Birck Nanotechnology Center

The Emerging Field of Nanotechnology

Nanotechnology involves the building of new materials, structures, and devices with dimensions in the range of 1 to 100 nanometers — a range spanning from the diameter of carbon nanotubes through protein molecules to viruses. A sheet of paper is about 100,000 nanometers thick.

The physical properties of nano-size pieces of material differ in fundamental ways from the properties of larger pieces of the same material.

Encompassing nanoscale science, engineering, and technology, the Birck Nanotechnology Center seeks understanding of nanoscale phenomena and the design and manufacture of improved materials, structures, devices, and systems that employ valuable nanoscale properties.

Nanotechnology Initiatives

Among the possibilities of this new technology are:

- Materials with superior strength, hardness, and other characteristics
- Microscopic and sub-microscopic machines
- Electronic devices that outperform current microelectronics
- The merging of electronics and biology to create “bio-chips” that can rapidly and cost effectively diagnose disease or detect food-borne contamination

Laboratories

The Birck Nanotechnology Center includes the Scifres Nanofabrication Laboratory, the William B. and Mary Jane Elmore Advanced Concept Validation Center, the Kevin G. Hall Nano-Metrology Laboratory, and many other laboratories. The facility is comprised of six types of laboratory space.

- Cleanrooms
  The fabrication cleanroom provides a particle-free environment for constructing micro- and nanoscale devices. The biological/pharmaceutical cleanroom supports work in biological nanotechnology in a sterile environment. These two cleanrooms are linked, yielding unique nano-bio research capability.

- Chemistry and Biology
  In proximity to the cleanrooms and the Bindley Bioscience Center, these labs facilitate the handling, preparing, and processing of experimental materials and apparatus for nanoscale chemistry and biology research.

- Epitaxy
  In these labs crystals are grown one atomic layer at a time, enabling precise layer-by-layer construction of new materials and devices.

- Metrology
  These labs allow investigators to perform physical measurements on nanoscale materials and devices at dimensions as small as a fraction of an atom’s diameter.

- Instructional
  The instructional laboratories provide space for training undergraduate and graduate students in state-of-the-art nanotechnology.

- Incubator
  The nanotechnology incubator lab provides a site to support and conduct technology transfer and entrepreneurship.

Contact

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