

John Bardeen



John Bardeen was an eminent American physicist, who won the Nobel Prize twice. In 1956, with fellow scientists William B. Shockley and Walter H. Brattain, Bardeen shared the award for the invention of the transistor.

He received the award for the second time in 1972, with Leon N. Cooper and John R. Schrieffer, for formulating the theory of superconductivity.

Bardeen thus revolutionized the fields of electronics and magnetic resonance imaging.

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Early Life and Education:

Born in Madison, Wisconsin on 23 May in 1908, John Bardeen's father was a Professor of Anatomy and the first Dean of the Medical School at the University of Wisconsin. He acquired a BS degree in electrical engineering from the same university in 1928, and after one year, his MS degree in 1929.

Following a few years of research work in geophysics, Bardeen took another

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Scientist of the Week

Emmy Noether: The greatest of female mathematicians, she unlocked a secret of the universe

Recent Scientists of the Week

Wilder Penfield: Pioneer of brain surgery; mapped the brain's functions

Charles Nicolle: Eradicated typhus epidemics

Samuel Morse: The telegraph and Morse code

Jane Goodall: Major discoveries in chimpanzee behavior

John Philoponus: 6th century anticipation of Galileo and Newton

William Perkin: Youthful curiosity brought the color purple to all

Democritus: Atomic theory BC and a universe of diverse inhabited worlds

Susumu Tonegawa: Discovered how our bodies make millions of different antibodies

Cecilia Payne: Discovered that stars are almost entirely hydrogen and helium

Karl Landsteiner: Discovered the blood group system

Hypatia: Mathematician – her murder signaled the coming dark ages

Matthew Maury: A founder of oceanography

Adolphe Quetelet: Body mass index; social physics; the average man

Alhazen: A founder of modern optics

Diophantus: Father of algebra

Mary Somerville: Celestial Mechanics; unity of the sciences

Hermann Staudinger: Founder of macromolecular science

Percival Lowell: The hunt for Planet X; Pluto; Martian canals

degree in mathematical physics from Princeton University, receiving a Ph.D. in 1936.

Contributions and Achievements:

After years of research work at the universities of Minnesota and Harvard and then serving as principal physicist the Naval Ordnance Lab in Washington DC during the Second World War, John Bardeen finally joined the solid state physics group at Bell Labs in New Jersey in 1945.

He developed an interest in semiconductor research and collaborated with Brattain and Shockley to discover the transistor effect in semiconductors in 1947. His efforts laid the foundation for the modern age of electronics and computers and earned a share of the 1956 Nobel Prize for Physics along with fellow scientists William B. Shockley and Walter H. Brattain.

The transistor, which essentially functions as a solid-state electronic switch, replaced the less-suitable vacuum tube. Because the transistor was so much smaller and consumed much less power, a computer built using transistors was much smaller, faster, more durable and more efficient than a computer built with vacuum tubes. Miniaturization of many electronic devices followed; a trend that still continues to this day.

Bardeen left Bell Labs and accepted a teaching position at University of Illinois in 1951, where he was to remain until he retired in 1975. There, he worked with Cooper and Schrieffer to formulate the first successful microscopic theory of superconductivity, which was later termed as the BCS theory (Bardeen–Cooper–Schrieffer theory). They received the Nobel Prize in Physics for this theory in 1972.

Bardeen was awarded the Nobel Prize twice for his efforts, and he remains the only person in history to have two prizes in the same domain.

He revolutionized the fields of electrical engineering and solid state physics. The transistor is often recognized as the most influential invention of the twentieth century.

Personal, Later Life and Death:

Bardeen married Jane Maxwell in 1938. They had three children, James Maxwell, William Allen and Elizabeth Ann.

He died of heart disease on January 30, 1991 in Boston, Massachusetts, aged 82, where he had come to Brigham and Women's Hospital for medical treatment. He was buried in Forest Hill Cemetery.

John Bardeen was named by Life Magazine among the 100 most influential people of the twentieth century.

Joseph Lagrange: Revolutionized physics; founded variational calculus

Howard Florey: Transformed penicillin into a potent antibiotic

Selman Waksman: Discovery of TB antibiotic streptomycin

Caroline Herschel: Discoverer of comets and nebulae

John Wallis: Conservation of momentum; infinitesimal calculus

George Hevesy: Discovered hafnium; isotope tracers in biology

Martin Gardner: Enemy of pseudoscience; inspirational math

Pyotr Kapitsa: Discovered superfluidity

Carl Woese: Revolutionized our understanding of life's history

Linda Buck: Discovered how we smell things

John Michell: Black holes & weighing the earth in the 1700s

Abdus Salam: The second great unification in physics

James Croll: Visionary janitor who explained the ice ages

J Harlan Bretz: Proven right after decades of mega-flood ridicule

Youyou Tu: Malaria drug discovery saved millions of lives

Ambrose Fleming: The dawn of the electronic age

Ernest Walton: Artificially split the atom; Verified $E = mc^2$

Franz Mesmer: Mesmerizing pseudoscience & hypnosis

Phillipe Pinel: Founder of psychiatry & humane therapy

Rudolf Virchow: Discovered diseases strike by attacking cells

Irene Joliot-Curie: The first artificial radioactive elements

Thomas Gold: Maverick streetfighter; explained pulsars & hearing

Clinton Davisson: Proved that electrons can be waves

Henrietta Leavitt: The key to the size of the universe

Robert Boyle: The birth of chemistry

Hippocrates: The father of Western medicine

Sophie Germain: Elasticity theory & Fermat's last theorem

Thomas Kuhn: The paradigm shift

Top 100 Scientists

Our Top 100 Scientists

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