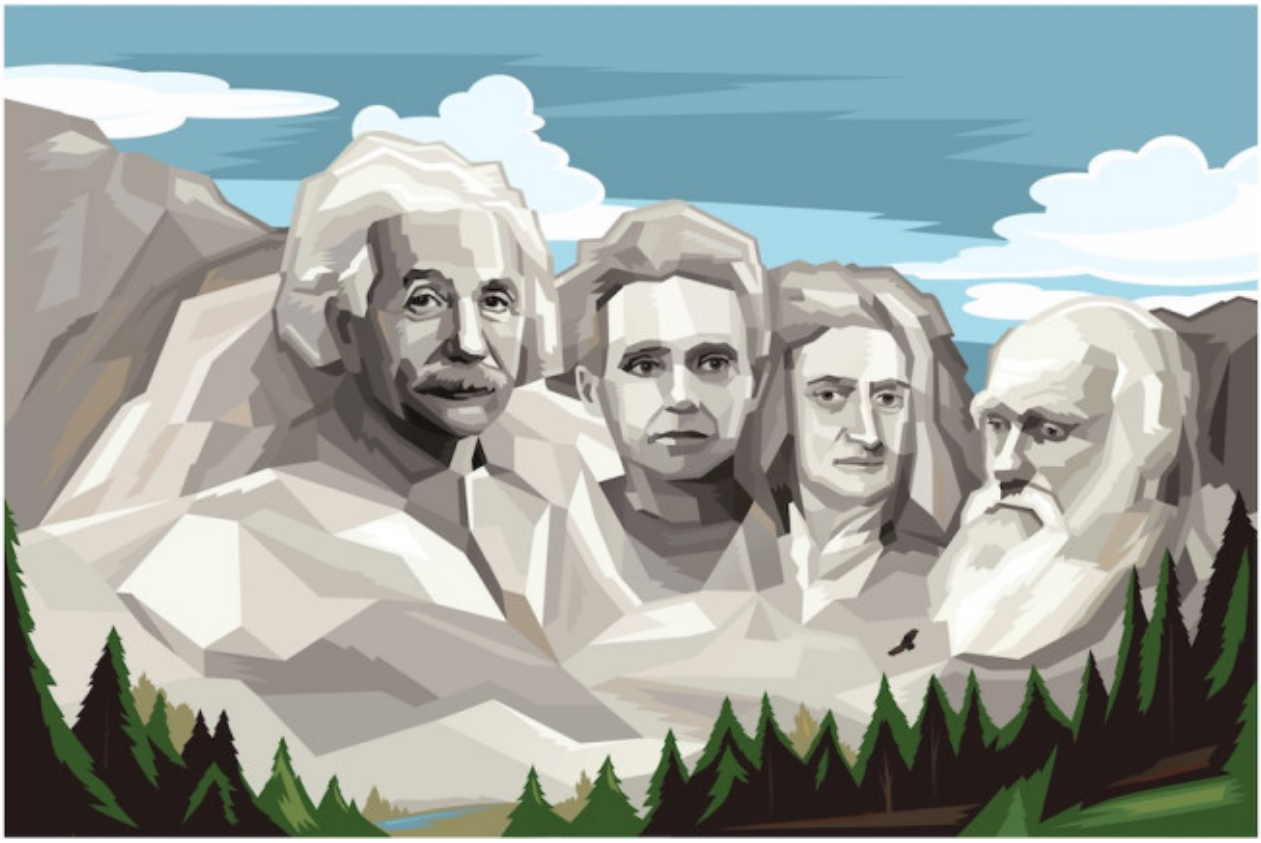
THE SCIENCES

The 10 Greatest Scientists of All Time

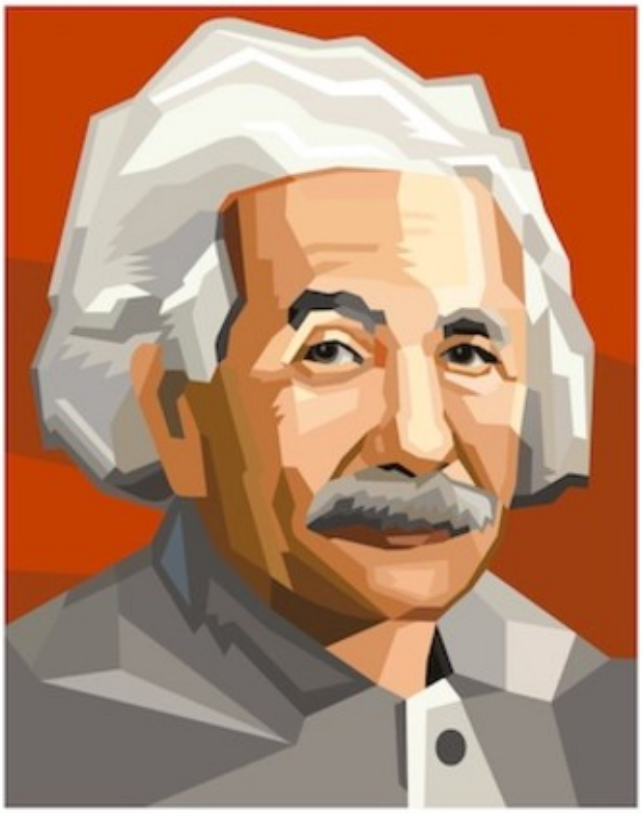
Get to know the scientists that changed the world as we know it though their contributions and discoveries.

By Mark Barna, Gemma Tarlach, Nathaniel Scharping, Lacy Schley, Bill Andrews, Eric Betz, Carl Engelking, Elisa Neckar, and Ashley Braun | Apr 11, 2017 8:00 PM



You know the first guy in our Rushmore of great scientists, but can you name the other three? (Credit: Mark Marturello)

Albert Einstein: The Whole Package



Albert Einstein (Credit: Mark Marturello)

A crowd barged past dioramas, glass displays and wide-eyed security guards in the American Museum of Natural History. Screams rang out as some runners fell and were trampled. Upon arriving at a lecture hall, the mob broke down the door.

history.

Such was Einstein's popularity. As a publicist might say, he was the whole package: distinctive look (untamed hair, rumpled sweater), witty personality (his quips, such as God not playing dice, would live on) and major scientific cred (his papers upended physics). *Time* magazine named him Person of the Century.

"Einstein remains the last, and perhaps only, physicist ever to become a household name," says James Overduin, a theoretical physicist at Towson University in Maryland.

Born in Ulm, Germany, in 1879, Einstein was a precocious child. As a teenager, he wrote a paper on magnetic fields. (Einstein never actually failed math, contrary to popular lore.) He married twice, the second time to his first cousin, Elsa Löwenthal. The marriage lasted until her death in 1936.

As a scientist, Einstein's watershed year was 1905, when he was working as a clerk in the Swiss Patent Office, having failed to attain an academic position after earning his doctorate. That year he published his four most important papers. One of them described the relationship between matter and energy, neatly summarized $E = mc2$.

Other papers that year were on Brownian motion, suggesting the existence of molecules and atoms, and the photoelectric effect, showing that light is made of particles later called photons. His fourth paper, about special relativity, explained that space and time are interwoven, a shocking idea now considered a foundational principle of astronomy.

Einstein expanded on relativity in 1916 with his theory of gravitation: general relativity. It holds that anything with mass distorts the fabric of space and time, just as a bowling ball placed on a bed causes the mattress to sag. During a solar eclipse in 1919, astronomers showed that the sun's mass did indeed bend the path of starlight. (The temporary darkness around the sun

N.J., where for years he tried (unsuccessfully) to unify the laws of physics. He became a U.S. citizen in 1940, and his fame grew as a public intellectual, civil rights supporter and pacifist.

Many consider Einstein's theory of general relativity to be his crowning achievement. The theory predicted both black holes and gravitational waves — and just last year, physicists measured the waves created by the collision of two black holes over a billion light-years away. During their epic journey across the cosmos, the ripples played with space and time like a fun-house mirror contorting faces.

General relativity also is the bedrock of gravitational lensing, which uses the gravity of stars and galaxies as a giant magnifying glass to zoom in on farther cosmic objects. Astronomers may soon take advantage of such physics to see geographic details of worlds light-years away.

Read More: 20 Brilliant Albert Einstein Quotes

Einstein, who died of heart failure in 1955, would have applauded such bold, imaginative thinking. His greatest insights came not from careful experimental analysis, but simply considering what would happen under certain circumstances, and letting his mind play with the possibilities. "I am enough of an artist to draw freely upon my imagination," he said in a *Saturday Evening Post* interview. "Knowledge is limited. Imagination encircles the world." — ***Mark Barna***

Marie Curie: She Went Her Own Way

Marie Curie (Credit: Mark Marturello)

Despite her French name, Marie Curie's story didn't start in France. Her road to Paris and success was a hard one, as equally worthy of admiration as her scientific accomplishments.

Born Maria Salomea Sklodowska in 1867 in Warsaw, Poland, she faced some daunting hurdles, both because of her gender and her family's poverty, which stemmed from the political turmoil at the time. Her parents, deeply patriotic Poles, lost most of their money supporting their homeland in its struggle for independence from Russian, Austrian and Prussian regimes. Her father, a math and physics professor, and her mother, headmistress of a

governesses. Curie and her sister Bronislawa found another way.

The pair took up with a secret organization called Flying University, or sometimes Floating University. Fittingly, given the English abbreviation, the point of FU was to stick it to the Russian government and provide a pro-Polish education, in Polish — expressly forbidden in Russian-controlled Poland.

Eventually, the sisters hatched a plan that would help them both get the higher education they so desperately wanted. Curie would work as a governess and support Bronislawa's medical school studies. Then, Bronislawa would return the favor once she was established. Curie endured years of misery as a governess, but the plan worked. In 1891, she packed her bags and headed to Paris and her bright future.

At the University of Paris, Curie was inspired by French physicist Henri Becquerel. In 1896, he discovered that uranium emitted something that looked an awful lot like — but not quite the same as — X-rays, which had been discovered only the year before. Intrigued, Curie decided to explore uranium and its mysterious rays as a Ph.D. thesis topic.

Eventually, she realized whatever was producing these rays was happening at an atomic level, an important first step to discovering that atoms weren't the smallest form of matter. It was a defining moment for what Curie would eventually call radioactivity.

Around the same time, Curie met and married her French husband, Pierre, an accomplished physicist who abandoned his own work and joined his wife's research. The two started examining minerals containing uranium and pitchblende, a uranium-rich ore, and realized the latter was four times more radioactive than pure uranium. They reasoned some other element must be in the mix, sending those radioactive levels through the roof. And they were right:

radioactivity, making Curie the first woman to win a Nobel.

Tragedy struck just three years later. Pierre, who had recently accepted a professorship at the University of Paris, died suddenly after a carriage accident. Curie was devastated by his death.

Yet she continued her research, filling Pierre's position and becoming the first woman professor at the university. In 1911 Curie won her second Nobel Prize, this time in chemistry, for her work with polonium and radium. She remains the only person to win Nobel prizes in two different sciences.

Curie racked up several other accomplishments, from founding the Radium Institute in Paris where she directed her own lab (whose researchers won their own Nobels), to heading up France's first military radiology center during World War I and thus becoming the first medical physicist.

She died in 1934 from a type of anemia that very likely stemmed from her exposure to such extreme radiation during her career. In fact, her original notes and papers are still so radioactive that they're kept in lead-lined boxes, and you need protective gear to view them. — ***Lacy Schley***

Isaac Newton: The Man Who Defined Science on a Bet

Isaac Newton (Credit: Mark Marturello)

Isaac Newton was born on Christmas Day, 1642. Never the humble sort, he would have found the date apt: The gift to humanity and science had arrived. A sickly infant, his mere survival was an achievement. Just 23 years later, with his alma mater Cambridge University and much of England closed due to plague, Newton discovered the laws that now bear his name. (He had to invent a new kind of math along the way: calculus.) The introverted English scholar held off on publishing those findings for decades, though, and it took the Herculean efforts of friend and comet discoverer Edmund Halley to get Newton to publish. The only reason Halley knew of Newton's work? A bet the former had with other scientists on the nature of planetary orbits. When Halley mentioned the orbital problem to him, Newton shocked his friend by giving the answer immediately, having long ago worked it out.

Halley persuaded Newton to publish his calculations, and the results were the *Philosophiæ Naturalis Principia Mathematica*, or just the *Principia*, in 1687. Not only did it describe for the first time how the planets moved through space and how projectiles on Earth traveled through the air; the *Principia* showed that the same fundamental force, gravity, governs both. Newton united the heavens and the Earth with his laws. Thanks to him, scientists believed they had a chance of unlocking the universe's secrets.

It would take too long to list his other scientific achievements, but the greatest hits might include his groundbreaking work on light and color; his development and refinement of reflecting telescopes (which now bear his name); and other fundamental work in math and heat. He also dabbled in biblical prophecies (predicting the world's end in A.D. 2060), practiced alchemy and spent years trying, and failing, to produce the fabled philosopher's stone. Alas, even Newton's genius couldn't create the impossible.

In 1692, this rare failure, along with the unraveling of one of his few close friendships — and possibly mercury poisoning from his alchemical experiments — resulted in what we'd now call a prolonged nervous breakdown. Newton's science-producing days were over, for reasons known only to him, though he would remain influential in the field.

So how did Newton pass his remaining three decades? Remarkably, by modernizing England's economy and catching criminals. After languishing on a professor's salary at Cambridge University for decades, in 1696 Newton received a cushy royal appointment to be Warden of the Mint in London. It was meant as an easy job with a nice paycheck: It "has not too much bus'nesse to require more attendance than you may spare," his friend Charles Montague wrote after landing him the job. But Newton, focused as ever, threw himself into it.

After a promotion to Master of the Mint, he oversaw the recoinage of English currency, advised on economics, established the gold standard and replaced all the country's metal currency with improved, ridged coins (still in use today), which made it harder to shave off bits of the precious metals.

He also focused his attention on counterfeiters, searching them out as zealously as he sought answers from the heavens. Newton established information networks among London's shadiest spots, even going undercover to do so. Counterfeiting was considered high treason, punishable by death, and Newton relished witnessing his targets' executions.

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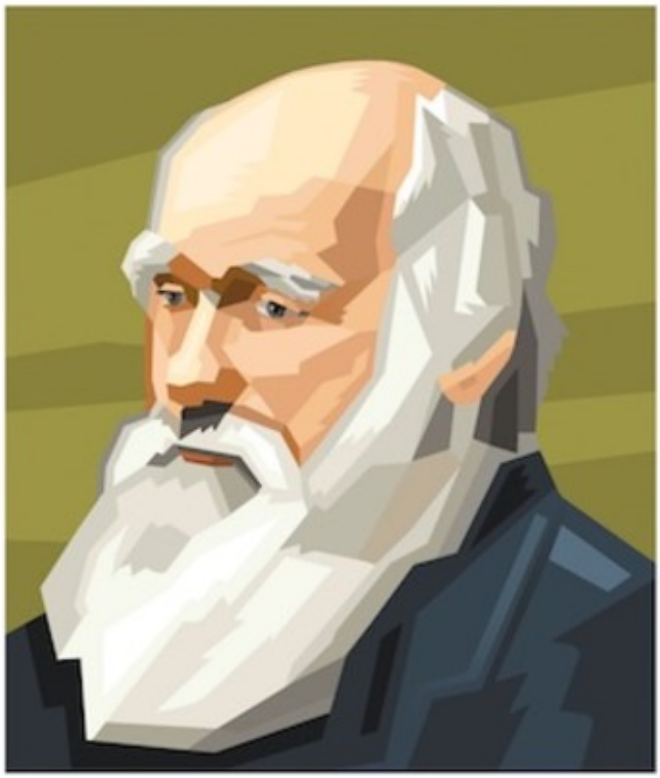
He famously feuded with German scientist Gottfried Leibnitz, mainly over who invented calculus first, creating a schism in European mathematics that lasted over a century. Newton also made it his life's work to torment English scientist Robert Hooke, destroying the legacy of a man once considered London's Leonardo da Vinci.

How fitting that the unit of force is named after stubborn, persistent, amazing Newton, himself a force of nature. — ***Bill Andrews***

Charles Darwin: Delivering the Evolutionary Gospel



Charles Darwin (Credit: Mark Marturello)

would make Darwin, who had once studied to become a country parson, the father of evolutionary biology.

Aboard the HMS *Beagle*, between bouts of seasickness, Darwin spent his five-year trip studying and documenting geological formations and myriad habitats throughout much of the Southern Hemisphere, as well as the flora and fauna they contained.

Darwin's observations pushed him to a disturbing realization — the Victorian-era theories of animal origins were all wrong. Most people in Darwin's time still adhered to creationism, the idea that a divine being was responsible for the diversity of life we find on Earth.

Darwin's observations implied a completely different process. He noticed small differences between members of the same species that seemed to depend upon where they lived. The finches of the Galapagos are the best-known example: From island to island, finches of the same species possessed differently shaped beaks, each adapted to the unique sources of food available on each island.

This suggested not only that species could change — already a divisive concept back then — but also that the changes were driven purely by environmental factors, instead of divine intervention. Today, we call this natural selection.

When Darwin returned, he was hesitant to publish his nascent ideas and open them up to criticism, as he felt that his theory of evolution was still insubstantial. Instead, he threw himself into studying the samples from his voyage and writing an account of his travels. Through his industrious efforts, Darwin built a reputation as a capable scientist, publishing works on geology as well as studies of coral reefs and barnacles still considered definitive today.

Darwin also married his first cousin, Emma Wedgwood, during this time. They had 10 children, and by all accounts Darwin was an engaged and loving father, encouraging his children's interests and taking time to play with them. This was a level of attention uncommon among fathers at that time — to say nothing of eminent scientists.

Through it all, the theory of evolution was never far from his mind, and the various areas of research he pursued only strengthened his convictions. Darwin slowly amassed overwhelming evidence in favor of evolution in the 20 years after his voyage.

All of his observations and musings eventually coalesced into the tour de force that was *On the Origin of Species*, published in 1859 when Darwin was 50 years old. The 500-page book sold out immediately, and Darwin would go on to produce six editions, each time adding to and

survive and those that fall short will die out.

Though Darwin's theory was logically sound and backed up by reams of evidence, his ideas faced sharp criticisms from adherents of creationism and the religious establishment around the world — just as he had feared.

Although it wouldn't become widely accepted until the 1930s, Darwin's theory of natural selection and his ideas on evolution have survived largely intact. "I can't emphasize enough how revolutionary Darwin's theory was and how much it changed people's views in so short a time," says Jerry Coyne, professor emeritus in the Department of Ecology and Evolution at the University of Chicago. "*On the Origin of Species* is absolutely thorough and meticulously documented, and anticipated virtually all the counterarguments. There's nothing you can really say to go after the important aspects of Darwin's theory." — ***Nathaniel Scharping***

Nikola Tesla: Wizard of the Industrial Revolution

Nikola Tesla (Credit: Mark Marturello)

Nikola Tesla grips his hat in his hand. He points his cane toward Niagara Falls and beckons bystanders to turn their gaze to the future. This bronze Tesla — a statue on the Canadian side

American homes across the country. He developed the Tesla coil — a high-voltage transformer — and techniques to transmit power wirelessly. Cellphone makers (and others) are just now utilizing the potential of this idea.

Tesla is perhaps best known for his eccentric genius. He once proposed a system of towers that he believed could pull energy from the environment and transmit signals and electricity around the world, wirelessly. But his theories were unsound, and the project was never completed. He also claimed he had invented a "death ray."

In recent years, Tesla's mystique has begun to eclipse his inventions. San Diego Comic-Con attendees dress in Tesla costumes. The world's most famous electric car bears his name. The American Physical Society even has a Tesla comic book (where, as in real life, he faces off against the dastardly Thomas Edison).

While his work was truly genius, much of his wizardly reputation was of his own making. Tesla claimed to have accidentally caused an earthquake in New York City using a small steam-powered electric generator he'd invented — *MythBusters* debunked that idea. And Tesla didn't actually discover alternating current, as everyone thinks. It was around for decades. But his ceaseless theories, inventions and patents made Tesla a household name, rare for scientists a century ago. And even today, his legacy still turns the lights on. — ***Eric Betz***

Galileo Galilei: Discoverer of the Cosmos

Around Dec. 1, 1609, Italian mathematician Galileo Galilei pointed a telescope at the moon and created modern astronomy. His subsequent observations turned up four satellites — massive moons — orbiting Jupiter, and showed that the Milky Way's murky light shines from many dim stars. Galileo also found sunspots upon the surface of our star and discovered the phases of Venus, which confirmed that the planet circles the sun inside Earth's own orbit.

"I give infinite thanks to God, who has been pleased to make me the first observer of marvelous things," he wrote.

The 45-year-old Galileo didn't invent the telescope, and he wasn't the first to point one at the sky. But his conclusions changed history. Galileo knew he'd found proof for the theories of Polish astronomer Nicolaus Copernicus (1473-1543), who had launched the Scientific Revolution with his sun-centered solar system model.

Galileo's work wasn't all staring at the sky, either: His studies of falling bodies showed that objects dropped at the same time will hit the ground at the same time, barring air resistance — gravity doesn't depend on their size. And his law of inertia allowed for Earth itself to rotate.

But all this heavenly motion contradicted Roman Catholic doctrine, which was based on Aristotle's incorrect views of the cosmos. The church declared the sun-centered model heretical, and an inquisition in 1616 ordered Galileo to stop promoting these views. The real blow from religious officials came in 1633, after Galileo published a comparison of the Copernican (sun-centered) and Ptolemaic (Earth-centered) systems that made the latter's believers look foolish. They placed him under house arrest until his death in 1642, the same year Isaac Newton was born.

The English mathematician would build on Galileo's law of inertia as he compiled a set of laws so complete that engineers still use them centuries later to navigate spacecraft across the solar system — including NASA's Galileo mission to Jupiter. — ***E.B.***

Ada Lovelace: The Enchantress of Numbers

Ada Lovelace (Credit: Mark Marturello)

To say she was ahead of her time would be an understatement. Ada Lovelace earned her place in history as the first computer programmer — a full century before today's computers emerged.

She couldn't have done it without British mathematician, inventor and engineer Charles Babbage. Their collaboration started in the early 1830s, when Lovelace was just 17 and still known by her maiden name of Byron. (She was the only legitimate child of poet Lord Byron.) Babbage had drawn up plans for an elaborate machine he called the Difference Engine — essentially, a giant mechanical calculator. In the middle of his work on it, the teenage Lovelace met Babbage at a party.

There, he showed off an incomplete prototype of his machine. According to a family friend who was there: "While other visitors gazed at the working of this beautiful instrument with the sort of expression. . . that some savages are said to have shown on first seeing a looking-glass or hearing a gun. . . Miss Byron, young as she was, understood its working, and saw the great beauty of the invention."

It was mathematical obsession at first sight. The two struck up a working relationship and eventual close friendship that would last until Lovelace's death in 1852, when she was only 36. Babbage abandoned his Difference Engine to brainstorm a new Analytical Engine — in theory, capable of more complex number crunching — but it was Lovelace who saw that engine's true potential.

The Analytical Engine was more than a calculator — its intricate mechanisms and the fact that the user fed it commands via a punch card meant the engine could perform nearly any mathematical task ordered. Lovelace even wrote instructions for solving a complex math problem, should the machine ever see the light of day. Many historians would later deem those instructions the first computer program, and Lovelace the first programmer. While she led a raucous life of gambling and scandal, it's her work in "poetical science," as she called it, that defines her legacy.

In the words of Babbage himself, Lovelace was an "enchantress who has thrown her magical

Pythagoras (Credit: Mark Marturello)

Memories of middle or high school geometry invariably include an instructor drawing right triangles on a blackboard to explain the Pythagorean theorem. The lesson was that the square of the hypotenuse, or longest side, is equal to the sum of the squares of the other sides. Simply put: $a2 + b2 = c2$. A proof followed, adding a level of certainty rare in other high school classes, like social studies and English.

Pythagoras, a sixth-century B.C. Greek philosopher and mathematician, is credited with inventing his namesake theorem and various proofs. But forget about the certainty.

Babylonian and Egyptian mathematicians used the equation centuries before Pythagoras, says Karen Eva Carr, a retired historian at Portland State University, though many scholars leave open the possibility he developed the first proof. Moreover, Pythagoras' students often attributed their own mathematical discoveries to their master, making it impossible to untangle who invented what.

Even so, we know enough to suspect Pythagoras was one of the great mathematicians of antiquity. His influence was widespread and lasting. Theoretical physicist James Overduin sees an unbroken chain from Pythagoras to Albert Einstein, whose work on curving space and time

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Carl Linnaeus: Say His Name(s)

Carl Linnaeus (Credit: Mark Marturello)

It started in Sweden: a functional, user-friendly innovation that took over the world, bringing order to chaos. No, not an Ikea closet organizer. We're talking about the binomial nomenclature system, which has given us clarity and a common language, devised by Carl Linnaeus.

Linnaeus, born in southern Sweden in 1707, was an "intensely practical" man, according to Sandra Knapp, a botanist and taxonomist at the Natural History Museum in London. He lived at a time when formal scientific training was scant and there was no system for referring to living things. Plants and animals had common names, which varied from one location and language to the next, and scientific "phrase names," cumbersome Latin descriptions that could run

Linnaeus, a botanist with a talent for noticing details, first used what he called “trivial names” in the margins of his 1753 book *Species Plantarum*. He intended the simple Latin two-word construction for each plant as a kind of shorthand, an easy way to remember what it was.

“It reflected the adjective-noun structure in languages all over the world,” Knapp says of the trivial names, which today we know as genus and species. The names moved quickly from the margins of a single book to the center of botany, and then all of biology. Linnaeus started a revolution, but it was an unintentional one.

Today we regard Linnaeus as the father of taxonomy, which is used to sort the entire living world into evolutionary hierarchies, or family trees. But the systematic Swede was mostly interested in naming things rather than ordering them, an emphasis that arrived the next century with Charles Darwin.

As evolution became better understood and, more recently, genetic analysis changed how we classify and organize living things, many of Linnaeus’ other ideas have been supplanted. But his naming system, so simple and adaptable, remains.

“It doesn’t matter to the tree in the forest if it has a name,” Knapp says. “But by giving it a name, *we* can discuss it. Linnaeus gave us a system so we could talk about the natural world.”
— ***Gemma Tarlach***

Rosalind Franklin: The Hero Denied Her Due

In 1962, Francis Crick, James Watson and Maurice Wilkins shared the Nobel Prize for describing DNA's double-helix structure — arguably the greatest discovery of the 20th century. But no one mentioned Rosalind Franklin — arguably the greatest snub of the 20th century.

The British-born Franklin was a firebrand, a perfectionist who worked in isolation. "She was prickly, did not make friends easily, but when she did she was outgoing and loyal," Jenifer Glynn wrote in *My Sister Rosalind Franklin.*

Franklin was also a brilliant chemist and a master of X-ray crystallography, an imaging technique that reveals the molecular structure of matter based on the pattern of scattered X-ray beams. Her early research into the microstructures of carbon and graphite are still cited, but her work with DNA was the most significant — and it may have won three men a Nobel.

While at King's College London in the early 1950s, Franklin was close to proving the double-helix theory after capturing "photograph #51," considered the finest image of a DNA molecule at the time. But then both Watson and Crick got a peek at Franklin's work: Her colleague, Wilkins, showed Watson photograph #51, and Max Perutz, a member of King's Medical Research Council, handed Crick unpublished data from a report Franklin submitted to the council. In 1953, Watson and Crick published their iconic paper in *Nature*, loosely citing Franklin, whose "supporting" study also appeared in that issue.

Franklin left King's in 1953 in a long-planned move to join J.D. Bernal's lab at Birkbeck College, where she discovered the structure of the tobacco mosaic virus. But in 1956, in the prime of her career, she developed ovarian cancer — perhaps due to her extensive X-ray work. Franklin continued working in the lab until her death in 1958 at age 37.

"As a scientist, Miss Franklin was distinguished by extreme clarity and perfection in everything she undertook," Bernal wrote in her obituary, published in *Nature*. Though it's her achievements that close colleagues admired, most remember Franklin for how she was forgotten. — ***Carl Engelking***

Read More: Check out some of the **lesser known science heroes**.

Our Personal Favorites

Isaac Asimov *(1920–1992)* Asimov was my gateway into science fiction, then science, then

Richard Feynman *(1918–1988)* Feynman played a part in most of the highlights of 20th-century physics. In 1941, he joined the Manhattan Project. After the war, his Feynman diagrams — for which he shared the '65 Nobel Prize in Physics — became the standard way to show how subatomic particles interact. As part of the 1986 space shuttle Challenger disaster investigation, he explained the problems to the public in easily understandable terms, his trademark. Feynman was also famously irreverent, and his books pack lessons I live by. — ***E.B.***

Robert FitzRoy *(1805–1865)* FitzRoy suffered for science, and for that I respect him. As captain of the HMS Beagle, he sailed Charles Darwin around the world, only to later oppose his shipmate's theory of evolution while waving a Bible overhead. FitzRoy founded the U.K.'s Met Office in 1854, and he was a pioneer of prediction; he coined the term weather forecast. But after losing his fortunes, suffering from depression and poor health, and facing fierce criticism of his forecasting system, he slit his throat in 1865. — ***C.E.***

Jean-Baptiste Lamarck *(1744–1829)* Lamarck may be remembered as a failure today, but to me, he represents an important step forward for evolutionary thinking. Before he suggested that species could change over time in the early 19th century, no one took the concept of evolution seriously. Though eventually proven wrong, Lamarck's work brought the concept of evolution into the light and would help shape the theories of a young Charles Darwin. Science isn't all about dazzling successes; it's also a story of failures surmounted and incremental advances. — ***N.S.***

Lucretius *(99 B.C.–55 B.C.)* My path to the first-century B.C. Roman thinker Titus Lucretius Carus started with Ralph Waldo Emerson and Michele de Montaigne, who cited him in their essays. Lucretius' only known work, On the Nature of Things, is remarkable for its foreshadowing of Darwinism, humans as higher primates, the study of atoms and the scientific method — all contemplated in a geocentric world ruled by eccentric gods. — ***M.B.***

Katharine McCormick *(1875–1967)* McCormick planned to attend medical school after earning her biology degree from MIT in 1904. Instead, she married rich. After her husband's death in 1947, she used her inheritance to provide crucial funding for research on the hormonal birth control pill. She also fought to make her alma mater more accessible to women, leading to an all-female dormitory, allowing more women to enroll. As a feminist interested in science, I'd love to be friends with this badass advocate for women's rights. — ***L.S.***

John Muir *(1838–1914)* In 1863, Muir abandoned his eclectic combination of courses at the University of Wisconsin to wander instead the "University of the Wilderness" — a school he never stopped attending. A champion of the national parks (enough right there to make him a hero to me!), Muir fought vigorously for conservation and warned, "When we try to pick out

dedication and passion indicative, to me, of what science is all about. As the wolf population has nearly disappeared and moose numbers have climbed, patience and emotional investment like his are crucial in the quest to learn how nature works. — ***Becky Lang***

Marie Tharp *(1920–2006)* I love maps. So did geologist and cartographer Tharp. In the mid-20th century, before women were permitted aboard research vessels, Tharp explored the oceans from her desk at Columbia University. With the seafloor — then thought to be nearly flat — her canvas, and raw data her inks, she revealed a landscape of mountain ranges and deep trenches. Her keen eye also spotted the first hints of plate tectonics at work beneath the waves. Initially dismissed, Tharp's observations would become crucial to proving continental drift. — ***G.T.***

Read more: All in the Family: **The Dynasties That Changed Science**

Making Science Popular

(Credits: Alfred Eisenstaedt/The LIFE Picture Collection/Getty Images; Astrid Stawiarz/Getty Images; Colin McPherson/Corbis via Getty Images; Everett Collection; Michel Gunther/Science

Rachel Carson *(1907–1964)*: With her 1962 book *Silent Spring*, the biologist energized a nascent environmental movement. In 2006, *Discover* named *Silent Spring* among the top 25 science books of all time.

Richard Dawkins *(1941–)*: The biologist, a charismatic speaker, first gained public notoriety in 1976 with his book *The Selfish Gene*, one of his many works on evolution.

Jane Goodall *(1934–)*: Studying chimpanzees in Tanzania, Goodall's patience and observational skills led to fresh insights into their behavior — and led her to star in a number of television documentaries.

Stephen Jay Gould *(1941–2002)*: In 1997, the paleontologist Gould was a guest on *The Simpsons*, a testament to his broad appeal. Among scientists, Gould was controversial for his idea of evolution unfolding in fits and starts rather than in a continuum.

Stephen Hawking *(1942–)*: His books' titles suggest the breadth and boldness of his ideas: *The Universe in a Nutshell, The Theory of Everything*. "My goal is simple," he has said. "It is a complete understanding of the universe, why it is as it is and why it exists at all."

Aldo Leopold *(1887–1948)*: If Henry Thoreau and John Muir primed the pump for American environmentalism, Leopold filled the first buckets. His posthumously published *A Sand County Almanac* is a cornerstone of modern environmentalism.

Bill Nye *(1955–)*: What should an engineer and part-time stand-up comedian do with his life? For Nye, the answer was to become a science communicator. In the '90s, he hosted a popular children's science show and more recently has been an eloquent defender of evolution in public debates with creationists.

Oliver Sacks *(1933–2015)*: The neurologist began as a medical researcher, but found his calling in clinical practice and as a chronicler of strange medical maladies, most famously in his book *The Man Who Mistook His Wife for a Hat.*

Carl Sagan *(1934–1996)*: It's hard to hear someone say "billions and billions" and not hear Sagan's distinctive voice, and remember his 1980 *Cosmos: A Personal Voyage* miniseries. Sagan brought the wonder of the universe to the public in a way that had never happened before.

Neil deGrasse Tyson *(1958–)*: The astrophysicist and gifted communicator is Carl Sagan's

Science Stars: The Next Generation

As science progresses, so does the roll call of new voices serving as bridges between lab and layman. Here are some of our favorite emerging science stars:

- British physicist **Brian Cox** became a household name in the U.K. in less than a decade, thanks to his accessible explanations of the universe in TV and radio shows, books and public appearances.
- Neuroscientist **Carl Hart** debunks anti-science myths supporting misguided drug policies via various media, including his memoir *High Price*.
- From the Amazon forest to the dissecting table, YouTube star and naturalist **Emily Graslie** brings viewers into the guts of the natural world, often literally.
- When not talking dinosaurs or head transplants on Australian radio, molecular biologist **Upulie Divisekera** coordinates **@RealScientists**, a rotating Twitter account for science outreach.
- Mixing pop culture and chemistry, analytical chemist **Raychelle Burks** demystifies the molecules behind poisons, dyes and even *Game of Thrones* via video, podcast and blog.
- Climate scientist and evangelical Christian **Katharine Hayhoe** preaches beyond the choir about the planetary changes humans are causing in PBS' *Global Weirding* video series.

— ***Ashley Braun***

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