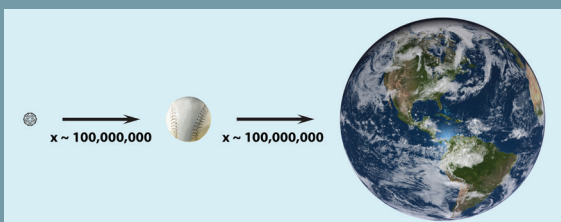


# What is Nanotechnology?

Nanotechnology encompasses science, engineering, and technology at the nanoscale, which is about 1 to 100 nanometers. Just how small is that? A nanometer is one-billionth of a meter. For reference, a sheet of paper is about 100,000 nanometers thick.

Nanotechnology is affecting all aspects of life through innovations that enable, for example, strong, lightweight materials for better fuel economy; improved cancer detection, diagnosis, and treatment; clean, accessible drinking water around the world; superfast computers with vast amounts of storage; self-cleaning surfaces; wearable health monitors; more efficient solar panels; safer food through packaging and monitoring; regrowth of skin, bone, and nerve cells for better medical outcomes; smart windows that lighten or darken to conserve energy; and concrete that is more crack-resistant, lasts longer, and has embedded nanosensors to detect stress or corrosion.



If a buckminsterfullerene molecule (60 carbon atoms arranged in a sphere, with a diameter of 1.1 nanometers) were as big as a softball, a softball would be as big as the Earth.

## The NNCO is the coordination office of the NNI

The National Nanotechnology Coordination Office (NNCO) acts as the primary point of contact for information on the NNI; provides technical and administrative support to the NSET Subcommittee; maintains the NNI website ([www.nano.gov](http://www.nano.gov)); provides public outreach on behalf of the NNI; and promotes access to and early application of the technologies, innovations, and expertise derived from NNI activities.

### Contact the NNCO

Phone: 703-292-8626

E-mail: [info@nnco.nano.gov](mailto:info@nnco.nano.gov)

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

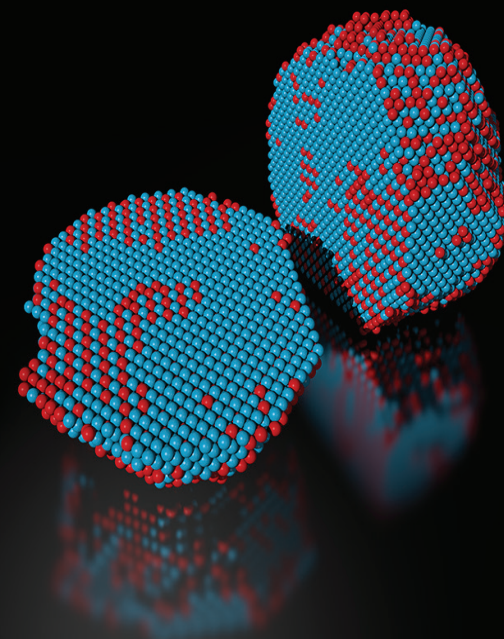


Cover image: 3-D atomic composition of an iron-platinum nanoparticle. Image: Colin Ophus and Florian Niekief, Lawrence Berkeley National Lab



# The National Nanotechnology Initiative

Leading to a revolution  
in technology and industry  
that benefits society

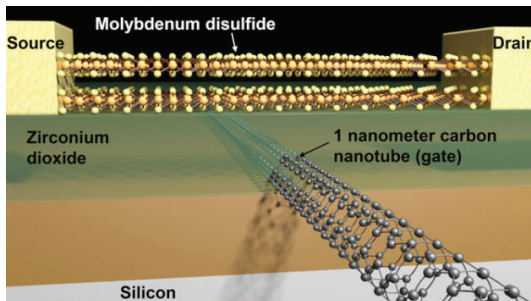


## What is the U.S. National Nanotechnology Initiative?

The National Nanotechnology Initiative (NNI), established in 2001, is now a collaboration of twenty Federal agencies and Cabinet-level departments with shared interests in nanotechnology research, development, and commercialization. These agencies recognize that the ability to understand and harness the novel phenomena that occur at the nanoscale is already leading to revolutionary new materials, devices, and structures.

These advances promise to improve human health and quality of life, enhance the U.S. economy, boost job creation, and strengthen our national defense. As a result of the NNI investments, nanotechnology has become ubiquitous in our daily lives.

**With the support of the NNI, nanotechnology research and development is taking place in academic, government, and industry laboratories across the United States.**



(Image: University of California, Berkeley)

Scientists at the Department of Energy's Lawrence Berkeley National Laboratory demonstrated the world's first one nanometer transistor. Transistors are the basic switches that enable all modern electronics.

## NNI Goals

- Advance a world-class nanotechnology research and development program
- Foster the transfer of new technologies into products for commercial and public benefit
- Develop and sustain educational resources, a skilled workforce, and a dynamic infrastructure and toolset to advance nanotechnology
- Support responsible development of nanotechnology

## How is the NNI Organized?

The NNI is managed within the framework of the National Science and Technology Council (NSTC), the Cabinet-level council managed by the Office of Science and Technology Policy at the White House.

The Nanoscale Science, Engineering, and Technology (NSET) Subcommittee of the NSTC facilitates planning, budgeting, program implementation, and review across the NNI agencies. The NSET Subcommittee is composed of representatives from agencies participating in the NNI.

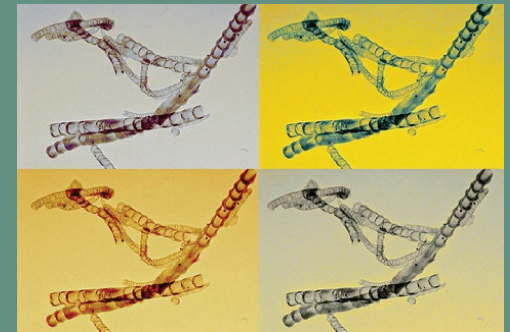
## Nanotechnology Signature Initiatives

Nanotechnology Signature Initiatives (NSIs) are multiagency initiatives designed to focus on technology areas of national importance that may be more rapidly advanced through enhanced interagency coordination and collaboration. Current NSIs include:

- Water Sustainability through Nanotechnology
- Nanoelectronics for 2020 and Beyond
- Sustainable Nanomanufacturing
- Nanotechnology Knowledge Infrastructure
- Nanotechnology for Sensors and Sensors for Nanotechnology

## Small Solutions for Big Problems

Nanotechnology researchers are working on a number of different therapeutics where a nanoparticle can encapsulate or otherwise help to deliver medication directly to cancer cells and minimize the risk of damage to healthy tissue. This technique has the potential to change the way doctors treat cancer and dramatically reduce the toxic effects of chemotherapy.



This image shows the bamboo-like structure of nitrogen-doped carbon nanotubes for the treatment of cancer. (Image: Wake Forest University and the National Cancer Institute)