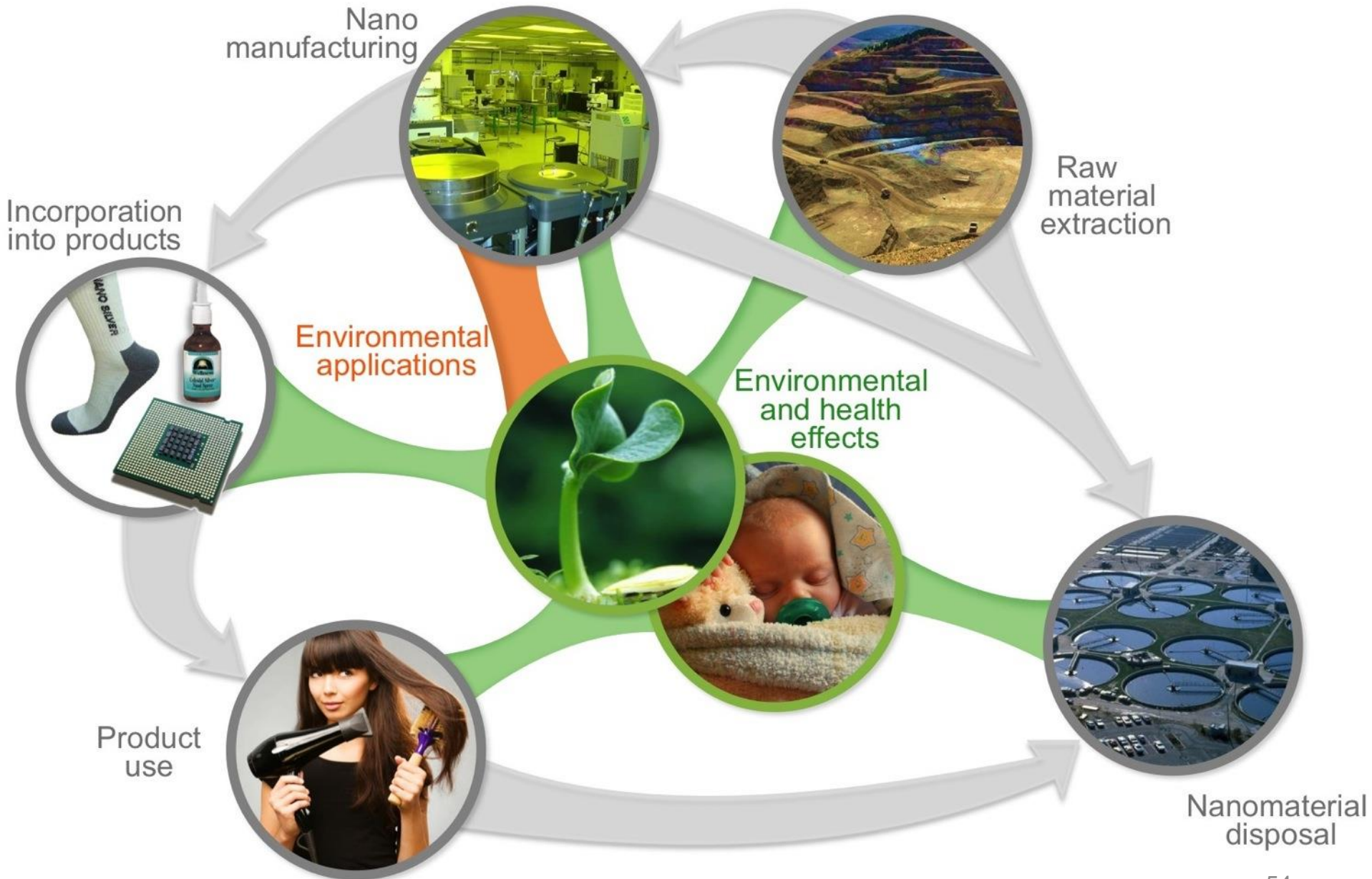
After more than twenty years of basic and applied research, nanotechnologies are gaining in commercial use. But it has been difficult to find out how many “nano” consumer products are on the market and which merchandise could be called “nano.” While not comprehensive, this inventory gives the public the best available look at the 1,600+ manufacturer-identified nanotechnology-based consumer products introduced to the market.

**Participate**

-  [Log-In](#)
-  [Request an Account](#)

By crowdsourcing expertise our goal is to create a 'living' inventory for the exchange of accurate information on nano enabled consumer products. Registered users are encouraged to submit relevant data pertaining to nanoparticle function, location, properties, potential exposure pathways, toxicity and life cycle assessment. Registered users can update

# Nanomaterial Life Cycle





[www.nanotechproject.org/cpi](http://www.nanotechproject.org/cpi)

# Questions?

Please type your questions in the chat box.

Contact: Dr. Marina Vance, [nina@vt.edu](mailto:nina@vt.edu)



# How Can We Better Serve You?

Whether you are joining us live or watching the recorded version of this webinar, please take 1 minute to provide your feedback and suggestions.

[Survey link](#)



# Webinar Recordings

To access this recording, slides, and handout visit  
[nano4me.org/webinars.php](http://nano4me.org/webinars.php)





# Certificate of Participation

If you attended the live version of this  
1.5 hour webinar and would like a  
certificate of participation, please email:

[sbarger@engr.psu.edu](mailto:sbarger@engr.psu.edu)



# 2014 - 2015 Events Calendar

**Jan. 30, 2015**

*Webinar*

Integrating Nanotechnology into Electronics Technology

**Feb. 27, 2015**

*Webinar*

Remote Access Labs for Your Classroom

**Nov. 11 – 13, 2014**

*Workshop*

Hands-On Introduction to Nanotechnology for Educators

**April 13 – 17, 2015**

*Workshop*

Nanotechnology Course Resources I: Safety, Processing, and Applications

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