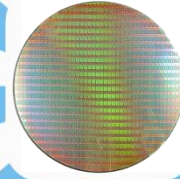


Semiconductors – How Basic Research Powers our World

What is a semiconductor?

A semiconductor is a material that is neither an electrical conductor nor an insulator, but is in between the two. While best known for their role in microprocessors, the applications of semiconductors are widespread. Basic research funded by the federal government has helped to develop this technology into products that benefit society.



LEDs: From 1981 to 1987, the Office of Naval Research (ONR) and National Science Foundation (NSF) provided funds for basic research at North Carolina State University that led to the development of technology for the growth of single crystals of SiC and GaN. Single crystals of SiC and GaN are key components of ultra-bright, the solid state light sources that have made possible full color displays on modern cell phones and other devices, as well as a new generation of traffic lights.



FLASH Memory: From research conducted at U.C. Berkeley 1984 to 1990 that was supported by funding from DARPA and the Air Force Office of Scientific Research. This research generated an understanding of the physics of hot-electron injection in thin insulator films, without which we could not have today's digital cameras, pocket memory sticks, iPods, or numerous other devices.



Flat Panel Displays: From 1981 to 1990, research by professors from Cornell, M.I.T., CalTech, and Columbia, supported by funding from DARPA, NSF, and the Department of Energy, advanced the laser crystallization of amorphous silicon necessary for producing the flat panel displays used in today's televisions and computers.





Microprocessors -

The semiconductor that revolutionized the way we live.

From 1981 to 1989, the Department of Defense (DoD) and its Defense Advance Projects Agency (DARPA) supported research at Stanford University that would lead to major innovations in microprocessor manufacturing. Government support for basic research made it possible to overcome critical obstacles to producing microchips with millions and even billions of transistors. Without this research, products like the Intel Pentium, AMD Athlon, or Micron 2 Gbit memory chip would not exist. These microprocessors are found in almost every appliance and electronic device we use in modern-day life.