2019 Inductees

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Chieko Asakawa invented the Home Page Reader (HPR), the first practical voice browser to provide effective internet access for blind and visually impaired computer users. Designed to enable users to surf the internet and navigate web pages through a computer’s numeric keypad instead of a mouse, HPR debuted in 1997; by 2003, it was widely used around the world.

Asakawa and her team developed HPR at IBM Research - Tokyo, combining existing synthetic-speech technology with an understanding of HTML programming. HPR enabled users to independently navigate the web, and it could speak text, frames, images and text links; describe graphical elements like clickable maps; allow users to understand complex tables such as television listings; and differentiate content through devices like reading hyperlinks in a female voice and plain text in a male voice.

Asakawa’s contributions to accessibility technology have helped change how visually disabled individuals communicate and interact. Blind since the age of 14, her experience informs her work, which includes a digital system to input and edit Braille; a network allowing Braille libraries to upload documents and books; aDesigner, a disability simulator enabling sighted web developers to mimic the experience of blind users; and most recently, the NavCog project, a collaboration between IBM Research and Carnegie Mellon University to use artificial intelligence, robotics, physical-positioning sensors and computer-aided vision to supply real-world accessibility through smartphone apps.

Born in Osaka, Japan, Asakawa earned her doctorate in engineering from the University of Tokyo. She joined IBM in 1985 and was named an IBM Fellow in 2009. She is the recipient of numerous awards, including the Achievement Award from the Society of Women Engineers, and holds more than 20 patents.
In the 1970s, Jeff Kodosky and James Truchard were researchers at the Applied Research Laboratories at the University of Texas, responsible for automating acoustical instruments for the U.S. Navy. Frustrated by inefficient data collection methods of the time and determined to simplify their work, they imagined how computers might facilitate high-end testing. Along with co-worker Bill Nowlin, they founded National Instruments (NI) to develop the relationship between scientific instruments and computers through a concept called virtual instrumentation, where software and hardware combine to perform the functions of traditional instruments. LabVIEW (Laboratory Virtual Instrumentation Engineering Workbench) would become its flagship product.

Kodosky and Truchard introduced LabVIEW in 1986 as a graphical programming language that enables user-defined testing, measurement and control systems. It grew to be used by engineers, scientists, academics and students around the world. Based on structured data flow methods, Kodosky and Truchard's virtual instrumentation software is used in a variety of industries, including electronics, energy, aerospace and defense, wireless, automotive, heavy equipment, industrial machinery, academic research and semiconductors.

With LabVIEW, users program graphically and can design custom virtual instruments by connecting graphical icons with software wires to create block diagrams that are natural design notations for scientists and engineers. Users can customize front panels with knobs, buttons, dials and graphs to emulate control panels of instruments or add custom graphics to visually represent the control and operation of processes.

LabVIEW created a new paradigm for programming and has been recognized with more than 100 national and international awards. NI has grown to a multinational, billion-dollar company.

He holds the title of Business and Technology Fellow at NI and has more than 100 patents.
In 1986, James Truchard and Jeff Kodosky introduced LabVIEW (Laboratory Virtual Instrumentation Engineering Workbench), a graphical programming language that enables user-defined testing, measurement and control systems, and is used by engineers, scientists, academics and students around the world. A new paradigm for programming, Truchard and Kodosky’s virtual instrumentation software has been adopted across many industry sectors with varied applications, from controlling the CERN Large Hadron Collider to facilitating navigation of the FDA regulatory process to testing video game controllers.

In the 1970s, Truchard and Kodosky were researchers at the University of Texas Applied Research Laboratories, responsible for automating acoustical instruments for the U.S. Navy. Frustrated by inefficient data collection methods of the time and determined to simplify their work, they imagined how computers might facilitate high-end testing. Along with co-worker Bill Nowlin, they founded National Instruments (NI) to develop the relationship between scientific instruments and computers through a concept called virtual instrumentation, where software and hardware combine to perform the functions of traditional instruments. LabVIEW would become its flagship product.

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After leading NI for four decades as CEO and chairman, he retired in 2017.
Rebecca Richards-Kortum develops low-cost, high-performance medical technologies for poor communities where standard medical equipment isn’t an option. As an engineer and educator focused on improving access to quality healthcare, she teaches students to be technological innovators who think in human terms.

While a professor of biomedical engineering at the University of Texas at Austin, Richards-Kortum learned that early screening programs for cancer were beyond the reach of many. So she created a battery-powered, low-cost imaging system to detect precancerous tissues without a biopsy. This was further developed to detect oral cancer with Ann Gillenwater at the University of Texas MD Anderson Cancer Center, and clinically tested with Baylor College of Medicine’s Sharmila Anandasabapathy and MD Anderson's Kathleen Schmeler. A study in the United States and China showed the system could eliminate unnecessary and costly biopsies for about 90 percent of patients with benign esophageal cancer lesions, and a study in El Salvador, Brazil and Texas’ Rio Grande Valley showed it could improve early detection of cervical cancer.

Richards-Kortum moved to Rice University in 2005, and during a visit to Malawi saw under-equipped neonatal wards where premature babies died daily due to the lack of equipment and infrastructure that was commonplace in high-income countries. With Rice colleague Maria Oden, she founded the Rice 360° Institute for Global Health and began working with students on low-cost, low-power devices to save newborn lives. The team’s successes include the Pumani CPAP system for newborns with breathing problems; BiliSpec, a tool that measures bilirubin to detect jaundice; and DoseRight, for accurate dosing of children’s liquid medication.

Richards-Kortum received her bachelor’s degree in physics and mathematics from the University of Nebraska-Lincoln, and her master’s degree in physics and a doctorate in medical physics from the Massachusetts Institute of Technology. Her many honors include a MacArthur Foundation Fellowship.
Edmund O. Schweitzer III brought the first microprocessor-based digital protective relay to market, revolutionizing the performance of electric power systems with computer-based protection and control equipment, and making a major impact in the electric power utility industry. Previously, utilities relied on bulky relays made of springs, magnets and coils. Schweitzer’s more precise, more reliable digital relay was one-eighth the size, one-tenth the weight and one-third the price.

Schweitzer became intrigued with electric power system protection and protective relays as an electrical engineering student, earning his bachelor’s and master’s degrees at Purdue University and, in 1977, his doctorate at Washington State University. In 1982, he started Schweitzer Engineering Laboratories (SEL) in Pullman, Washington, today an employee-owned company, to develop and manufacture digital protective relays, which exist to make electric power safer, more reliable and more economical.

Schweitzer’s multifunctional digital relay, the SEL 21, not only protected power systems; it recorded data, helped locate faults and provided additional innovations that have since become standard features of protective relays. The SEL-PRTU, a later device, was the first to enable communication to multiple relays.

Schweitzer’s digital technology led to reduced design work in protection and control systems, flexible operation options and increased reliability, resulting in reduced cost. SEL equipment is in service worldwide at voltages from 120 volts through 765 kilovolts, protecting feeders, motors, transformers, capacitor banks, transmission lines and other power apparatus for customers including utility companies, and operations using large amounts of power, like mines, factories, hospitals, universities and data centers. SEL products can be found in 163 countries around the world.

A member of the National Academy of Engineering and an IEEE Fellow, Schweitzer received the IEEE Medal in Power Engineering in 2012.
Dennis Ritchie and Ken Thompson’s creation of the UNIX operating system and the C programming language were pivotal developments in the progress of computer science. Today, 50 years after its beginnings, UNIX and UNIX-like systems continue to run machinery from supercomputers to smartphones. The UNIX operating system remains the basis of much of the world’s computing infrastructure, and C language — written to simplify the development of UNIX — is one of the most widely used languages today.

Thompson and Ritchie met at Bell Labs in 1967. Ritchie came from Harvard University with a Bachelor of Science degree in physics. It wasn’t long before their differing, yet complementary backgrounds spurred the development of UNIX, a multitasking, multiuser operating system alternative to the batch processing systems then dominating the computer industry.

Thompson and Ritchie’s collaboration was a game-changer. In 1972, Ritchie completed the original version of the C programming language; Thompson then rewrote the UNIX kernel in C. This made UNIX portable — that is, easily adapted for different computer platforms, unlike previous operating systems that ran on only one type of hardware — and allowed it to be used almost without change across a wide span of computers. From UNIX came an influential design philosophy emphasizing simplicity and clarity, and the introduction of a hierarchical filing system and pipes to connect processes together.

After 40 years with Bell Labs, Ritchie retired in 2007 as head of the System Software Department. His many honors include the Japan Prize, the National Medal of Technology and the A.M. Turing Award from the Association for Computing Machinery.
During the late 1960s and early 1970s, Bell Labs colleagues Ken Thompson and Dennis Ritchie developed UNIX, a multitasking, multiuser operating system alternative to the batch processing systems then dominating the computer industry. With smartphones to supercomputers running on UNIX and UNIX-like systems, Thompson and Ritchie laid the foundation for much of the world’s computing infrastructure.

To run early computers, users had to load programs and data — typically in the form of punched paper cards, or magnetic or paper tape — into the machine. Computer operating systems were specific to the vendor-supplied hardware, and even different operating systems from the same vendor could require different commands, operating procedures and debugging.

In 1972, Ritchie completed the original version of the high-level C programming language; Thompson then rewrote the UNIX kernel in C. This made UNIX portable — that is, easily adapted for different computer platforms and allowed it to be used almost without change across a wide span of computers. UNIX further introduced an influential operating system design philosophy emphasizing simplicity and clarity, and concepts like the introduction of a hierarchical filing system and pipes to connect processes together.

Thompson’s many notable contributions to computer science include Belle, the world champion chess-playing computer, built at Bell Labs in 1977 with Joe Condon, and the UTF-8 multibyte character encoding scheme, developed in 1992 with Rob Pike. It is the most widely used encoding on the World Wide Web.

Thompson graduated from the University of California, Berkeley, with bachelor’s and master’s degrees in electrical engineering. With Bell Labs from 1966 to 2000, he is currently a Distinguished Engineer at Google. The Japan Prize, the National Medal of Technology and the A.M. Turing Award from the Association for Computing Machinery are among his many honors.
David Walt created microwell arrays that could analyze thousands of genes simultaneously, revolutionizing the field of genetic analysis. His development of single-molecule analysis, in which analytes are chemicals or protein molecules instead of DNA, is an extension of that work. Walt’s technology accelerated the understanding of numerous human diseases and is now being used in diagnosis. It has also made DNA sequencing more affordable and accessible.

The development of microarray technology began when an etching procedure resulted in evenly spaced tiny wells on the ends of optical fibers. Walt realized their pattern and depths were highly reproducible and predictable, with sizes orders of magnitude smaller than anything previously reported: a fiber with a diameter of 0.5 mm could accommodate as many as 50,000 wells.

When the etched fibers were exposed to a suspension of tiny beads, one bead fell into each well. Walt attached fluorescent dyes to the beads that allowed researchers to determine the identity and location of each bead — the first self-assembled random bead array. This revolutionized the approach to sensor fabrication, and made arrays simple to assemble and easy to reproduce.

In 1998, Walt was the scientific founder of Illumina Inc., which focused on the random bead array technology for developing next-generation genotyping instrumentation. By the early 2010s, Illumina instruments had been used in 90 percent of all genetic analyses performed worldwide. He founded Quanterix in 2007 to develop his single-molecule analysis technology.

Walt is currently a faculty member at Harvard Medical School and the Pathology Department at Brigham and Women’s Hospital. He is also a member of the Wyss Institute at Harvard and is a Howard Hughes Medical Institute Professor. He holds more than 60 patents.
Television and film both must be edited to create a final program. Film editing always involved manually cutting and pasting strips of film, a simple and fast technique. But even by the late 1980s, video editing was severely limited because changes had to be done in sequence — in a linear fashion — making edits difficult. Bill Warner invented the Avid Media Composer, a digital, nonlinear editor that took over the industry for both video and film with its graphical interface. The result was the ability to make instantaneous changes anytime, anywhere in the program, setting a new standard.

Warner founded Avid Technology Inc. in 1987. By 2000, more than 100 television shows and movies such as “Titanic” and “The Matrix” were edited with Avid products. By 2018, Avid’s solutions were used in 70 percent of commercially published music, 90 percent of original content from the leading streaming providers and nine of 10 leading international news networks. Avid has won a Grammy, 16 Emmys and two Oscars; it went public in 1993 and is listed on the Nasdaq under the symbol AVID.

Development of the Avid Media Composer was a significant challenge. Warner saw that the company needed to develop its own video compression and decompression. The industry was surprised when the first product ran at 30 frames per second, showing editors every frame of their original material. Avid pioneered the on-screen source and record monitor, and an interactive timeline. Most importantly, the system was extremely fast, allowing editors to find their footage, make edits and see the results instantly.

In addition to his digital editing work, Warner has worked over the years on improving hand-pedaled cycles. He founded Wildfire Communications in 1992, based on his invention of a telephone-based, voice-activated virtual assistant. Wildfire was sold to France Telecom in 2000. Referring to himself as an “engineering entrepreneur,” Warner today is building a business around personalized maps. He received a Bachelor of Science degree in electrical engineering from the Massachusetts Institute of Technology.
In 1951, pharmacologist John Baer joined Sharpe & Dohme — soon to become Merck Sharpe & Dohme — and became part of a research team that would revolutionize the treatment of hypertension. Together with fellow pharmacologist Karl Beyer and organic chemists James Sprague and Frederick Novello, Baer helped develop thiazide diuretics, the first class of drugs to safely and effectively treat hypertension.

Heart disease was the leading cause of death in the United States in 1958, the year chlorothiazide was introduced. Until then, the only effective medications for millions of Americans suffering various forms of hypertension were intravenous and intramuscular agents containing mercury that were both difficult to administer and toxic. Chlorothiazide was a safe and desirable alternative: the first diuretic to inhibit the reabsorption of sodium and chloride ions in the kidney, and increase urine production without upsetting electrolyte balance in the human body.

Today, thiazide diuretics remain a first-line treatment for high blood pressure and related heart problems, and are used to decrease edema.

Baer became a Fellow of the American Association for the Advancement of Science in 1966.
During 40 years of pharmaceutical research, Karl Beyer led teams that pioneered new classes of drugs. In 1942, Beyer joined Sharpe & Dohme, which merged in 1953 with Merck. Beyer then became president of the Merck Institute of Therapeutic Research — and eventually senior vice president of research for Merck & Co. — where he rejected the traditional model of discovering drugs by chance and instead promoted drug discovery by a laboratory team.

Chief among Beyer’s accomplishments was the creation of thiazide diuretics, the first class of drugs to safely and effectively treat hypertension, developed with the Merck Sharp & Dohme Research Laboratories team of fellow pharmacologist John Baer, and organic chemists James Sprague and Frederick Novello. When chlorothiazide was introduced in 1958, heart disease was the leading cause of death in the United States, with millions of Americans suffering from some form of hypertension. Chlorothiazide, a safe and effective alternative to existing medications, was the first diuretic to inhibit reabsorption of sodium and chloride ions in the kidneys, and increase urine production without upsetting electrolyte balance.

Beyer also developed probenecid, the first effective therapy for gout. Beyer’s discovery of a method of inhibiting reabsorption of uric acid from the kidneys offered relief from the pain of gout disease.

In 1975, Beyer, Sprague, Baer and Novello received the Lasker Foundation Special Public Health Award for their individual contributions to the invention of thiazide diuretics.
In 1943, scientist Frederick Novello embarked on a 38-year career with Merck Sharp & Dohme, working on compounds for the development of new drugs as a senior investigator in the Medicinal Chemistry Department. One of his key achievements — in collaboration with fellow organic chemist James Sprague and pharmacologists John Baer and Karl Beyer — was the invention of thiazide diuretics, the first class of drugs to safely and effectively treat hypertension.

When chlorothiazide was introduced in 1958, heart disease was the leading cause of death in the United States, with millions of Americans suffering from some form of hypertension. Until then, the only effective medications for treating hypertension were difficult to use and had toxic side effects. Chlorothiazide, the first diuretic to inhibit the reabsorption of sodium and chloride ions in the kidneys and increase urine production without upsetting electrolyte balance, was a safe and effective alternative.

In 1967, a landmark study of Veterans Administration patients with high blood pressure showed that thiazides dramatically reduced cardiovascular events, hospitalization and sudden death. Today, thiazide diuretics remain a first-line treatment for high blood pressure and related heart problems, and for decreasing edema. They are often used in combination with drugs from other classes to combat hypertension.

A graduate of Harvard University for his bachelor’s, master’s, and doctoral degrees, Novello held 64 patents. In 1975, Novello, Beyer, Sprague and Baer received the Lasker Foundation Special Public Health Award for their individual contributions to the invention of thiazide diuretics; Novello was recognized for being the first to synthesize chlorothiazide.
Biochemist James Sprague was a member of the Merck Sharp & Dohme Research Laboratories team that pioneered thiazide diuretics, the first class of drugs to safely and effectively treat hypertension, during the 1950s. Sprague — who joined Sharpe & Dohme in 1937, then continued at Merck Sharpe & Dohme after the companies merged — developed chlorothiazide with fellow organic chemist Frederick Novello and pharmacologists Karl Beyer and John Baer.

Chlorothiazide was introduced in 1958, when heart disease was the leading cause of death in the United States and millions of Americans suffered from some form of hypertension. Previously, the only effective medications for treating hypertension were intravenous and intramuscular mercurial agents; both were difficult to use and featured toxic side effects. Chlorothiazide was a safe and effective alternative.

As early as 1959, the American Heart Association and the National Institutes of Health reported declining death rates resulting from cardiac events, which they partly attributed to the new thiazide antihypertensives. Today, thiazide diuretics remain a first-line treatment for high blood pressure and related heart problems, and to decrease edema.

In 1975, Sprague, Beyer, Baer and Novello received the Lasker Foundation Special Public Health Award for their individual contributions to the invention of thiazide diuretics; Sprague was recognized for directing the chemical search for sulfa compounds that promote the excretion of body salt.

Besides thiazide diuretics, Sprague made other important discoveries in the area of sulfa drugs, helping to develop benemid, a treatment for gout.
S. Duncan Black and Alonzo G. Decker laid the foundation for the modern power tool industry with their invention of the portable hand-held electric drill. The company they co-founded, Black & Decker, became a world leader as they continued to innovate, introducing the first line of power tools designed specifically for the “Do-It-Yourself” consumer market in 1946, and the first cordless power tool in 1961.

Black, a draftsman, and Decker, a tool and die maker, met in 1906. In 1910, they pooled funds to open a small machine shop and began improving upon the world’s first electric power tool — a combination DC electric motor and manual drill device requiring operators to grip side handles with both hands while pressing into a chest plate to help penetrate the work surface.

In 1914, Black and Decker devised a pistol grip and trigger switch that enabled power control with one hand. Moreover, their new ½-inch portable drill included a universal electric motor capable of running on alternating current (AC) or direct current (DC). They began manufacturing their drill in 1916; the following year, the company opened a 12,000-square-foot manufacturing plant in Towson, Maryland. By 1920, Black & Decker surpassed $1 million in annual sales and soon had offices in eight U.S. cities and a factory in Canada. Virtually all of today’s electric drills descend from the original Black & Decker drill.

Black held 14 patents. He served as president of the company from 1910 until his death in 1951, when Decker replaced him. Through the years, Black & Decker acquired a variety of companies, and in 2010, Black & Decker merged with Stanley Works to become Stanley Black & Decker.
Virtually all of today’s electric drills descend from the original portable hand-held drill patented in 1917 by Alonzo Decker and S. Duncan Black, whose invention spurred the growth of the modern power tool industry. As the partners continued their innovations — including the first line of power tools designed for home users — the company they co-founded, Black & Decker, became a world leader.

In 1906, Decker, a tool and die maker, and Black, a draftsman, met as 23-year-old employees of the Rowland Telegraph Co. Four years later, Black sold his car for $600 and, with an equal amount from Decker, they opened a small machine shop in Baltimore. The initial focus of the new business was improving and manufacturing the inventions of others. While successful, they wanted to invent and produce their own products; their first was a portable air compressor designed for automobile owners to inflate their tires.

While pondering a Colt .45 automatic pistol, Black and Decker determined its features could improve the electric drill. In 1914, they devised a pistol grip and trigger switch enabling single-handed power control and began manufacturing their drill in 1916. In 1917, the company opened a 12,000-square-foot manufacturing plant in Towson, Maryland. By 1920, Black & Decker surpassed $1 million in annual sales and soon had offices in eight U.S. cities and a factory in Canada.

Decker, who had no formal education beyond seventh grade, held 41 patents. The Black & Decker Co. was a family business for decades. A Black or a Decker served in a direct leadership role as president, CEO or board chair from its founding in 1910 until 1978. In 2010, Black & Decker merged with Stanley Works to become Stanley Black & Decker.
A major contributor to the Allied efforts in World War II, Andrew Higgins was touted as “The Man Who Won the War” by President Dwight D. Eisenhower.

Higgins was a New Orleans-based boat builder and inventor. His best-known boat was the Landing Craft, Vehicle, Personnel (LCVP), or Higgins Boat, that was used to land American troops on the beaches of Normandy on D-Day.

During the 1930s, Higgins developed the Eureka, a fast, maneuverable and rugged flat-bottomed craft. In competition with boats from other manufacturers prior to the American entry into World War II, the Eureka’s superior performance resulted in the U.S. Navy awarding contracts to Higgins Industries to build landing craft for the military.

Higgins then evolved the Eureka into a series of boats including the Landing Craft, Personnel (Large), and the Landing Craft, Vehicle (LCV), which featured a ramp. Soon afterward, he combined the functions of the LCP(L) and the LCV into the LCVP. The LCVP carried 36 combat-equipped infantrymen, a Jeep and 12 troops, or 8,100 pounds of cargo. It featured a crew of four and could float in 3 feet of water, reach a speed of 12 knots, and was protected by two .30-caliber machine guns.

The Higgins Boat became the standard personnel landing craft for the military during World War II. Higgins was honored by the U.S. Army, Navy and Marine Corps for his work, which also included high-speed Patrol Torpedo (PT) boats. He was named on 18 patents, and he remained president of Higgins Industries until his death in 1952.
Boston-area entrepreneur Joseph Lee was a pioneer in the automation of bread and breadcrumb making during the late 1800s. He invented machines for use in the hospitality industry that automated the mixing and kneading of bread dough and that created crumbs from day-old loaves.

The son of slaves, Lee spent much of his South Carolina childhood in bondage. He worked as a servant in Beaufort, then served for 11 years as steward in the U.S. Coast Survey, where he gave particular attention to bread making. By then a skilled chef and baker, Lee observed that the best bread was produced by evenly and thoroughly kneaded dough.

By the early 1880s, the self-educated Lee had become a successful hotel and restaurant owner and caterer in Massachusetts. In 1894, he filed for a patent on a machine that would produce uniform bread. Troubled by the enormous amount of unsold bread his kitchens discarded because it was a day or more old and believing that breadcrumbs were better than cracker crumbs for coatings, Lee developed — and, in 1895, patented — a device to mechanize the tearing, crumbling and grinding of bread into crumbs. By 1900, Lee’s crumber was used by many of America’s leading hotels and was a fixture in hundreds of the country’s leading catering establishments. In 1902, he patented an improvement to his bread machine, hailed for superior kneading action that closely approximated the work of the human hand.

Lee eventually assigned the rights to his bread-kneading machine to The National Bread Co., continuing to own stock and receive royalties. He also sold his breadcrumbing machine to The Goodell Co., a manufacturing firm located in New Hampshire.

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<th>Born</th>
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Key honors/awards
- Lee was included in Kareem Abdul-Jabbar’s 2012 book “What Color is My World? The Lost History of African-American Inventors”
- Massachusetts Charitable Mechanic Association: Silver Medal, 1895
During the early 1940s, when dentist and biochemist Joseph Muhler was an Indiana University undergraduate, he began studying fluoride and tooth decay at the suggestion of his biochemistry professor, Harry Day. Their research, in collaboration with inorganic chemist William Nebergall, would result in a cavity-preventing product using stannous fluoride. In 1956, Crest® toothpaste was introduced nationally. In 1960, it became the first toothpaste to be recognized by the American Dental Association (ADA) as an effective decay-preventing agent.

The idea of using fluoride in toothpaste surfaced in the late 1940s, around the same time research showed that fluoride ions made tooth enamel harder and more resistant to attack. Muhler researched more than 150 fluoride compounds before establishing stannous fluoride as the most effective hardening and protective agent for tooth enamel. In 1949, Procter & Gamble Co. began funding Muhler and Day's work; one year later, Nebergall joined the project.

In the 1950s, the team introduced a formulation containing stannous fluoride. Shortly thereafter, the product was licensed to Procter & Gamble, and stannous fluoride toothpaste was introduced in limited test markets in 1955.

Crest debuted in 1956, inspiring other manufacturers to develop their own fluoride formulas. The widespread use of fluoride toothpaste is credited as a significant factor in the nationwide decline in cavities that began in the late 1970s. Today, all toothpastes with the ADA Seal of Acceptance must contain fluoride.
Inorganic chemist William Nebergall, and dentist and biochemist Joseph Muhler developed a cavity-preventing product using stannous fluoride, building on research begun in the 1940s at Indiana University by then-undergraduate Muhler and biochemistry professor Harry Day. In 1956, Crest® toothpaste was introduced nationally. Four years later, it became the first toothpaste to be recognized by the American Dental Association (ADA) as an effective decay-preventing agent.

At Day’s suggestion, Muhler had begun investigating a recently published method for measuring the fluoride content of teeth and bones. By the late 1940s, research showed that fluoride ions made tooth enamel harder and more resistant to attack, and the idea of using fluoride in toothpaste took hold. In 1949, Procter & Gamble Co. began funding Muhler and Day’s research; one year later, Nebergall joined the project. Nebergall worked on the inorganic chemistry aspects, producing high-purity stannous fluoride and compatible abrasives. Ultimately, Nebergall received three patents related to compounds created during his research.

The product was licensed to Procter & Gamble and, in the mid-1950s, the team introduced a formulation containing stannous fluoride. Stannous fluoride toothpaste was introduced in limited test markets in 1955. Crest debuted nationally in 1956. By the late 1970s, a steep nationwide decline in cavities was attributed in part to the widespread use of fluoride toothpaste. Today, all toothpastes with the ADA Seal of Acceptance must contain fluoride.

Nebergall was co-author (with Frederic Schmidt and Henry Holtzclaw Jr.) of “General Chemistry,” a widely used first-year college chemistry textbook.