WELCOME

The **New Jersey Inventors Hall of Fame** (NJIHoF) honors inventors, innovators and companies that have contributed to improving society and changing our lives. Learn more about the history of some famous New Jersey inventors.

New Jersey Inventor's Hall of Fame
Annual Awards Dinner Banquet
October 18, 2012
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1999 Hall of Fame

Cyrus W. Bemmels

In 1946 Cyrus Woodrow Bemmels conceived the idea of making very strong thin adhesive tapes by embedding parallel strands of continuing filament yarns in the adhesive, now commonly referred to as strapping tape. His colleagues at Permacel were slow to realize the importance of this discovery, but Bemmels persisted in championing his invention. In 1949, it was placed on the market and was an immediate success.

The major breakthrough came when he found a way to embed strands in a rubbery bonding coat, which provided maximum tensile strength and shock resistance because it allowed each strand to shift somewhat. The bonding coat helps bear the load without breaking one strand prior to another and requires no cross-strands. Bemmels' invention resulted in tape structures five to 10 times stronger than prior tapes without any sacrifice in thickness or flexibility and changed the direction of industrial tape production.

Bemmels' tapes were used in the packaging industry replacing steel strapping, string and wire. Their high strength and shock resistance adapt them well to heavy jobs such as bundling conduit or pipe and palletizing bulky containers. The tapes also apply easily, prevent shifting, absorb shock, and hinder tampering of cardboard containers. Very high-strength tapes, 500 pounds to 1,000 pounds per inch tensile were developed for heavy-duty packaging where no stretching can be permitted. "Suspension packaging" used in shipping aircraft parts and for meat packaging was another result of Bemmels' work.

Bemmels' first patent was granted in 1951 for pressure-sensitive adhesives, followed by 11 more patents over the next 24 years for additional tapes and tape making processes. Bemmels worked on 200 of the other tapes by Permacel, especially the cellophane and electrical tapes. His strand-reinforced tapes at one point brought Johnson & Johnson more revenue than any other single invention but the Band-Aid.

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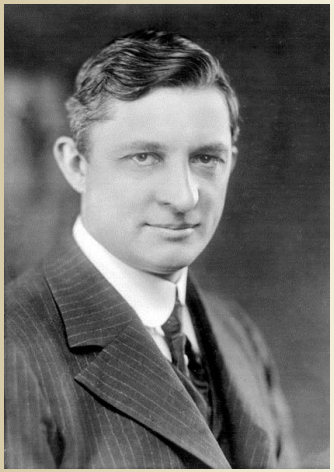
Willis Haviland Carrier



Willis Haviland Carrier invented the basics of modern air conditioning when he built his first air treatment device for a printer who needed a method to control changes in humidity. The fluctuations affected the paper's size, causing the color layers in the images to misalign. This first air treatment device was installed in 1902, and the patent for "An apparatus for Treating Air" was granted in 1906.

That same year the idea caught the attention of U.S. textile mills. Successful adjustments were made for applications to extreme heat in the mills. The list of clients expanded rapidly as other industries found uses for "conditioned air." Spurred by this success, Carrier and six friends scraped $35,000 together and formed the Carrier Engineering Company in 1915 in Newark, N.J. The company began manufacturing its own products in 1922 when Carrier developed one of the most significant achievements in the industry's history: the centrifugal refrigeration machine. This was the first practical method of air conditioning large spaces.

Comfort air conditioning as we are familiar with it today made its debut in 1924. Many Americans' first exposure to air conditioning was in movie theaters striving to keep business during summer months. During the late '20s, Carrier developed smaller "unit air conditioners" for small and medium-sized businesses.

1928 brought the "Weathermaker" that regulated year-round household air temperature, moisture, circulation and cleaning. But the Great Depression stopped this line for a time. After World War II, the housing industry began to expand into suburbia and with that move came air conditioned homes. About 430,000 homes had central air in 1955. Thirty years later, air conditioning was included in 70 percent of all new U.S. homes and nearly 90 percent in the American South.

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Haig Kafafian

Haig Kafafian's inventions applied the principles of cybernetics - the science of control - to create some of the first communications devices for the handicapped. His communications systems and their offshoots have allowed many persons with limited mobility to lead confident, productive lives, and develop their innate talents.Kafafian's inventions, which he manufactured under the CYBERCOM trademark permit persons who are unable to type or use a conventional keyboard, but who can control a single part of their body, to communicate effectively. He developed interfaces suitable for people whose loss of fingers or muscle coordination do not allow the use of multi-key keyboards. Keyboard interfaces were reduced from the standard 104 keys to 14. Injured veterans, quadriplegics, cerebral palsy and thalidomide victims were able to communicate effectively through Kafafian's systems.

Before focusing on the needs of the physically challenged, Kafafian was involved for twenty years in designing aircraft control and missile guidance systems and served as director of the Guided Missiles Division of the National Company. He is a fellow of the New York Academy of Sciences, and has served as president of the Academy of Sciences at Philadelphia. Kafafian's commitment to the physically challenged has led him to grant license-free use of his 11 U.S. and foreign patents in this field.

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Morton A. Kreitchman

Morton A. Kreitchman's three patents for various fluid control valves grew his company, Valcor Engineering, from a Newark loft in 1951 into an international corporation specializing in valves for the aerospace, nuclear, biomedical and chemical industries.Kreitchman first designed a valve that expanded the then state-of-the-art shear seal or gate valves by connecting a floating solenoid parallel to the valve. Until Kreitchman met the challenge, seal shear valves operating with contaminated fluids, such as were found in many aircraft fuel systems, wore out quickly. Aircraft fuel systems are prone to grit contamination because of the large volume and multiple tanks. Use of a solenoid not only reduced the size, weight and cost of the valve operation but permitted the valve's seal to operate repeatedly and consistently without damage. The invention was patented in 1956; more than 40 years later, over 1 million of Kreitchman's reliable and safe valves are still working on aircraft, fuel control systems and turbine-driven auxiliary power systems throughout the world. Kreitchman also helped the beverage dispensing industry to meet sanitary requirements with an inexpensive valve assembly that minimizes crevices and areas where sediment and organic matter collect, and allows for easy cleaning and sterilization.

His third major contribution, the electromagnetic pump, provides a low-cost, precision pump for dispensing very small quantities of liquid. The pump is used in scientific and medical applications. Kreitchman devised a unique solution by replacing a motor typically used for these applications with a solenoid-operated pump. He also used the principle of a floating "O" ring to control the pumping action, rather than a conventional piston and check valve.

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Arthur Schawlow

C Charles Townes and Arthur Schawlow are credited with inventing the maser, a device that amplifies electromagnetic waves and creates a means for the sensitive reception of communications and for precise navigation. By applying the same concepts to visible light, Schawlow and Townes were able to create the laser. Both Schawlow and Townes sought ways to expand on the maser principle of electromagnetic amplification into shorter wavelengths of infrared and visible light. Their paper published in the August 1958 issue of Physical Review titled "Infrared and Optical Lasers" described the concept and design for the laser. Schawlow and Townes received a patent for their proposal in 1960. Their paper describing the basic principles of lasers initiated the development of a new scientific field and laid the groundwork for a multibillion-dollar industry. By the end of the 1960s, eye surgeons were routinely using lasers because the light beams can be made minutely small and be precisely focused. Today, the laser is ubiquitous; areas where its use has become essential include radar, telecommunications, astronomy, navigation, data processing and retrieval, surgery and medical diagnostics, scientific analysis and holography. In 1964 Townes was awarded the Nobel Prize for his advances in the field of quantum electronics and currently serves as professor emeritus in the physics department of the University of California, Berkeley. In 1961, Schawlow became professor of physics at Stanford University, and received the Nobel Prize in Physics in 1981 for his work in laser spectroscopy.

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Dr. Joseph Abys

Joseph Abys has continually applied his innovation ability in palladium plating technology, which has found wide applicability not only in the electronics industries, but also for connectors in telecommunications, computer and consumer items, such as smart card devices, pagers, and wireless phones.

Other applications included semiconductor packaging for integrated circuits and optoelectronics; automotive uses such as airbags, audio connectors, engine controllers; in the aerospace industry for use on jet engine blades, in ink-jet printers, in medical devices, as a coating on eyeglass frames, and for watches and costume jewelry. Through 1995, AT&T/Lucent Manufacturing had a cost savings of $103 million by using this technology.

Abys holds 19 U.S. patents and numerous foreign patents, with a number of additional patents pending. He has co-authored more than 50 technical publications and two book chapters for an authoritative book on the subject of electroplating. He received a doctorate in Physical Inorganic Chemistry from Brown University in 1979.

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Edwin Howard Armstrong

Edwin Armstrong, an electrical engineer, invented three of the basic electronic circuits underlying all modern radio, radar and television. While a junior at Columbia University, Armstrong made his first major invention. In the summer of 1912, Armstrong devised a new regenerative circuit that yielded not only the first radio amplifier but also the key to the continuous-wave transmitter that still lies at the heart of all radio operations.

During World War I, Armstrong was commissioned as an officer in the U.S. Army Signal Corps and sent to Paris. His assignment to detect possible inaudible short wave enemy communications led to his second major invention. Adapting a seldom-used technique called heterodyning, he designed a complex eight-tube receiver that, in tests from the Eiffel Tower, amplified weak signals to a degree previously unknown. He called this the superheterodyne circuit, and although it detected no secret enemy transmissions, it is today the basic circuit used in most radio and television receivers.

By the late 1920s, Armstrong set out to eliminate the last big problems of radio static by designing an entirely new system, in which the carrier-wave frequency would be modulated while its amplitude would be held constant. Undeterred by current opinion - which held that this method was useless for communications - Armstrong brought forth in 1933 a wide-band frequency modulation (FM) system that in field tests gave clear reception through the most violent storms, and as a dividend, offered the highest fidelity sound yet heard in radio. It took him until 1940 to get a permit for the first FM station, erected along with a 425-foot tower on the Hudson River Palisades in Alpine, N.J., and it took another two years before the FCC gave him a few frequency allocations.

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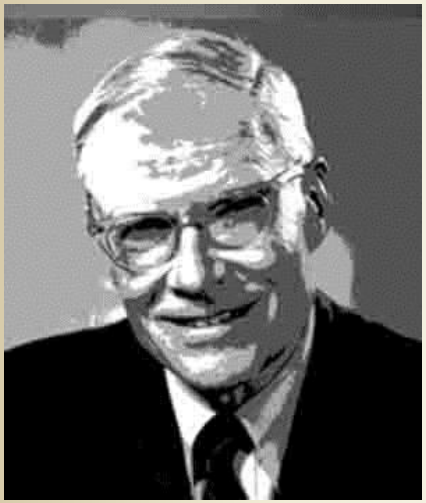
William O. Baker



During his 41-year career at Bell Laboratories, William O. Baker carried out pioneering work on macromolecules, particularly the polymers used as electrical insulators and structural materials in the communications and electronics industries. His early studies in solid-state chemistry extended to the origins of materials science and engineering. With colleagues at Bell Labs, he combined chemical experimentation with high-frequency electrical, ultra-sonic and X-ray and electron scattering techniques to find high-performance materials leading to electronic and mechanical innovation in use. During World War I, Armstrong was commissioned as an officer in the U.S. Army Signal Corps and sent to Paris. His assignment to detect possible inaudible short wave enemy communications led to his second major invention. Adapting a seldom-used technique called heterodyning, he designed a complex eight-tube receiver that, in tests from the Eiffel Tower, amplified weak signals to a degree previously unknown. He called this the superheterodyne circuit, and although it detected no secret enemy transmissions, it is today the basic circuit used in most radio and television receivers.
Baker was responsible for the discovery of a synthetic molecule called "microgel," which was heavily exploited in the critically important synthetic rubber program during World War II.
Baker has worked extensively in the application of science and technology to meet national needs and to promote government/industry/university cooperation. He has served on the President's Science Advisory Committee, the National Science Board, the National Cancer Advisory Board, the National commission on Libraries and information Sciences, and various military advisory boards. Currently, he chairs the Diplomatic telecommunications Services Board related to the U.S. government global network outside the Department of Defense. Baker received his Ph.D. from Princeton University and a B.S. in physical chemistry from Washington College. He holds 13 patents.

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Allen B. DuMont

In 1932, working at a small laboratory in the basement of his home in Upper Montclair, DuMont invented the "Magic Eye," a cathode-ray tube that could be used as a visual tuning aid in radio receivers. He sold the rights to his invention to RCA for $20,000, which he used as capital for expansion. He developed a long-persistence coating for cathode-ray tubes with the use of an electronic pencil, a device permitting remote-controlled writing on a screen. In 1933, DuMont proposed a radio-detection system but was asked by the Army Signal Corps not to seek patents because of its military significance. The following year his laboratory was incorporated as the Allen B. DuMont Laboratories in Passaic.

When the television market for cathode-ray tubes was slow to develop, DuMont turned to the manufacture of cathode-ray oscilloscopes for use as research and test instruments. During the 1930s, scientist Ernest O. Lawrence of the University of California used DuMont's oscilloscopes in atomic research. In the late 1930s, DuMont traveled to Europe to study the latest developments in television. Upon his return, he developed an all-electronic television receiver to be marketed by 1938.

In 1939, DuMont criticized the television standards proposed by the Radio Manufacturers Association and proposed alternatives that would be more compatible with future innovations. He became an influential member of the National Television Systems Committee, which formulated standards that were ultimately adopted. In 1941, he initiated experimental telecasts over W2XWV (later WABD) in New York.

During World War II, the DuMont Laboratories manufactured instruments, radar and navigational systems for the Navy and Signal Corps. It also participated in the Manhattan Project.

After the war, the DuMont television network was established. Initially, it linked WABD in New York with WTTG in Washington, D.C. It soon expanded to serve approximately 200 affiliated stations and was incorporated as Metropolitan Broadcasting Company in 1955 (later Metromedia).

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Nikil S. Jayant

Dr. Jayant is the director of the Multimedia Communications Research Laboratory at Bell Labs, where he is responsible for the creation and commercialization of technologies for audiovisual communication and multimedia information systems.

Jayant's personal research has been in the field of digital coding and transmission of information systems. Businesses created by Jayant's research and leadership span several segments in audiovisual and data communications. They include low bit rate speech codecs for digital transmission, multiplexing, cellular telephony and AUDIX voice storage; high-quality audio coding for teleconferencing and advanced DAT; video coding for advanced television and voiceband videotelephony; and high-density magnetic disks for computer data. Other emerging businesses include set-top boxes, DVD systems, CD-quality broadcast receivers and internet multimedia.

Jayant's patent "Predictive Decoding/Speech Signal," issued in 1986, relates to signal processing used to reduce noise effects in digital communication systems. This patent is critical for speech coder implementations used in DSDV modems, simultaneous voice/fax internet phones, voice-mail, video conferencing, internal audio broadcast, PSTN/IP gateways, voice-over frame relay, voice-over ATM, DEME equipment, consumer goods and games, as well as for speech compression software that is an important part of multimedia communications systems.

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Henry M. Rowan

In 1953 Henry M. (Hank) Rowan, the founder and chairman of c., built his company's first furnace in his backyard with the help of his wife Betty. From that humble beginning, Inductotherm has become the world's largest designer and manufacturer for induction melting, heat treating, and welding.

Inductotherm is currently a global industrial conglomerate of more than 80 companies, with 4,800 employees, facilities in 15 nations, and customers around the world.

A native of Raphine, Va., Rowan grew up in Ridgewood, N.J. After serving as a pilot in the Army Air Corps during World War II, he earned a B.S. in electrical engineering from Massachusetts Institute of Technology.

Rowan then set out to revolutionize the technology for induction melting, heat treating, and welding systems in the early 1950s. Frustrated by complacent management at the manufacturing company where he began his career, Rowan resigned to join with a former customer to create a company that would fulfill his dreams.

An idealist and a perfectionist, Rowan pushed himself and his team to develop ground breaking new technologies under intense pressure deadlines, often taking huge risks to get the order and satisfy the customer. Inductotherm's superior engineering led to advances that stunned the industry and enabled it to outperform companies many times larger than itself.

Rowan's U.S. Patent No. 3,295,050 (1962), entitled "Frequency Tripler Circuit Utilizing the Third Harmonic Component of Transformers," and U.S. Patent No. 3,335,354 (1964), entitled "Stabilized Controlled Rectifier Circuit Having an Inductive Load," reflected the first major breakthroughs in the technology of induction heating systems for efficiently melting metals.

Despite constant competitive challenges, Rowan succeeded in building a global conglomerate that dominates the industry. In 1992, Rowan endowed Glassboro State College with $100 million. It is now known as Rowan University.

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Dr. Alfred Y. Cho

When Alfred Cho joined Bell Laboratories in 1968, he envisioned that smaller and smaller electronic and photonic devices would create a need for a crystal growth technology with control of layer thickness and material composition. This insight led to the development of molecular beam epitaxy (MBE).

During the early 1970?s, Cho used surface analytical techniques to understand molecular beam crystal growth under controlled high vacuum conditions. He was the first to observe the two dimensional reflection high energy electron diffraction pattern of GaAs crystal growth and the atomic smoothing of the crystal surface which ultimately formed the basis for the successful growth of superlattice and quantum well structures with atomic layer precision.

MBE is used to prepare single crystal films for semiconductors, metals and insulators with exquisite control. These structures play an important role in the fabrication of consumer electronic and optical devices and other products.

With 48 patents on crystal growth and semiconductor devices related to MBE, Cho is often referred to as ?the father of MBE.? His many research accomplishments include construction of surface phase diagram for MBE crystal growth, the first fabrication of an MBE artificial superlattice, the first MBE IMPATT diode, mixer diode, field effect transistor operating at microwave frequencies, and the first MBE double-heterostructure laser operating at room temperature.

Cho earned bachelor?s, master?s and doctoral degrees in electrical engineering from the University of Illinois. He is director of semiconductor research of the Physical Science and Engineering Division at Bell Laboratories in Murray Hill, N.J.

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James L. Flanagan

Outstanding contributions in the areas of voice communications, computer techniques and electroacoustic systems by James L. Flanagan have resulted in products and processes of great benefit to society and the awarding of 48 U.S. patents in the area of telecommunications.

Flanagan?s modeling of the basilar membrane motion led to engineering models of auditory signal processing. His achievements with mathematical and experimental modeling of vocal excitation for speech production have provided a basis for advanced speech synthesizers.

Flanagan provided the basis for many of the low-bit-rate coding algorithms now in wide use for telecommunications and electronic voice mail systems. His pioneering work on acoustic signal processing led to the development of autodirective microphone arrays for teleconferencing.

His book, "Speech Analysis, Synthesis and Perception", is widely recognized as the seminal presentation of the scientific and technical aspects of speech processing systems.

In July 1996, he received the National Medal of Science, the nation?s highest scientific honor, from President Bill Clinton. Other awards include the Gold Medal of the Acoustical Society of America, the Edison Medal of the IEEE, the L.M. Ericsson International Prize in Telecommunications and the Medal of the European Speech Communication Association.

Flanagan is vice president for research and director of the Center for Computer Aids for Industrial Productivity at Rutgers University. He earned a bachelor?s degree from Mississippi State University and master?s and doctoral degrees from Massachusetts Institute of Technology.

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Ezra Gould

One of the finest mechanics of his day, Ezra Gould also possessed considerable skill as an inventor. He is credited with designing and building the first shaping machine and one of the earliest gear-cutting machines made in the United States.

Gould?s company began in a small plant in Newark in 1833. His shaping machine, drill press and hand-operated gear-cutting machine, exhibited at the Crystal Palace in New York City, earned Gould the American Institute?s silver medal in 1851. Many other machines, now in extensive use, owe their history to the mechanical and inventive genius of Gould.

In 1877, Gould formed a partnership with Ulrich Eberhardt to establish Gould & Eberhardt. The firm manufactured Gould's gear cutters and shapers and sold the machines around the world. A major customer was the auto industry; each of the major auto companies used cutting and shaping equipment to produce automotive gears.

Gould, who retired in 1890 at the age of 81, was well known in business and society circles and was a noted philanthropist.

During World War II, Gould & Eberhardt, then located in Newark, received an Army-Navy "E" Production Award in recognition of extraordinary achievement in the production of war equipment. At the time, the company was one of the largest in the world specializing in shaping and gear-hobbing machines, basic tools required for the production of all types of machinery.

Flanagan is vice president for research and director of the Center for Computer Aids for Industrial Productivity at Rutgers University. He earned a bachelor?s degree from Mississippi State University and master?s and doctoral degrees from Massachusetts Institute of Technology.

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Milton Morse

During a 50-year career, Milton Morse has provided technical solutions important to the development of a variety of industrial, commercial and military products and systems. He holds 65 U.S. patents and 39 foreign patents, including awards in France, Japan, Great Britain, Spain, Italy, Switzerland, Belgium and Canada. Still active at the age of 84, his most recent patent was issued in January 1995.

Among Morse?s more commercially successful inventions and the major source of his company?s revenues are environmental sealing boots for electrical components. The seals provide an inexpensive means of protecting electrical/electronic switches and circuit breakers from failure due to exposure to water, salt spray, dust, grease, oil, lubricants and solvents. The seals have been used in defense applications including submarines, aircraft carriers, Polaris missiles, Patriot missile launch controls and Apollo space vehicles. The seals are also widely used in industrial and commercial applications such as machine tools, aircraft, waste treatment equipment, pressure washers, underwater lighting and chemical processing equipment.

His patents have ranged from geo-thermal techniques for desalinating water to multi-speed derailleur gear-shifting mechanisms; from electro-acoustic loudspeaker transducers to manually-releasable, self-grounding electrical plugs. And from vandal-resistant telephone keypads to omnidirectional radar scanning systems.

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Richard H. Ranger

As a designer for the Radio Corporation of America (RCA), in 1924, Richard Ranger invented the wireless photoradiogram, or transoceanic radio facsimile, the forerunner of today?s "Fax" machines. A photograph of President Calvin Coolidge sent from New York to London in November 1924 became the first photo picture reproduced by transoceanic radio facsimile. Commercial use of Ranger?s product began two years later. Officials of the Marconi Wireless Telegraph Co. in London cooperated with RCA in introducing the Ranger system, which could send a 5x7 inch photograph in about 20 minutes.

In 1928, Ranger invented the photo-radioscope, which used jets of hot and cold air playing on a sensitized screen to record enlarged pictures. Three years later, he set up a consulting business specializing in radio, acoustics and general electronic technique. In 1933, he invented the electronic chimes, an automatic device to reproduce the familiar hand-struck chimes used by the National Broadcasting Co. (NBC). By connecting his electrically-operated chimes with outdoor loudspeakers, he was later able to create the effect of church bells.

During World War II, he was put in charge of radar and communications for the U.S. Army and spent 1944 to 1946 on technical intelligence missions in Europe. While in Germany, he studied advances in tape recorders which led to further development of magnetic tape recorders after the war.

The Academy of Motion Picture Arts presented Ranger with an "Oscar" in 1956 for his development of the tape recorder and synchronization of film and sound. Ranger was a 1911 alumnus of the Massachusetts Institute of Technology.

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Dr. Harry L. Yale

During a 33-year career at the Squibb Institute for Medical Research, Harry Yale was responsible for the discovery and development of six ethical drugs. His first success was the development of the anti-tuberculous compound Isoniazid for which he received the Lasker Award in Public Health in 1953.

Yale also played a key role in the development of the antipsychotic drugs Vesperin (triflupromazine), Prolixin (fluphenazine) and its derivatives Proflixin Enanthate and Prolixin Decanoate which are long-acting drugs, as well as the diuretic, antihypertensive Naturetin (bendroflumethiazide).

The author or co-author of 156 patents and some 125 academic research papers, Yale served as editor of the aliphatic compound section of Chemical Abstracts for 25 years. He earned a bachelor?s degree in chemistry from the University of Illinois and a doctorate in organic chemistry from Iowa State. Yale also worked for the National Defense Research Committee synthesizing booster explosives, as a research chemist at Shell Development Co. and on the Manhattan Project.

At his retirement from Squibb in 1979, he was a Senior Research Fellow.

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Dr. Richard Dehmel

Richard Dehmel, inventor of the Dehmel Flight Trainer/Simulator, was granted U.S. patent No. 2,494,508 for "Means for Aircraft Flight Training" on Jan. 10, 1950. The invention was the first to solve the equations of flight and have the controls and instruments of the trainer respond as an accurate equivalent of a real airplane.

The trainer/simulator dramatically reduced the cost, time and risk to train aircraft crews. It also allowed a significantly higher level of training in "extraordinary situations." For example, Pan American World Airways trained 125 flight crews, plus 46 British Overseas Airways and 85 military transport crews during 13,000 hours of simulator time. The simulator enabled Pan Am to reduce crew training costs by 60 percent and in-flight training time from 21 to eight hours per crew.

Dehmel spent much time building a multi-talented team to accelerate the design and production of this critical tool for use during the latter half of World War II.

Dehmel earned master?s and doctorate degrees from Columbia University after earning a mechanical engineering degree from the University of California. He was a 1991 inductee into the Aviation Hall of Fame of New Jersey.

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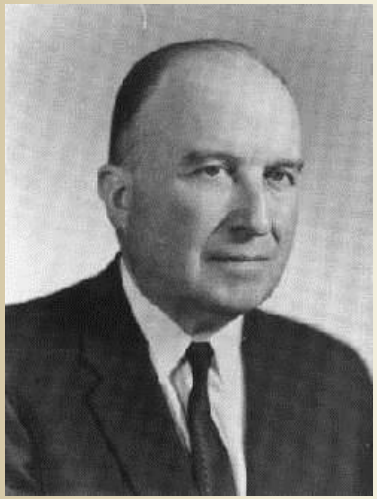
Dr. Harry F. Olson



Harry F. Olson, Ph.D. is recognized as a pioneer and leading authority in acoustics and electronic sound recording.

One of Olson's early projects was the velocity microphone, the first microphone with uniform directivity, which became the standard for broadcasting use. He later pioneered several other directional types of microphones, including the unidirectional types used in television broadcasting and sound motion picture filming.

During World War II, he developed underwater sound equipment, anti-noise microphones, and high powered announcing systems. He also made pioneering contributions to loudspeaker development, including the development and improvement of phonograph pickup and disc recording equipment, sound motion picture and development of electronic noise reducers, stereophonic sound systems, magnetic tape recorders for sound and television, the electronic music synthesizer, and an experimental voice-activated phonetic typewriter.

Olson held over 100 U.S. patents on devices and systems in the acoustical field and was the author of more than 130 articles and professional papers. His books, Acoustical Engineering and Dynamical Analogies, have long been standard reference texts around the world. Several of his inventions are in the collection of the Smithsonian Institution. He was elected to the National Academy of Sciences in 1959. Olson earned bachelor?s and doctorate degrees from the University of Iowa.

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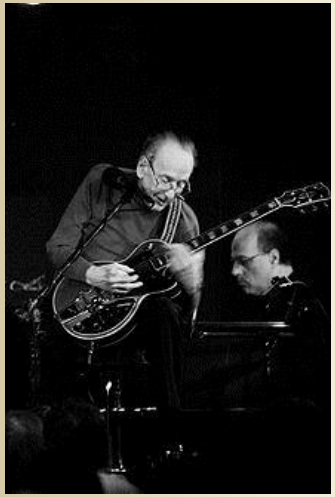
Les Paul



Les Paul, a musician and electronics wizard, revolutionized the sound of American popular music. Working out of his home in Mahwah, Paul helped develop the solid-body electric guitar and the world's first multiple track tape recorder in the early 1950s.

Paul's electric guitar prototype, known as "the log," was built in the 1940s on a piece of 4-by-4 lumber with the strings anchored on a door hinge. Audiences rejected the original version, resulting in the addition of a solid body shaped like a guitar. Gibson Guitar began marketing the Les Paul electric guitar in 1952, putting the guitar at the center of popular music performance and profoundly influencing the rock-and-roll and rhythm-and -blues revolution of the 1950s and 1960s. The Les Paul guitar became and remains the instrument of preference for many top ranking guitarists in pop, rock, jazz, blues and country music.

In the 1930s, Paul began experimenting with recording sound which led to the development of the "sound on sound" recording technique during which performances were built layer-by-layer by "bouncing" the sound between two recording devices. His equipment used records at first, but later versions used recording tape.

In the 1950's, Paul pioneered the multi-recording machine which revolutionized music recording techniques by allowing each instrument or vocal part its own track on a tape, independent of the other tracks. He is widely considered the inventor of the first 8-track tape recorder.

Paul was inducted into the Rock and Roll Hall of Fame in 1988 for his contributions "both as an entertainer and inventor." His inventions were sought after by the Smithsonian Institution which now possesses about four dozen of his guitars and other memorabilia.

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1996 Hall of Fame

Arnold J. Morway

With 293 U.S. patents and numerous foreign patents to his credit, Morway is the most prolific of all inventors at Exxon Research and Engineering. He is, however, best known for a product he never patented, "Eisenhower grease," which was developed to waterproof U.S. military trucks, tanks and other equipment during World War II. This grease proved invaluable during the Allied invasions of Sicily, Anzio and Normandy and is regarded as a significant technical contribution in support of America's war effort.
His patented greases were used to lubricate a wide variety of motors and heavy industrial equipment, automobiles, trucks, ships and aircraft enabling Exxon to secure a strong market share and to maintain a strong commercial position in this highly competitive field. His initial patent was granted in 1936 for the discovery which resulted in the development of more than 50 products. In 1938, he invented some of the first premium quality anti-friction bearing greases for high temperature use and thereafter invented the first commercially produced lithium-based aviation greases during World War II. In 1953, Morway invented the first extreme-pressure calcium acetate multi-purpose greases for industry and automotive use.

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1996 Hall of Fame

Charles Frederick Wallace

In 1913, when nearly 30,000 Americans were dying each year from typhoid fever as a consequence of drinking contaminated water, Charles Wallace invented the "chlorinator" which provided the first practical and effective means for the controlled feeding of chlorine gas to sterilize drinking water. The accomplishment was heralded as a major advancement in the field of public health. Wallace?s device could automatically pipe a thimble or so of chlorine gas into 1 million parts of water.

The device was first used at the Boonton reservoir that served as the water supply for Jersey City. At the time, pollution from a small stream was threatening the water supply. Martin F. Tiernan, Wallace?s partner, convinced Jersey City?s water department that the chlorinator could solve their pollution problems for only $150. The device was installed in a blacksmith?s shop near the reservoir, but a gas leak turned the blacksmith?s tools green and he threw the device into the reservoir. After fishing the device out of the water, it was hooked up again and worked properly.

Wallace's first invention was so successful that within a few years the Wallace & Tiernan device was being used to purify half the world's drinking water supply. In addition to the chlorinator, Wallace held 80 patents for devices such as pressure-sensitive instruments, telemetering systems, and timing devices used in marine beacons, foghorns and other aids to navigation.

In 1940, Wallace received the Modern Pioneer Award of the National Association of Manufacturers. Born in Kansas City, Mo., he attended the University of Michigan in 1906, and in 1922. In 1922, Wallace and Tiernan were jointly awarded the Franklin Institute?s Edward Longstreth Medal for their chlorinator invention.

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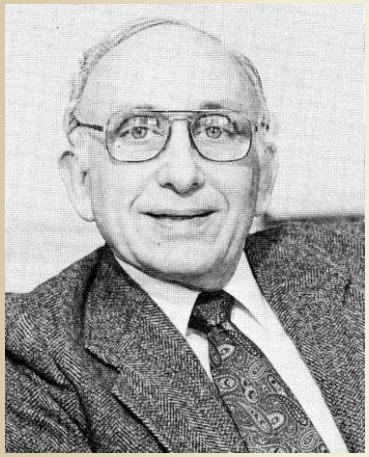
1996 Hall of Fame

N. Joseph Woodland



Woodland invented the bar code and bar code reader in 1949 while self employed. Colleague Bernard Silver assisted Woodland with preparing and filing the patent application for Classifying Apparatus and Method, which was granted in October 1952.

Woodland then selected IBM as the company most likely to pursue the exploitation of automated checkout in supermarkets. From 1971 to 1982, Woodland was responsible for developing IBM's UPC proposal and selling it to the grocery industry.

In 1993, he received the National Medal of Technology from President George Bush for his invention and contribution to the commercialization of bar code technology which improved productivity in every industrial sector and gave rise to the bar code industry.

In 1993, he received the National Medal of Technology from President George Bush for his invention and contribution to the commercialization of bar code technology which improved productivity in every industrial sector and gave rise to the bar code industry. During World War II, Woodland was recruited for the U.S. Army's Manhattan Project in Oak Ridge, Tenn., where he served as a technical aide to the Corps of Engineers unit chief for the project in which uranium isotopes were separated through liquid thermal diffusion. His responsibilities included project historian. He contributed material to Atomic Energy for Military Purposes, the official report on the development of the atomic bomb.

Woodland earned bachelor?s degree and master?s degrees in mechanical engineering from Drexel University and Syracuse University respectively.

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1995 Hall of Fame

David Aronson

David Aronson is known for his work in the advancement of low temperature energy utilization equipment and various energy recovery systems while working as a manager in development engineering for the Worthington Air Conditioning Co., a division of Worthington Corp. He was recognized in 1964 with the company's Worldwide Engineering Award for his outstanding engineering achievement in the development of the Worthington Sentry absorption chiller.

He joined Worthington in 1951 and rose in the company ranks from staff engineer to chief engineer and beyond.

His inventions solved many difficult problems associated with absorption refrigeration. The patents were useful in the development of refrigeration for air conditioning, refrigeration and heat-pumping. They also permit the development of refrigeration systems that can utilize "waste heat," thereby conserving energy.

Among his 31 United States patents are an oil burner for gas turbine applications, large tonnage water chillers for air conditioning, a nuclear powered system using liquid metal coolant, and a heat pump using fuel-fired engine or turbine. He earned degrees in chemical engineering from both Cooper Union and the Polytechnic Institute in New York.

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1995 Hall of Fame

Alvin M. Cohan

Alvin Cohan is responsible for a body of work, which started with the first machine in his basement and culminated in a $10 million company employing 50 people. His work encompasses the advancement of production printing equipment for the container industry.

A glance at the average American household shows at least 10 different containers in the refrigerator (soda and beer cans, yogurt, cottage cheese, ice cream, sour cream and salad dressing containers) and another 10 in the bathroom (toothpaste tubes and pumps, shampoo jars and bottles, moisturizers, creams, band aids, pharmaceutical products, etc.) that have been decorated by systems Cohan either directly manufactured or by systems using his inventions. He developed the ultraviolet (UV) curing system to the high standards the printing industry enjoys today.

Production speeds, print quality and material handling considerations were advanced by Alvin Cohan. His patents currently in use include oval cosmetic containers decorated by silk screen; and the printing on Band Aid and Curad bandage containers, and can lines in Canada, the United States, Germany and Venezuela. Cohan is a 1941 graduate of New Jersey Institute of Technology's Newark College of Engineering.

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1995 Hall of Fame

George deStevens

In 1958, Dr. George deStevens discovered hydrochlorothiazide, a potent, non-mercurial, orally-active diuretic. In an extensive three-year program, he led a research group which synthesized over 400 derivatives. Used alone and in combination, Hydrochlorothiazide became the most widely prescribed drug for the treatment of hypertension throughout the world. Because of its potency and built-in ceiling effect, it is highly effective in removing excess fluids from the body with minimum side effects. In addition, its fixed combination with other antihypertensive drugs has facilitated the treatment and control of high blood pressure for millions of patients. As a result, the incident of stroke, renal damage and heart attacks has been markedly reduced for millions, thus leading to a significant reduction in mortality. In the U.S., more than 50 million people suffer from hypertension.

Dr. deStevens was executive vice president and director of research at CIBA and CIBA-Geigy from 1967 to 1979. In that capacity, he led research teams which developed Rimactane, a cure for tuberculosis; Celospor, a broad spectrum antibiotic; Slow-K, for potassium deficiencies in cardiovascular disorders; Apresazide, a new antihypertensive; Tegretol, for the treatment of epilepsy; Lioresal, an antispastic agent; Rengasil, for the treatment of arthritis; and Lopressor, a widely used antihypertensive agent. In addition, he pioneered the establishment of a new drug delivery system research group, which in collaboration with Alza, led to the development of Transderm-Nitro, for the treatment of angina.

Currently, Dr. deStevens is research professor of chemistry at Drew University and among the founders of Drew's Charles A. Dana Research Institute for Scientists Emeriti. He earned a doctorate in organic chemistry and enzymology from Fordham University. In 1991, the American Chemical Society named deStevens as the first recipient of the E.B. Hershberg Award for important discoveries in medicinally active substances.

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1995 Hall of Fame

Joseph J. Masuch

Awarded 165 patents, Mascuch is best known for the development of the ignition shield which allows the clear reception and transmission of radio signals when the electrical system of an airplane or automobile engine is running.
He also developed a flexible metal hose that allowed the use of safe fuel lines in aircraft, a device first used in Wiley Post's airplane "The Winnie May" in 1934. Mascuch also developed the anti-jackknife hitch that prevents trailers from jackknifing when braking.
Rustproof standardized stainless steel automobile bumpers, propeller blade, marine bulkhead door, antenna structure, standardized helicopter hoists, the mechanism for carrying and releasing bombs and rockets, the instant reading thermocouple thermometer, and gear-driven clamps are also Mascuch devices.
Mascuch organized Breeze Corporation in 1926 by consolidating a number of manufacturing businesses and founded Victory Engineering Corp. in 1942. He graduated from Newark Technical School, a predecessor to New Jersey Institute of Technology.

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Glenn Leslie Dimmick

Among his 94 patents, Dimmick's most significant inventions are in the areas of sound motion picture recording, sound powered telephones, optical lens coating and dichroic reflectors for color television.

The first attempts at "talking movies" used a phonograph record for the sound. But the synchronization with the movie film was a problem. A system was needed that could effectively and practically put the sound track on the movie film at the same time the video image was captured on film. Dimmick's initial invention related to sound motion picture recording was a very robust galvanometer specifically adapted for recording sound on film. The galvanometer used electrical current from the studio microphones to "wiggle" a small mirror that produced a modulated light beam to the edge of the film.

Over the years, Dimmick invented numerous refinements, including noise reduction on the sound recording system that resulted in a robust, effective system. The RCA sound recording system with his galvanometer was still being used by the motion picture studios in 1963 when Dimmick retired, 32 years after his initial invention.

He invented the sound powered telephone for U.S. Navy ships during World War II. The system, manufactured by RCA, uses the acoustic energy from the speaker's voice to generate enough electrical current to power the far end receiver without a battery.

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Kenneth S. Johnson

Kenneth S. Johnson was considered the world's foremost authority on wire transmission. Johnson developed the basic engineering measure known as the "Q" factor, or quality factor of a circuit, which has become an indispensable design aid in a wide variety of electrical engineering system applications.

When he first used the symbol "Q" to represent the ratio of reactance to effective resistance in a coil or a condenser, Johnson could not have anticipated that within a span of 30 years this same symbol would be commonly used to describe an attribute of such dissimilar things as a resonant circuit, a spectral line, a mechanical vibrator, and a bouncing ball.

Johnson had originally designated the ratio of reactance to effective resistance of a coil by the symbol "K." It was in 1920, while working on the practical application of the wave filter which G.A. Campbell had invented some years before, that he first employed the symbol "Q" for his parameter. Initially, Johnson used a capital "Q" for coils and a small "q" for the corresponding ratio in capacitors. Before long, was using it for both in his U.S. patent No. 1,628,983 (1927) where it is applied to the coils in an electrical network.

Johnson also designed the 1937 telephone which was put in use throughout the country. The 1907 magna cum laude graduate of Harvard University held 53 U.S. patents.

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1994 Hall of Fame

Jack Avins

Jack Avins was responsible for more than 50 patents in the area of television and radio receivers. His early inventions were in the area of FM detection, where his FM detector became the industry standard in domestic and foreign radio and television receivers.

From 1964 forward, Avins developed integrated circuits for consumer products. The use of integrated circuits in consumer products resulted in improved performance, cost reduction, reduced power consumption and improved reliability of those products.

Avins was a fellow of The Institute of Electrical and Electronics Engineers, a member of the administrative committee of the Broadcast and Television Receivers Group, and Chairman of its Standards Subcommittee. He received a David Sarnoff Award for his inventions and leadership in the "development of integrated circuits for use in television receivers."

He earned a bachelor's degree from Columbia University and a master's degree from Polytechnic Institute in Brooklyn. He was a resident of Princeton.

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William O. Geyer

William Geyer arrived in the United States from his native Germany in 1910 at age 17, earning his passage by peeling potatoes on the ship. He had no money or command of the language but put his skills to work as a glassblower at Westinghouse, making lamps for 15 cents an hour.
By 1918, at age 25, he established Scientific Glass Apparatus Co. in Bloomfield in the back bedroom of his home. After the business spilled onto other parts of his property, including the chicken coop, he established his first factory in Bloomfield, about 500 feet from his home. Several skilled craftsmen manned the plant, producing custom-made glassware for local laboratories.
Geyer was the inventor of automatic burettes, metal-clad joints, melting point thermometers and other items now considered standard equipment in laboratories. He was also responsible for the development and production of interchangeable glassware in the United States.

He was honored with the Kiwanis International Legion of Honor Award.
His son "Indian" Bill Geyer, who was an All-American running back at Colgate University and a professional with the Chicago Bears, succeeded his father as president of Scientific Glass, now an international company with annual sales in excess of $7 million. He was resident of Bloomfield.

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1994 Hall of Fame

George R. Hansen

George Hansen developed a new casting process for the manufacture of silicon carbide refractory shapes that were competitive in terms of design and capability with ferrous metal parts used in high temperature applications. Many industries use silicon carbide, a very abrasion and heat resistant material, to reduce process down-time and manufacturing costs.
Development of this process enabled industries such as aluminum casting, chemical processing, ferrous metal and pollution control to use silicon carbide as part of their processes. Hansen personally trained employees at Carborundum manufacturering sites in Brazil and Europe.
Hansen attended both Rutgers University and Newark Technical School, forerunner of New Jersey Institute of Technology. Hansen was a resident of Whiting

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Dr. John Bardeen

The solid-state electronic age was born in 1947 when the AT&T Bell Labs scientists invented the transistor. The invention of the transistor resulted from basic research in the theoretical and experimental physics of solids, specifically on the properties of semiconductors.
Transistors detect, specify, rectify and switch electric currents. They are tiny, relatively cheap, highly reliable, and use very little power. These properties have made possible digital computers, space flight, electric guitars, pocket calculators, heartbeat regulators, hearing aids, electronic watches and solid-state television, radios and hi-fi sets among countless other consumer products.
The industries involved in these products employ millions of people worldwide, and their output amounts to many billions of dollars annually.
For their pioneering research, Bardeen, Shockley and Brattain were awarded the 1956 Nobel Prize in Physics. Dr. Bardeen won a second Nobel Prize in 1972 for co-developing a low-temperature superconductor theory.

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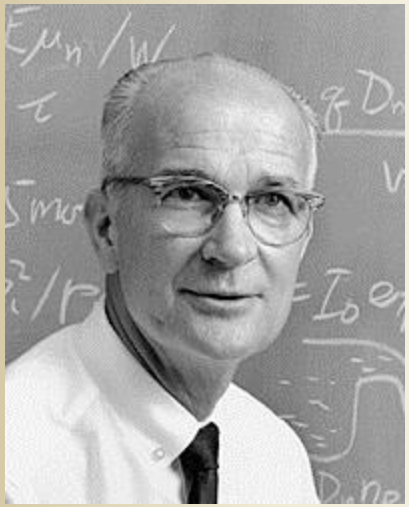
Dr. William Shockley



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1994 Hall of Fame

Dr. Walter Brattain

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1993 Hall of Fame

Marc A. Chavannes

Marc A. Chavannes and Alfred W. Fielding developed AirCap air cellular packaging material - air bubbles encapsulated between two layers of plastic film, each containing a barrier layer to retard air loss. Bubble cushioning was clean, cost-effective packaging material providing superior protection from shock and vibration throughout a product's shipping and storage cycle. The development of AirCap packaging material, U.S. patent #3,416,984, was formalized in 1960 when Chavannes and Fielding founded Sealed Air Corporation as a public corporation. Sealed Air specialized in developing the market for "protective packaging" and other uses for the product, including padded shipping envelopes and solar pool covers. Fielding is a 1939 graduate of Stevens Institute of Technology. He has been executive vice president (1960-1985) and served on the Board of Directors (1960-1987) of Sealed Air Corporation. Retired, he currently resides in Kirkland, Wash. Chavannes is a native of Switzerland and spent part of his professional life in the diplomatic service as a judge on the World Court and at the League of Nations before entering business. In the 1930s, he studied physics and chemistry before starting a latex business. Today, Chavannes is retired and lives in Florida.

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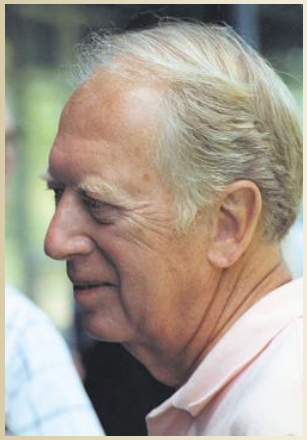
Alfred W. Fielding



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1993 Hall of Fame

Charles J. Fletcher

While serving as a pilot in the U.S. Navy in Norfolk, Va., Charles J. Fletcher sketched the design for a vehicle envisioned to rise above the water or terrain (approximately 10 inches to two feet) depending on available horsepower. The vehicle would generate an airflow trapped against a uniform surface such as the ground or water, freeing it from the surface and eliminating friction. Positive control and movement would be attained using aircraft control techniques and the release of air. What Fletcher called the "Glidemobile" is known today ad the hovercraft. The hovercraft has proven to be a major advance in military land assault vehicles and modern inter-waterway travel. Hovercrafts are manufactured in the U.S. today and by Bell Aerosystems and sell for between $800,00 and $1.5 million each. Fletcher's claim as an inventor of the hovercraft, undocumented because the U.S. military suppressed the patent to keep the idea a secret, was recently validated during resolution of a lawsuit brought by British Hovercraft Ltd. against the United States, seeking royalties of $104 million. Attorneys for the U.S. Department of Justice found a 1960 edition of Design News which featured an article on Fletcher's hovercraft. Fletcher was tracked down and his records on the project which included 16 mm films of the "Glidemobile," documentation regarding his conceptual drawings, subsequent work, model flight trials, and various news articles proved easy to destroy the Hovercraft Ltd. case. Fletcher earned a bachelor's degree in aeronautical engineering from the academy of Aeronautics at New York University in 1950. He holds 17 aeronautical patents on vertical lift and rocket engines plus five additional patents for industrial products.

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Dr. Erwin Klingsberg

Wild oats is a weed which infests crops worldwide such as wheat and barley, contributing to the global food crisis. A chemist-inventor with mores than 40 patents, Erwin Klingsberg developed the selective herbicide "Avenge," which effectively controls the wild oat weed, benefitting the economies of countries around the world because it increases both the yields and quality of wheat and barley harvests. In addition to Avenge and dyestuffs, he also developed a cost-effective procedure for analyzing vat dyes. His multi-volume treatise on pyradine chemistry, published in 1960 has remained the standard in the field. Klingsberg was a chemist at American Cyanamid's research laboratories in Bound Brook from 1946 to 1981. He has lectured on his work in many parts of the world and held a number of visiting professorships here and abroad. He earned a bachelor's degree from the University of Pennsylvania and a Ph.D. from the University of Rochester. Retired, he currently resides in Washington, D.C.

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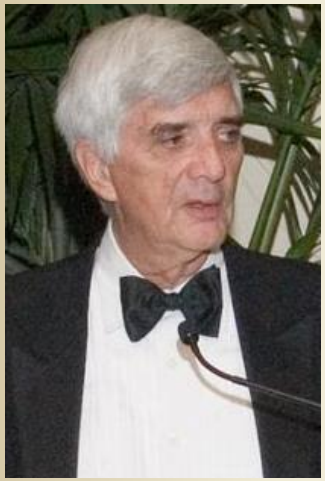
Dr. Robert W. Lucky



Robert W. Lucky developed the adaptive equalizer which corrects signal distortion found in the transmission of data over telephone lines. The device was a quantum leap forward in data transmission technology, quadrupling the speed of transmission from 2400 bits to 9600 bits per second. The adaptive equalizer led to more efficient transmission of voice and data as well as lower cost because of the significant reduction of transmission of time. The device uses a transversal filter which resets automatically during the period preceding the actual transmission. The novel solution to a vexing problem was truly adaptive in that the equalizer changed its own characteristics according to the nature of the pulses in the lines. Lucky also has researched thee methods and technologies for future communication systems, including optical fiber technology, data networks, mobile communication, image processing, and broadband communications technologies and services. The textbook he co-authored on data communications became the most cited reference in the communications field over a 10-year period. His popular book, "Silicon Dreams," is a semi-technical and philosophical discussion of the ways in which both humans and computers deal with information. His latest book is titled "Lucky Strikes Again." Robert Lucky was named Vice President of Applied Research at Bellcore in October 1992 after a 30year career at AT&T Bell Laboratories. He earned undergraduate and graduate degrees in electrical engineering at Perdue University and was the recipient of the prestigious Marconi Prize for his contributions to data communications in 1987.

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1993 Hall of Fame

Keith D. Millis

During World War II, when many primary metals were in short supply, Keith D. Millis made a discovery that revolutionized the metalworking industry. While searching for a replacement for chromium, a key alloying element is stainless steel, high strength steels, and abrasion resistant irons such as Ni-Hard, he discovered the process for making ductile cast iron. Millis' discovery occurred when he added magnesium to a liquid bath of iron, with dramatic results. After sweeping much of the metal off the floor, he checked the microstructure and found the graphite in a round shape rather than a corn flake shape. Millis hadn't achieved his objective, but rather discovered something more revolutionary. Ductile cast iron is twice as strong as its gray iron parent, and much easier to cast than steel. Millis' discovery changed the world. Because of ductile iron, automobiles have been made better, tractors and bulldozers have increased performance, machine tools are more accurate, and water enters homes more efficiently. It has been said that his discovery may be the one invention in this century which has had the most influence on the metal-working industry. Ductile iron is used world wide and is a multi-billion dollar per year industry. The Ductile Iron Society has sponsored a perpetual scholarship in the name of Keith Dwight Millis for the education of men and women throughout the world. Millis was a graduate of Rensselar Polytechnic Institute.

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Sidney Pestka

Dr. Sidney Pestka has made seminal contributions in diverse areas molecular biology including furthering our understanding of how antibiotics work, development of the first biotheraputic - interferon, and development of antisense RNA technology used in genetic engineering to block a single gene. During comprehensive and far-reaching work on antibiotics, he began to research on the anti-viral protein known as interferon. In the process, Dr. Pestka developed not only new technology but fundamental new insights into the field. Interferon therapy helps patients with hairy cell leukemia maintain remission and enjoy a normal life without enduring radiation therapy, bone marrow transplants, chemotherapy, splenectomy, or blood transfusions. Interferon therapy also has made significant inroads for treatment of many other malignant tumors and viral diseases. Significant remissions have been observed in chronic myelogenous leukemia, T-cell leukemia, malignant melanoma, renal cell cancer, bladder cell cancer, multiple myeloma, a non-Hodgkin's lymphomas, and AIDS-related Kaposi's sarcoma. It is the only current treatment for chronic Hepatitis B and Hepatitis C. Leukocyte Interferon, a rare natural protein estimated to cost $50 million per gram 12 years ago, is now available as practical treatment for various cancers in sufficient amounts to supply all needs. Many patients are alive and well today because of Dr. Pestka's direct contributions. Thousands more will be alive and thriving in the future because of his achievements. Dr. Pestka also revolutionized the purification of proteins through the development of reverse phase high performance liquid chromatography (HPLC), a process now employed by laboratories around the world involved in the isolation and purification of proteins. In 1983, he developed a bold new technique for blocking the expression of single genes in prokaryotic cells with the use of antisense RNA. The discovery has become a commonplace consideration in planning experiments within molecular genetics and developing strategies for the treatment of many diseases. Currently professor and chairman of the Department of Molecular Genetics and Microbiology at UMDNJ's Robert Wood Johnson Medical School in Piscataway, N.J., he spent some 16 years working at The Roche Institute of Hoffman-La Roche in Nutley. Dr. Pestka earned a bachelor's degree from Princeton University and a doctorate in medicine from the University of Pennsylvania.

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Melvin L. Druin

Druin is the author of 14 U.S. patents in engineering resins, structural composites, polymer blends and microporous plastics films. His most important inventions relate to the development of Celgard Microporous Film, introduced by Celanese Plastics Co. The invention in 1972 led to a stable, porous structure that did not shrink or collapse up to 212 degrees Fahrenheit. Celgard is the material of choice for oxygenators used in all open heart surgeries and for controlled release of pharmaceuticals. Druin worked for 17 years for Celanese, serving as Technical Director, Plastics Group and Engineering Resins. Druin also participated in the development of polybenzimidazole fiber, a material that is highly resistant to high temperatures and is used for safety garments in the U.S. space program. He joined Campbell Soup Co. in 1984 and served as a corporate vice president, responsible for the company's worldwide packaging organization. He helped position Campbell as a leader in developing the consumer-oriented, functional packaging forms, with a focus on improved and new convenience packaging for shelf stable, frozen and refrigerated food applications. His packaging organization was responsible for developing and implementing new metal can technology and for technical service support to Campbell's can operations. As an expert in plastics technology, his organization also designed and commercialized Campbell's first CPET plastics container operation in Modesto, Calif.

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1992 Hall of Fame

W. Lincoln Hawkins

In 1942, Hawkins joined Bell Telephone Laboratories as a member of the technical staff. The first Black scientist to be employed by Bell Labs in Murray Hill, he undertook research of the thermal and oxidative stabilization of polymers for use in telecommunications. Hawkins co-developed a chemical formula which protected polythylene from the oxidation effects of sunlight and heat. This enabled polyethylene to replace expensive and toxic lead alloys as a protective jacketing on telephone cables. Hawkins discovery went into production in the early 1960's and continues to be used with today's fiber optic cable. During his 34-year career at Bell Labs, Hawkins earned 14 U.S. patents and 129 foreign patents in 18 countries. He served as research director of the Plastics Institute of America from 1976-83. He has been awarded 17 international patents related to the protection of plastics against oxidative degradation. Hawkins also received the following awards: The International Award, Society of Plastics Engineers; election to the National Academy of Engineering; Award of Merit, National Technical Association, North Jersey Section, 1982; Achievement Award, Los Angeles Council of Black Professional Engineers, 1981; Percy L. Julian Award, 1977; Distinguished Alumni Award, Howard University, 1974; Annual Community Service Award of the Urban League, Essex County, 1973; Honor Scroll, American Institute of Chemists, 1970; and Sigma Xi. Honorary Degrees bestowed by: Montclair State College, LL.D.; Stevens Institute of Technology, D.Eng.; Kean College, LL.D. and Howard University, D.Sci. Hawkins was the first Black engineer to be inducted into the National Academy of Engineering and is a member of the Board of the National Action Council for Minorities in Engineering. He is the former chairman and member of the Board of Trustees of Montclair State College and served on the Board of Trustees of Mountainside Hospital. Hawkins also was active on the national and regional levels of the American Chemical Society.

New Jersey INVENTORS Hall of Fame

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1992 Hall of Fame

James Hillier

Hillier dedicated 16 years to the development of the electron microscope, of its applications and of related equipment that made it an even more useful scientific tool. In 1940, Hillier designed the first electron microscope that was offered commercially in North America for RCA. He was active in greatly expanding the range of useful applications of the instrument, particularly in biology and medicine. Today the instruments are used worldwide in every important laboratory, studying the fine structure of materials from viruses to genetics. All of Hillier's 41 inventions were made in RCA's New Jersey laboratories. He was a pioneer in fostering cooperation between industry and educational institutions and arranged collaborations with many institutions for dissemination of results obtained in New Jersey. These include Princeton University, University of Pennsylvania, Cornell University, Sloan-Kettering Institute for Cancer Research and Woods Hole Marine Biology Laboratory. Hillier, born in Brantford, Ontario, Canada, later spent 20 years as head of the David Sarnoff Research Center in Princeton during which he used his extensive experience as a successful inventor to guide the activities of the hundreds of inventors employed at the Center. During this period, the Center evolved several major inventions that spawned many familiar products such as liquid crystal displays, camera chips for video cameras, personal computer chips and amorphous silicon photo cells for solar energy. Inducted into the National Inventors Hall of Fame in Washington and Akron in 1980, Hillier received an honorary doctorate from New Jersey Institute of Technology.

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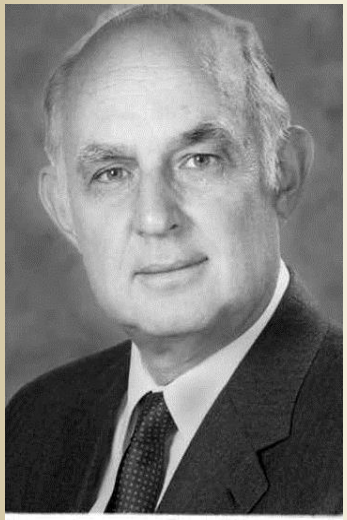
1992 Hall of Fame

Frederick J. Karol



Karol is recognized worldwide for his pioneering work in basic and applied chemistry of organotransition metal catalysts for use in fluid-bed reactors, and for the development of linear, low-density polyethylene resins - the world's largest volume plastic - leading to the commercial success of the Unipol polyethylene process. The Unipol process requires lower pressure and temperature to produce material, as a result Unipol plants cost half as much to build, occupy only 10 percent of the space, and consume only 25 percent of the energy in comparison with high pressure plants. Karol, who holds more than 69 U.S. patents, has been the recipient of a number of awards, including the 1988 Chemical Pioneer Award of the American Institute of Chemists, the 1987 Award of Excellence in Catalysis Society of Metropolitan New York, and the 1982 Thomas Edison Award from the R & D Council of New Jersey. Karol was the winner of the 1989 Perkin Medal for outstanding accomplishments in applied chemistry. He received the 1989 Conly Award for outstanding technology presented by the Society of Plastics Engineers and the SPE International Award in 1990. In 1991, he received the ACS Award for Creative Inventions.

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1992 Hall of Fame

Harold Law

Law is recognized throughout the electronics industry for development of the shadow mask color television tube, used in the vast majority of color TV receivers throughout the world. The first color television set was introduced in 1954; today there are approximately 180 million color sets in use in the United States. Law's method uses light to simulate electron rays for printing phosphor screens in shadow mask color tubes. The technique locates and fixes phosphor elements precisely where they are needed on the face plate to achieve independent excitation by electron beams of the red, green and blue emitting phosphors. As many as a quarter million are laid down in a standard TV tube. Law also developed the fabrication techniques that lead to the first practical color picture tube demonstrated by RCA in 1950. Among his key contributions were the "lighthouse" to simulate the shadowing of electron beams on the tube's face plate and the corresponding photo deposition of a mosaic of tiny phosphor dots to produce the color picture. Still used today, Law's techniques made possible the hundreds of millions of color TV receivers produced in the last 40 years. Law also was one of a trio of RCA Laboratories scientists, along with Albert Rose and Paul Weimer (1991 Hall of Fame inductees), who developed the Image Orthicon, an outstanding TV camera tube. His contribution was development of the glass-mesh target structure including a technique for making very fine high transmission metals meshes from ruled glass master. Originally built for the military, the Image Orthicon became the workhorse for commercial telecasting after World War II because it had tolerance and sensitivity for photographing live events, particularly sports, under difficult and changing lighting conditions.

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1991 Hall of Fame

Benjamin Abeles

The Voyager space probes have been described as "an epic journey to the four giant gas planets of our solar system." The invention that made the Voyager mission possible, the silicon-germanium thermoelectric power generator, was developed in the 1960s by Benjamin Abeles and George Cody at the David Sarnoff Research Center in Princeton. While studying the high temperature properties of semiconductors the pair discovered unexpectedly low thermal conductivity in silicon-germanium alloys. By doping the alloys with impurities, they further lowered the thermal conductivity and optimized the electrical properties needed to efficiently convert heat to electricity at high temperatures. This discovery led to the development of a reliable and longlived source of energy, perfect for deep space probes which cannot use solar panels to collect energy. In 1980, the Franklin Institute presented the prestigious Stuart Ballentine Medal for advancing communications using thermomagnetic radiation to the researchers.

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1991 Hall of Fame

George Cody

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1991 Hall of Fame

Carlyle Caldwell

Carlyle Caldwell's research into the chemistry of starches resulted in processes for the manufacture of the first commercially useful starch derivatives. By discovering how to modify the native starch molecules and alter the properties of the starch granule to provide a product which would function effectively and economically as a thickener, he laid the foundation for the use of starch in modern-day paper, textile and food industries. His subsequent work, incorporating cationic and/or anionic groups onto the starch molecule, significantly advanced the entire starch industry. Caldwell is the holder of three individual patents and is a co-inventor of 11 other patents.

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1991 Hall of Fame

Gordon W. Calundann

A pioneer and researcher in the emerging technology of high performance liquid crystalline polymers, Gordon Calundann developed a group of related inventions describing a family of wholly aromatic, thermotropic polyesters designed for use in high performance molded parts, fiber and film applications. Since 1985, these materials have found application in a broad and growing range of industries-electrical/electronic, automotive, industrial, textile and defense/aerospace. Marketed by Hoechst Celanese Corp as VECTRA, sales are expected to reach well over $100 million per year by the year 2000. Calundann is the holder of more than 35 U.S. patents.

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1991 Hall of Fame

Andrew G. F. Dingwall

Andrew Dingwall is widely recognized for his contributions to CMOS (Complimentary Metal Oxide Semiconductor) integrated circuits technology and participated in its commercial introduction. CMOS is now the accepted, multi-billion dollar technology used throughout the world to achieve affordable personal computers, digital watches, digital audio, digital controls and digital TV with millions of transistors on a silicon chip. Andrew Dingwall is the holder of nearly 80 patents including the first CMOS 256-bit, 1 kilobyte, 4 kilobyte static random access memories introduced during the 1970s. These devices, at the leading edge of the art at that time, introduced many features still found in modern 1 megabyte and 4 megabyte SRAMs in wide use.

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1991 Hall of Fame

C. Reed Funk

The results of C. Reed Funk's work can be found from urban lawns to the White House and from Arlington National Cemetery to the Rose Bowl. He is the world-wide leading authority in turf grass breeding. His more than 75 variety releases including eight U.S. Plant Patents for Kentucky Bluegrass varieties, nearly 60 Plant Protection certificates (USDA patent-like protection for sexually reproduced plants) and numerous plant registrations. C. Reed Funk's development intraspecific hybrids of Kentucky Bluegrass led to the development of varieties which are resistant to devastating Bluegrass diseases such as striped smut, leaf rust, crown rot and powdery mildew. Other research led to the breeding of fescues and rye grasses which possess greater resistance to insect, disease and drought, better plant vigor, and wider adaptability to growing conditions. He was the recipient of the U.S. Secretary of Agriculture's Distinguished Service Award for Scientific Research, the nation's most prestigious award in agricultural research.

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1991 Hall of Fame

Anthony D. Kurtz

Anthony Kurtz and his company, Kulite Semiconductor Products, are known throughout the world for the production and innovation of piezoresistive semiconductor transducers. He holds more than 50 patents relating to the structure and processing of transducers including accelerometers, pressure sensors and so on. These products have won numerous industrial awards. His development of a "smart" transducer was one of the first disclosures using a microprocessor to automatically compensate for offset errors in a semiconductor transducer.

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1991 Hall of Fame

Jerome Murray

The holder of more than 50 patents, Murray inventions include magnetic mixer, electric carving knife, pressure cooker, TV antenna rotator, power steering mechanism, and the marine generator. His work on , the Rotocam engine, an internal combustion engine utilizing piston and cylinder assembly found in traditional automobile engines, but 59 percent fewer parts by eliminating the crankshaft, camshaft, valve train, flywheel, and distributor, continued up until his death in 1998.

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1991 Hall of Fame

John H. Sinfelt

John Sinfelt's development of bimetallic catalysts has had major impact on the commercial reforming of petroleum naphtha fractions to produce high-octane components for gasolines. He was instrumental in the development of KX-130, Exxon's proprietary and highly active reforming active reforming catalyst which enables refiners to reduce the amount of catalyst needed in reforming-the principal refinery process for making high octane components required to make gasoline. The improved activities a selectives shown by bimetallic reforming catalyst were instrumental in the emergence of low-lead and lead-free gasolines during the 1970s and 1980s. The 1980 recipient of the President's National Medal of Science, John Sinfelt is the author of more than 80 technical papers and the holder of 42 U.S. patents.

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1991 Hall of Fame

Paul K. Weimer

The Orthicon television camera tube, exhibited by RCA during its introduction of television at the 1939 New York World's Fair, was the production of collaboration between the late Albert Rose, Paul K. Weimer and Harold B. Law. In 1942, the trio developed the Image Orthicon tube which was used by the military for guided missiles during World War II and later became the principal camera tube for television broadcasts throughout the world for 25 years.
Paul Weimer is internationally recognized as an authority in the field of solid state and thin film devices for television image sensor applications. He is the holder of 88 U.S. patents and has published more than 50 articles on television pick up tubes, thin film devices, and solid state image sensors. He was the recipient of the International Congress of Photographic Science's "Kulturepreis 1986," cited as a "pioneer in electronic photography."

Widely considered the "father of electronic imaging," the late Albert Rose was granted 40 U.S. patents and published more than 50 technical papers. The Institute for Graphic Communications created the Albert Rose Electronic Imager of the Year Award in his honor.

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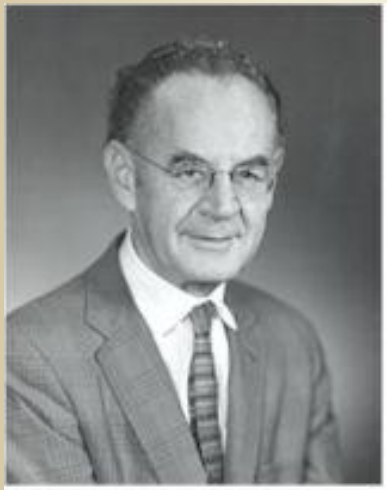
1991 Hall of Fame

Albert Rose



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1991 Hall of Fame

Karl G. Jansky

While working on a project to track down the high-frequency static and noises that plagued transatlantic telephone service in the 1920s, Karl Jansky made basic discoveries which lead to the development of radio astronomy. Using an antenna, he identified the sources of two types of static: lightning in nearby thunderstorms and lightning from distant storms, whose radio emissions may have been reflected back to earth by ionized layers of the upper atmosphere. The third type, which was quite different, was later identified as radio waves from outer space. Jansky announced his discovery at a meeting of International Scientific Radio Union in 1938. Thus was born the science of radio astronomy.

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1990 Hall of Fame

Rev. Hannibal Goodwin

Working in Plume House, the rectory of the House of Prayer Episcopal Church in Newark, Rev. Hannibal Goodwin sensitized a piece of celluloid to hold photographic images. His 1887 discovery of flexible nitro-cellulose film ignited the photographic revolution. Flexible film, which could be produced and stored in rolls, made photography accessible to amateurs and led to the mass production of cameras, film, and related equipment.

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1990 Hall of Fame

Hubert Lechevalier

With the late Selman Waksman, who was inducted into the Hall of Fame in 1989, Hubert Lechevalier developed the antibiotic neomycin as well as the process for its preparation. He also holds patents for the drug candicidin, for microbiological recovery of metals and for proteins in the recovery of metals. The author of more than 100 scientific papers and 10 books, he has been a visiting researcher at the Academy of Science of the USSR, the Czechoslovak Academy of Sciences, and France's Pasteur Institute.

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Jerome Lemelson

Winner of a record setting patent infringement suit against Mattel, Inc. for the flexible track used in "Hot Wheels," Jerome Lemelson holds more than 450 patents, more than any other living American. His patents include inexpensive portable telephones, the drive mechanism for cassette tape players, the multiple video terminal system used in computers, television security systems, computer controlled plastic extrusion and injection molding systems, direct numerical control of machine tools, and educational toys and games. The critical dimensions of the tiles on the Space Shuttle are measured by a computer-controlled system that relies on one of his patents, and the Sony Corporation uses his audio cassette patents to manufacture its Walkman.

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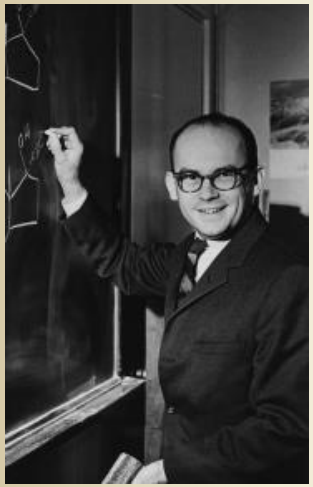
1990 Hall of Fame

Arthur Patchett



The antihypersensitive drug Enalapril and the cholesterol-lowering agent Mevacor, two key weapons in the battle against heart disease, were developed by a research team that included Arthur Patchett. Although part of the design elements for an angiotensin converting enzyme (ACE) inhibitor were known, his solution resulted in the first once-a-day ACE inhibitor for the treatment of hypertension and congestive heart failure. This drug has the greatest sales in its class in the United States ($1 billion annually). Mevacor a recent breakthrough that inhibits an enzyme necessary for cholesterol synthesis has been hailed as a major advance in the wag against heart disease.

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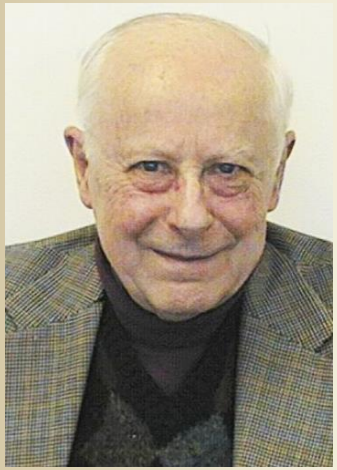
William Pfefferie



Catalytically supported thermal combustion and the magnaforming process for refining gasoline define the work of William Pfefferle: the development of catalytic processes that improve fuel efficiency and reduce emissions. Magnaforming, which reforms naphtha feedstocks into high octane gasoline blending stock, is used in the production of much of the world's gasoline, with resulting savings of millions of barrels of crude oil annually. Catalytically supported thermal combustion improves combustion stability and efficiency and significantly reduces nitrous oxide and other emissions. Of the 53 patents William Pfefferle has earned to date, 22 relate to applications of catalytically stabilized combustion. His work has formed the basis of the development of the catalytic combustor gas turbine, download catalytic steam generator for heavy oil recovery, catalytic relight coatings, and catalytically stabilized methane dimerization projects. After 20 years with Engelhard, he became co-founder of Precision Combustion in New Haven, Conn.

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1990 Hall of Fame

Harold Seidel

Harold Seidel developed the feed forward circuit technique which produces a stable, high frequency amplifier with controlled transfer characteristics. This invention significantly advanced the state of the art of amplifier control and led to commercially successful microwave amplifier designs. The holder of more than 130 patents in the fields of power conversion, RF circuit techniques, digital and analog data transmissions, optics, magnetic devices, semiconductor devices, acoustics, laser technology and analog, control and microwave circuits, he was one of the three scientists who developed the first operating three-level maser, a precursor of today's laser.

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1990 Hall of Fame

Oberlin Smith

An inventor, industrialist, and mechanical engineer, Oberlin Smith founded the Ferracute Machine Company, manufacturers of press machines for cutting. punching, forming and stamping metal. The holder of 70 patents, he was the consummate tinkerer, who invented or improved as die presses, can-making devices, looms, locks, a malted milk mixer, a garage door opener, and a device to automatically extract eggs from boiling water at a pre-set cooking time. His greatest contribution, however, was only recently attributed to him. After a visit to Thomas Edison' laboratory in 1877, Oberlin Smith spent ten months developing a reel-to-reel system that passed magnetized wire on magnetic recording. Lacking time to pursue further development of the invention, he placed his device in the public domain. In 1900 his concept was developed into Valdemar Poulsen's Telegraphone. Magnetic recording is the technology that permitted the development of devices such as the tape recorder, telephone answering machine, and computer.

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1990 Hall of Fame

Marvin Weinstein

Marvin Weinstein is the discoverer of Gentimicin, one of the most widely used and most important antibiotics on the market today. The holder of 28 patents, he is also the co-developer of the process for extracting interferon from bacteria, and the co-discoverer of amphotericin, thiostrepton, and carbomycin. Starting as a microbiologist at Schering-Plough in 1956, he retired as Vice President, Recombinant DNA Research in 1981.

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1990 Hall of Fame

Edward Weston

A prolific inventor who held 334 patents, Edward Weston helped revolutionize the measurement of electricity. In 1886 he developed a practical precision, direct reading, portable instrument to accurately measure electrical current, a device which became the basis for the voltmeter, ammeter and watt meter. The Weston Standard Cell, developed in 1893, was recognized as an international standard and was used by the National Bureau of Standards for almost a century to calibrate other meters. His company, Weston Instruments, produced world famous precision electrical measuring instruments including volt, amp, watt, ohm, and HF meters, current /potential transformers and transducers. Other Weston contributions include incandescent and arc lighting systems, the magnetic speedometer, and the dashboard ammeter for Harley - Davidson motorcycles. Edward Weston also revolutionized electroplating by using a dynamo instead of current. In addition, he designed the DC generators originally used to light the Brooklyn Bridge. Weston also helped found Newark Technical School, predecessor to New Jersey Institute of Technology, and served on its Board of Trustees.

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