

# SUPPORTING THE NATIONAL NANOTECHNOLOGY INITIATIVE

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NNCI Annual Conference



# NATIONAL NANOTECHNOLOGY INITIATIVE (NNI)

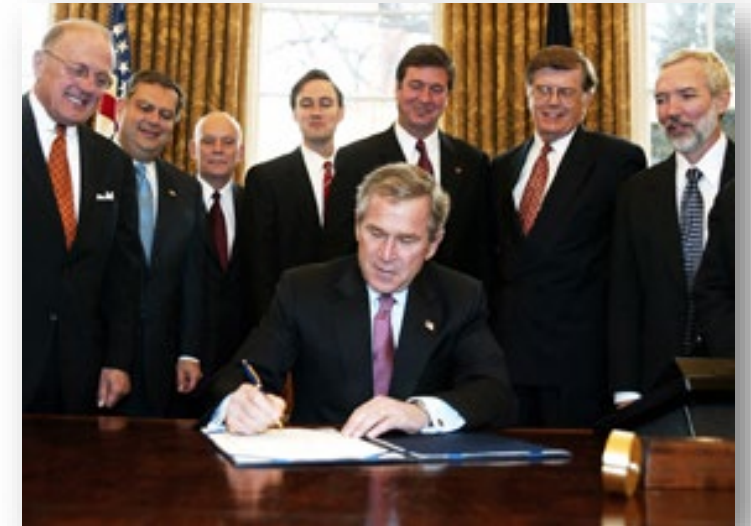
“**Just imagine**, materials with 10 times the strength of steel and only a fraction of the weight; shrinking all the information at the Library of Congress into a device the size of a sugar cube; detecting cancerous tumors that are only a few cells in size. Some of these research goals will **take 20 or more years** to achieve. But that is why -- precisely why -- as Dr. Baltimore said, there is such a **critical role for the federal government.**”

-President Bill Clinton, January 21, 2000



Today at the White House, the President signed into law the **21st Century Nanotechnology Research and Development Act**... Nanotechnology promises to be both evolutionary and revolutionary--improving and creating entirely new products and processes in areas from electronics to health care.

-White House Press Release, December 3, 2003

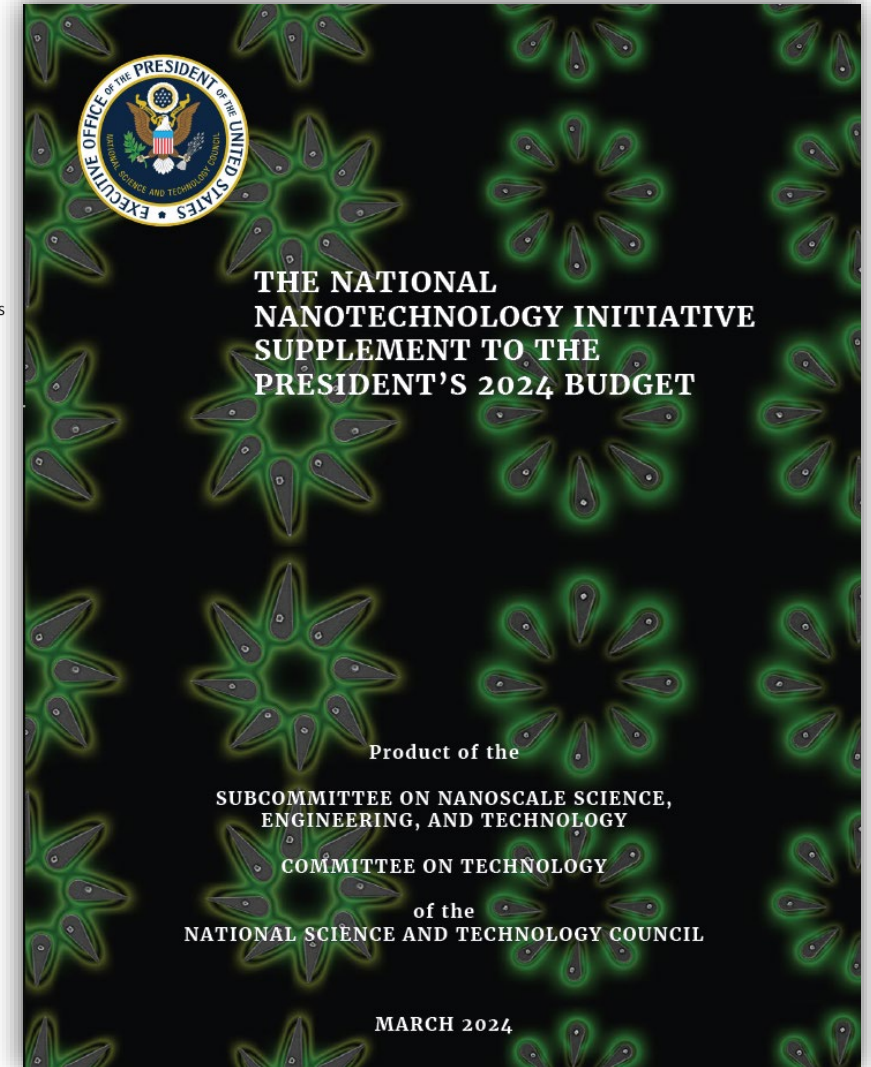
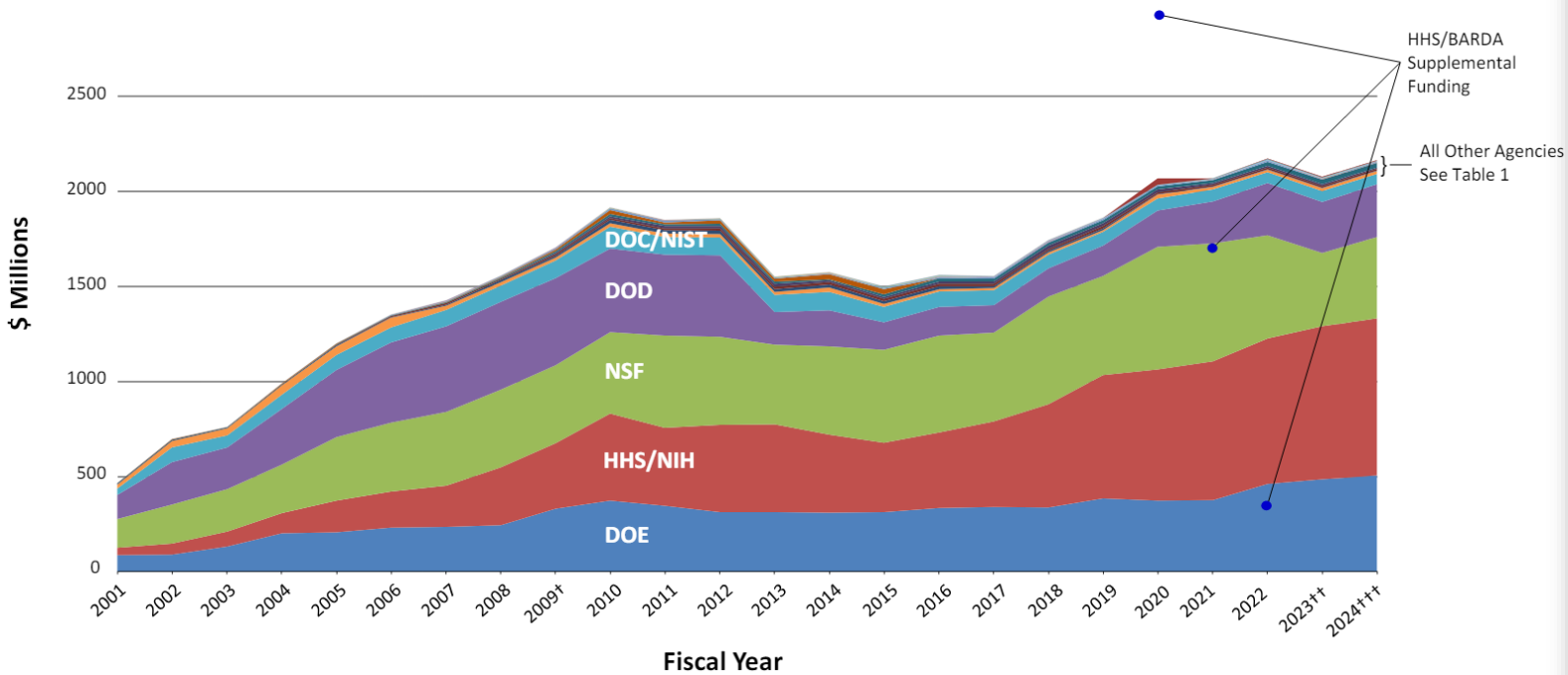




**NNI Vision:** A future in which the ability to understand and control matter at the nanoscale leads to ongoing revolutions in technology and industry that benefits society.



# THE NNI SUPPLEMENT TO THE PRESIDENT'S BUDGET



# WHAT IS THE NNI?

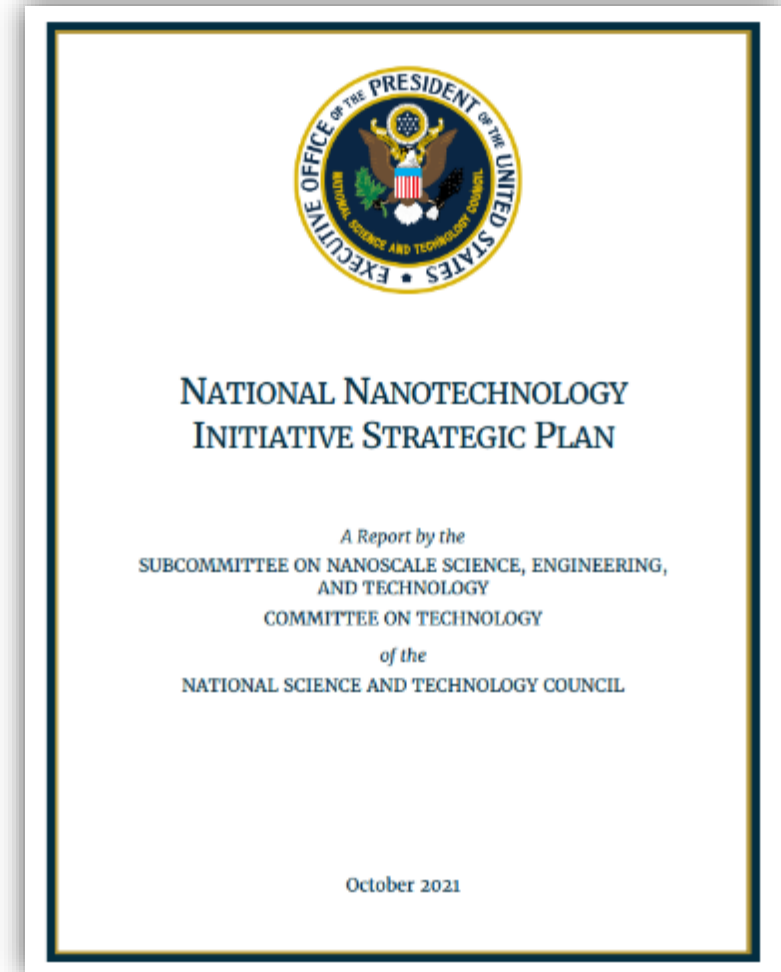
**Goal 1:** Ensure that the United States remains a world leader in nanotechnology research and development

**Goal 2:** Promote commercialization of nanotechnology R&D

**Goal 3:** Provide the infrastructure to sustainably support nanotechnology research, development, and deployment

**Goal 4:** Engage the public and expand the nanotechnology workforce

**Goal 5:** Ensure the responsible development of nanotechnology



# NASEM REVIEW OF THE NNI

- Analyze the composition of the science and engineering community currently being served by the nation's nanotechnology R&D infrastructure.
  - Explore trends, opportunities, and emerging use cases
  - Explore how geography, organization type, career stage, project focus area, and other factors influence awareness, access, and opportunity. The metrics used to track and evaluate success may also be considered.
- Identify barriers to use for communities who are not fully engaging with nanotechnology R&D infrastructure.
  - Examples: awareness, interaction models, peer review models, financial and travel logistics, remote access resources, IP and contractual agreements, opportunities to enhance data and resource sharing, and approaches to incentivizing use.
  - Recommend possible improvements to assist in achieving equitable and impactful national engagement in, and use of, existing infrastructure.



# SHARED INFRASTRUCTURE NETWORK COLLABORATION (SINC)

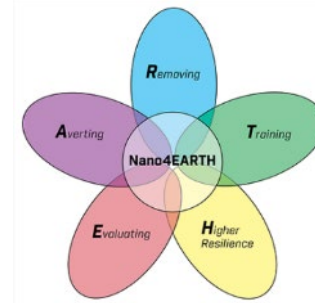
NNI user facilities

- DOE: Nanoscale Science Research Centers (NSRC)
- NSF: National Nanotechnology Coordinated Infrastructure (NNCI)
- NIST: Center for Nanoscale Science and Technology (CNST)
- NIH: Nanotechnology Characterization Laboratory (NCL)
- Many more facilities in support of nanoscale science, engineering, and technology

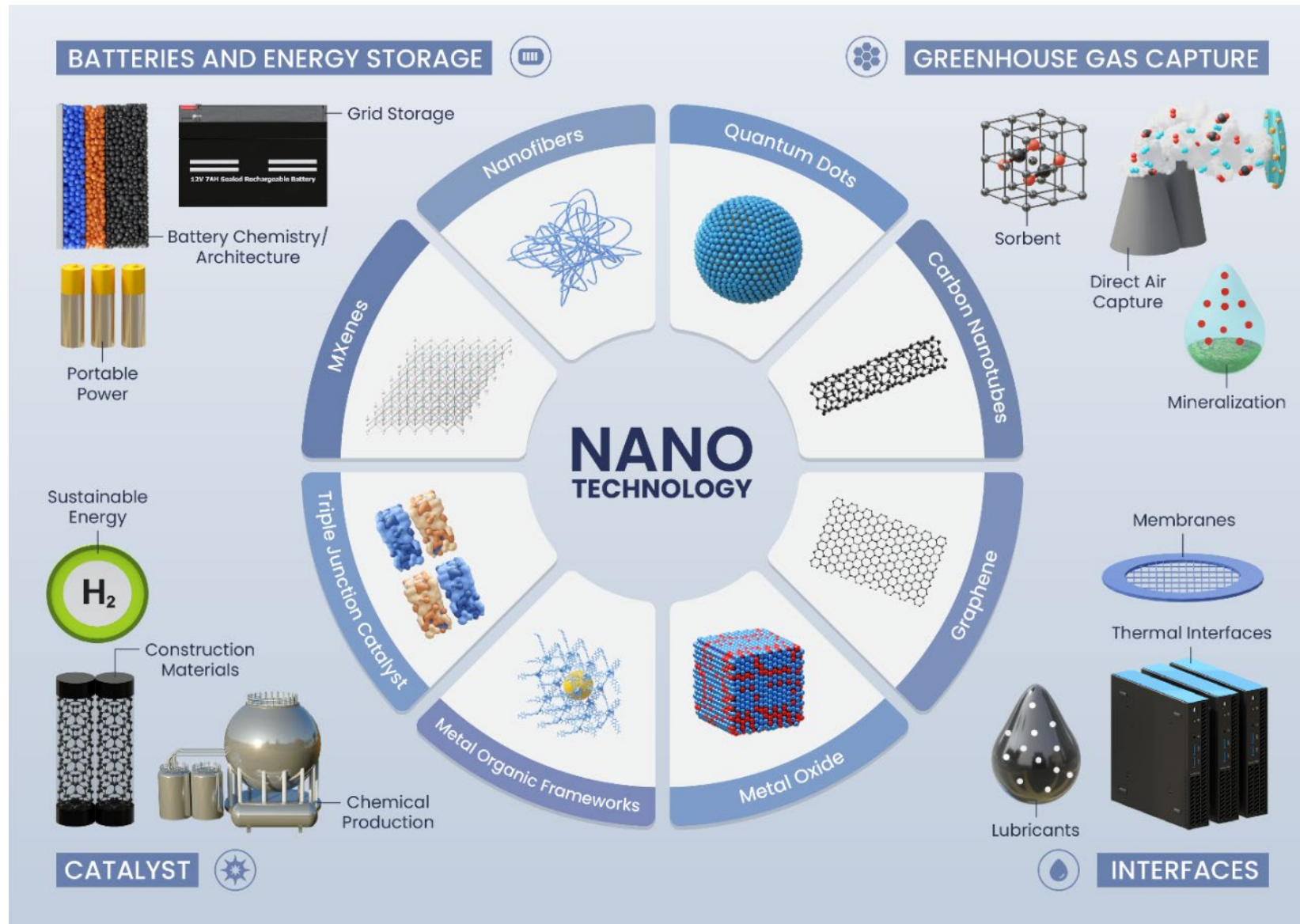




# Nano4EARTH

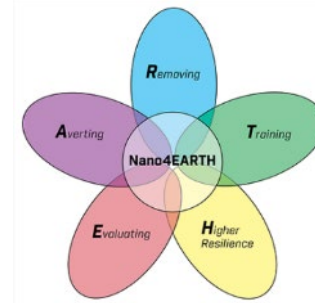


[www.nano.gov/nano4EARTH](http://www.nano.gov/nano4EARTH)

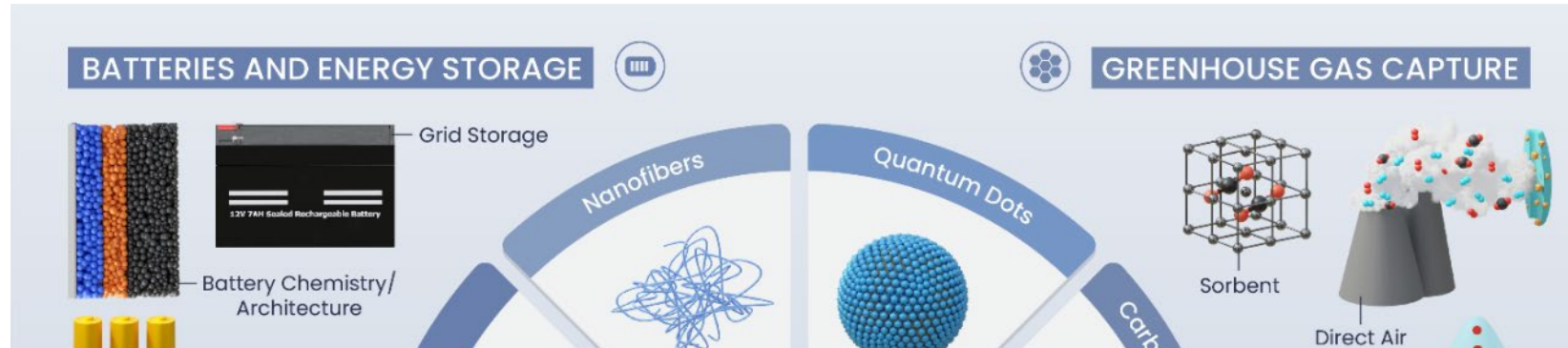




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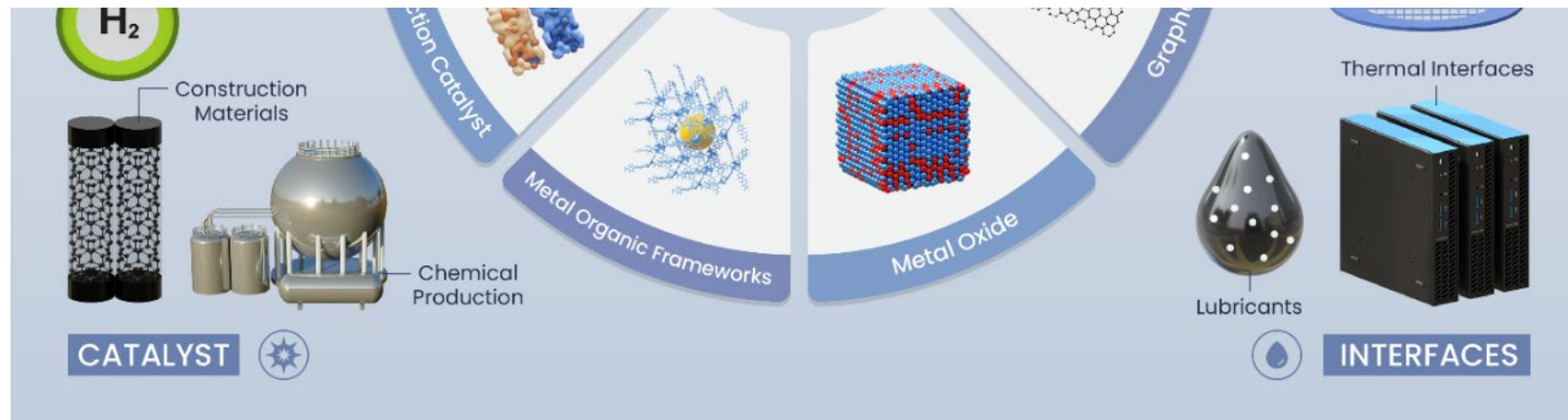


[www.nano.gov/nano4EARTH](http://www.nano.gov/nano4EARTH)



See comment in Nature Nanotechnology published on National Nanotechnology Day!

Campa, M.F., et al. Nanotechnology solutions for the climate crisis. Nat. Nanotechnol. (2024). <https://doi.org/10.1038/s41565-024-01772-5>



# NNI NANOMETROLOGY WEBINAR SERIES

- An Introduction to Nanometrology: History, State-of-the-Art, and Philosophy; Jan. 5, 2024
- Nanometrology for Food, Agriculture, and the Environment; Feb. 2, 2024
- Metrology of Nanoscale Medical and Pharmaceutical Products; March 1, 2024
- Metrology of Nanoparticles in Electronics; April 5, 2024
- Nanometrology for Continuous and Automated Manufacturing; Oct. 4, 2024



[www.nano.gov/NanometrologyWebinarSeries](http://www.nano.gov/NanometrologyWebinarSeries)

# NANOMETROLOGY INVOLVING BIG DATA, AI, AND MODELING

Measurement and analysis challenges in fields of nanotechnology that may be bottlenecked by computational challenges and large datasets.



[Colin Ophus](#)  
Stanford University



[Subramanian Sankaranarayanan](#)  
Center for Nanoscale Materials at  
Argonne National Laboratory



[Kamal Choudhary](#)  
National Institute of  
Standards and Technology

Nov. 1, 2024



# ENSURE THE RESPONSIBLE DEVELOPMENT OF NANOTECHNOLOGY

## Nanotechnology Environmental and Health Implications (NEHI) Interagency Working Group

HHS (FDA, NIH, NIOSH, ATSDR, NCEH), CPSC, USDA (USFS, NIFA), DOC (NIST), DOD, DOE, DOI (USBR, USGS), DOL (OSHA), State, EPA (ORD, OPPT), NSF, NNCO, OMB, OSTP

- Information exchange across government agencies, international organizations, and to the public
- Identify and prioritize research areas
- Develop strategies, guidance, and other tools
- Support the development of standards

### Topics/Activities of Note

- Micro/Nanoplastics
- Distributed Manufacturing/3D Printing
- Nanoinformatics
- International coordination

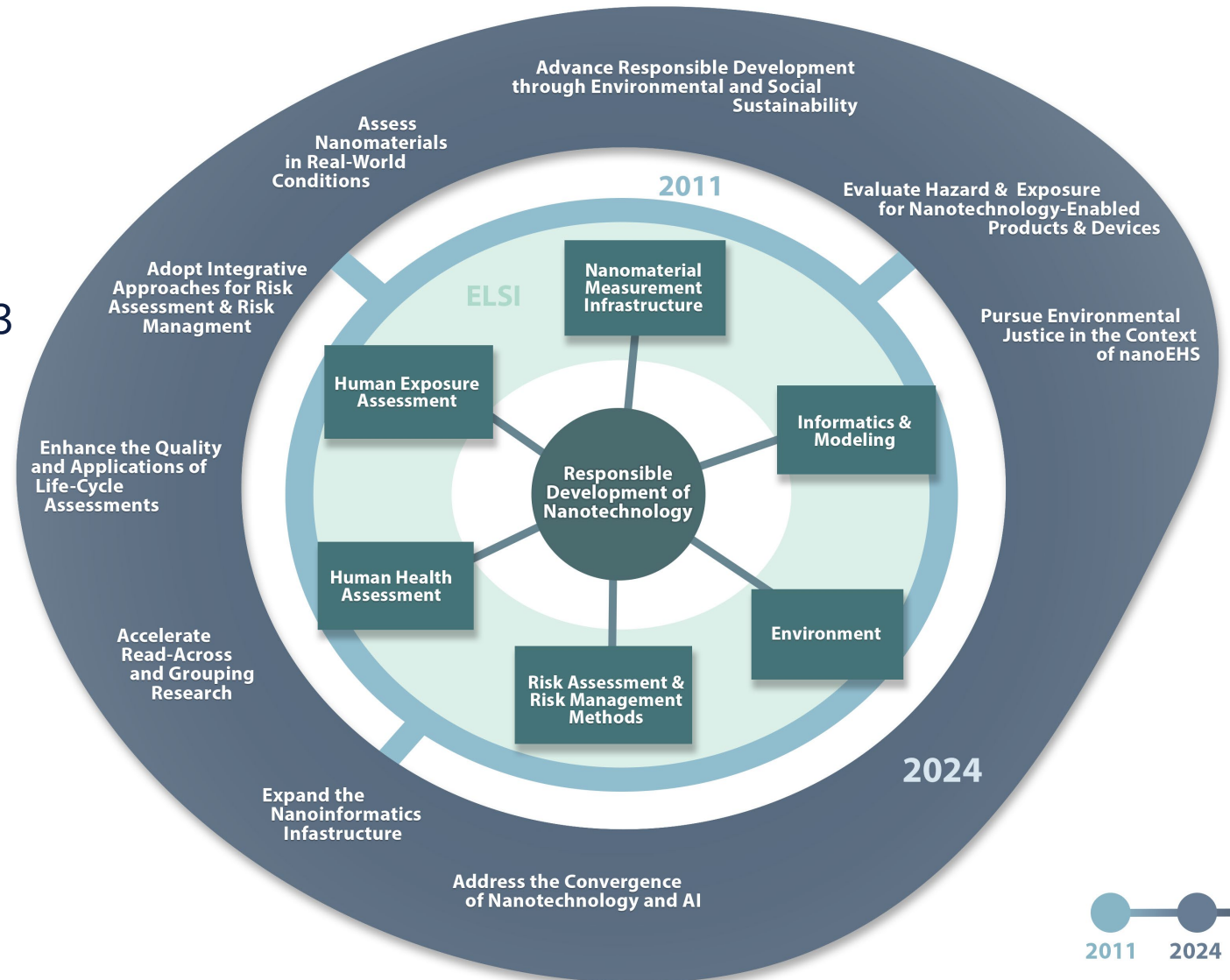




# NANOEHS RESEARCH STRATEGY

## 2024 EHS Research Strategy

- Request for Information: Spring 2023
- Refreshing the NNI's EHS Research Strategy Conference: Spring 2023
- Nanoinformatics Conference: Fall 2023
- Public Comment on Draft Strategy: June 2024
- Publishing: Fall 2024



# NANOPLASTICS

## NNI Nanoplastics Interest Group

- Started in 2019; currently 14 agencies and departments
- 2023 Public Webinar: Overview of United States Government Activities Addressing Micro- and Nanoplastics Issues

### NNI PUBLIC WEBINAR: OVERVIEW OF U.S. GOVERNMENT ACTIVITIES ADDRESSING MICRO- AND NANOPLASTICS ISSUES SESSION 1: RESEARCH AGENCIES

10:30 Introduction/background (Anil Patri, FDA, moderator)  
10:35 NIST: Overview (Kate Beers)  
10:45 NSF: Overview (Anne-Marie Schmoltner)  
10:55 USDA: Overview (Hongda Chen)  
11:05 DOE: Overview, including WaterPact (Ben Maurer)  
11:15 NOAA Marine Debris Program (Amy Uhrin)  
11:25 USGS: Overview (Shawn Fisher)  
11:35 NIEHS: Overview (Nigel Walker)  
11:45 Facilitated Q&A and discussion



**Kate Beers**  
Manager, Circular Economy  
Program, NIST



**Anne-Marie Schmoltner**  
Program Director,  
Environmental Chemistry, NSF



**Hongda Chen**  
National Program Leader for  
Bioprocess Engineering and  
Nanotechnology, USDA/NIFA



**Ben Maurer**  
Sustainable Oceans Lead,  
NREL



**Anil Patri**  
Director, Nanotechnology Core  
Facility, FDA  
(Moderator)



**Amy Uhrin**  
Chief Scientist, Marine Debris  
Division, NOAA



**Shawn Fisher**  
Hydrologist, USGS New York  
Water Science Center



**Nigel Walker**  
Acting Chief, Systems Toxicology  
Branch, NIH/NIEHS

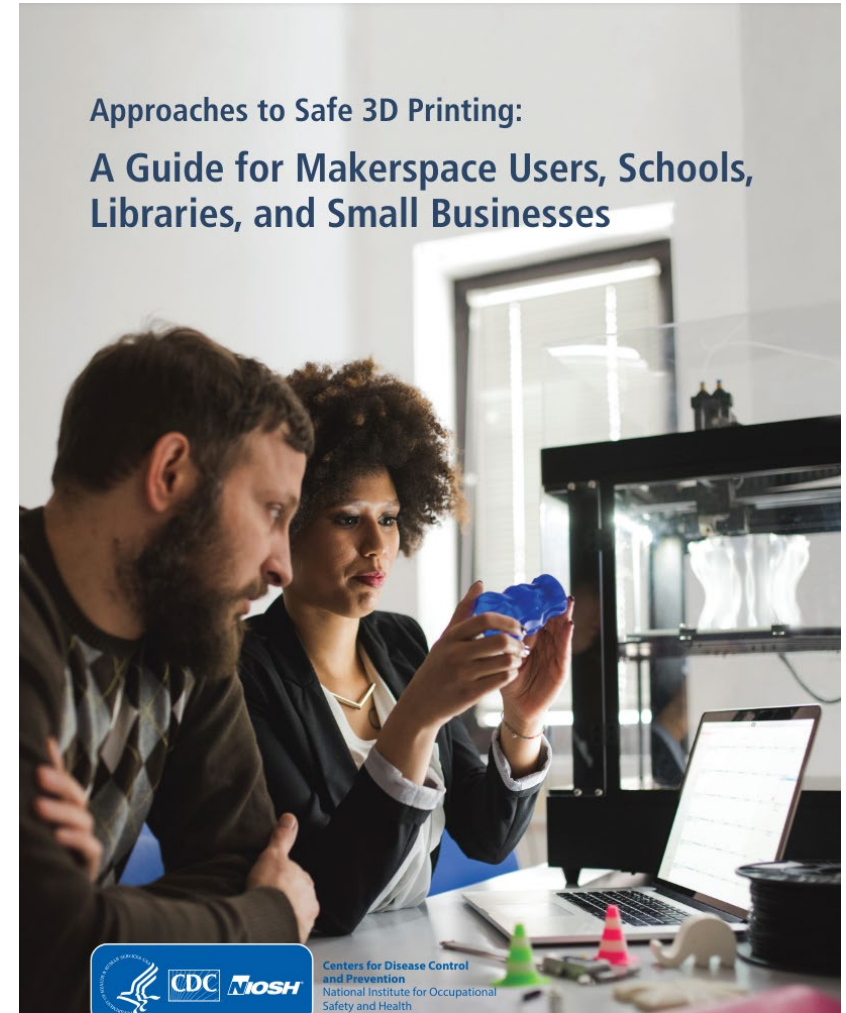


[HTTPS://WWW.NANO.GOV/PUBLICWEBINARS](https://www.nano.gov/publicwebinars)

# 3D PRINTING

NIOSH Report: Approaches to safe 3D printing

<https://www.cdc.gov/niosh/docs/2024-103/>



# U.S.-EU COMMUNITIES OF RESEARCH (CORs)

Address questions about the potential environmental, health, and safety (EHS) implications of nanomaterials

- Characterization
- Databases and Computational Modeling for NanoEHS
- Ecotoxicity
- Human Toxicity
- Exposure through Product Life
- Risk Assessment
- Risk Management and Control

Last Annual U.S.-EU Communities of Research (CORs) Workshop (Oct. 16), outside Zurich, Switzerland

CORs Activities to be highlighted at the 3rd US-Africa Conference: Nanotechnology Convergence for Sustainable Energy, Environment, Climate Change and Health (July 14-17), Casablanca, Morocco



**us-eu.org**



# PCAST REPORT

## Recommendations

3. ...enhance experiential learning programs for nanotechnology students and scientists to become the collaborative, multi-disciplinary workforce needed for nanotechnology and other advanced technologies.



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REPORT TO THE PRESIDENT AND TO CONGRESS  
The Seventh Assessment of the  
National Nanotechnology Initiative

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Executive Office of the President  
President's Council of Advisors on  
Science and Technology

August 2023



# EXPERIENTIAL AND MULTIDISCIPLINARY LEARNING AND EDUCATION (EXAMPLE) CONVENING

March 27, 2025

Washington, DC

- Value of interdisciplinary collaboration
- Importance of evaluation and metrics of success
- Stories of professionals who benefited from the different programs
- Experiential training programs available at user facilities



# HELP US CELEBRATE YOUR SUCCESS!

## Engage

- Webinars
- Workshops
- Respond to Requests For Information (RFI)
- Share news and highlights
- Participate in Communities of Research & Networks
- Contact the NNCO: [info@nnco.nano.gov](mailto:info@nnco.nano.gov)

## Follow Social Media

 [www.nano.gov](http://www.nano.gov)

 @NNInanonews

 National Nanotechnology Initiative

 YouTube NanoTube - The National Nanotechnology Initiative



# THANK YOU

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# ECONOMIC IMPACT

The U.S. Government's investment in nanotechnology through the National Nanotechnology Initiative (NNI) is a little more than **\$40 billion**.

- Revenues of US nanotechnology companies in 2022: \$67-\$83 billion
  - Excludes major industries that rely on nanotechnology
- Revenues of US nanotechnology companies during NNI: >\$1 trillion
- 2017 Economic Census (nanotech R&D code): >3,700 companies, >171,000 employees, \$42 billion in annual revenue, \$20 billion in employee salaries

