



HISTORICAL CHRONOLOGY

- c.1980 B.C. Egyptian pharaoh Amenemhet I is targeted as one of the first recorded victims of political assassination.
- 1500 B.C. In Babylon, fingerprints are pressed onto clay tablets of business contracts.
- c.480 B.C. Demaratus of Sparta uses an early form of secret writing, concealing a message on a wooden tablet covered with wax, to warn his countrymen of invasion by the Persian empire.
- c.300 B.C. *Arthashastra*, an ancient Indian manual on politics, discusses mining, metallurgy, medicine, pyrotechnics, poisons, and fermented liquors.
- c.618 In China during the T'ang dynasty (618–906 A.D.) fingerprints mark divorce decrees and business documents.
- c.1600 Chemists invent invisible inks, and the rebirth of complex mathematics revives encryption and code methods long dormant since Antiquity. Later, during the Scientific Revolution and the Enlightenment, telescopes and magnifying glasses are developed.
- 1609 In France, François Demelle publishes a book on the techniques of document analysis.
- 1679 The *Habeas Corpus* Act is formally passed by English Parliament.
- 1681 Publication of Jean Mabillon's *De Re Diplomatica*, which outlines the science of diplomatics, a precursor of questioned document examination.
- c.1684 British physician Nehemiah Grew describes the shapes of ridges on the ends of the fingers in a treatise.
- c.1686 As part of a general study of human skin, Italian anatomist Marcello Malpighi, an anatomy professor at the University of Bologna, describes the patterns of the ridges on the fingertips. Malpighi does not suggest that fingerprints can be used for unique identification of individuals.
- 1703 Although concepts of disease are primitive, in an act of biological warfare, Sir Jeffrey Amherst, commander-in-chief of British forces in North America, suggests grinding the scabs of smallpox pustules into blankets intended for Native American tribes known to trade with the French.
- 1789 Congress passes the Judiciary Act, which establishes the federal justice system and creates the Office of the Attorney General, as well as the U.S. Marshal Service.
- 1790 France introduces the metric system.
- 1802 John Dalton introduces modern atomic theory into the science of chemistry.
- 1817 German pharmacist Frederick Serturmer announces the extraction of morphine from opium.

- 1818 Augustin Jean Fresnel (1788–1827), French physicist, publishes his *Mémoire sur la diffraction de la lumière* in which he demonstrates the ability of a transverse wave theory of light to account for such phenomena as reflection, refraction, polarization, interference, and diffraction patterns.
- 1828 Friedrich Wöhler synthesizes urea. This is generally regarded as the first organic chemical produced in the laboratory, and an important step in disproving the idea that only living organisms can produce organic compounds. Work by Wöhler and others establishes the foundations of organic chemistry and biochemistry.
- 1828 Luigi Rolando (1773–1831), Italian anatomist, achieves the first synthetic electrical stimulation of the brain.
- 1836 Toxicological evidence (related to arsenic poisoning) is first used in a trial (in UK).
- 1839 Semen and sperm characteristics are defined by microscopic examination.
- 1839 Theodore Schwann extends the theory of cells to include animals and helps establish the basic unity of the two great kingdoms of life. He publishes *Microscopical Researches into the Accordance in the Structure and Growth of Animals and Plants*, in which he asserts that all living things are made up of cells, and that each cell contains certain essential components. He also coins the term “metabolism” to describe the overall chemical changes that take place in living tissues.
- 1840 Friedrich Gustav Jacob Henle publishes the first histology textbook, *General Anatomy*. This work includes the first modern discussion of the germ theory of communicable diseases.
- 1843 Charles-Frédéric Gerhardt (1816–1856), French chemist, simplifies chemical formula-writing, so that water becomes H₂O instead of the previous H₄O₂.
- 1857 Louis Pasteur demonstrates that lactic acid fermentation is caused by a living organism. Between 1857 and 1880, he performs a series of experiments that refute the doctrine of spontaneous generation. He also introduces vaccines for fowl cholera, anthrax, and rabies, based on attenuated strains of viruses and bacteria.
- 1858 Rudolf Ludwig Karl Virchow publishes his landmark paper “Cellular Pathology” and establishes the field of cellular pathology. Virchow asserts that all cells arise from preexisting cells (*Omnis cellula e cellula*). He argues that the cell is the ultimate locus of all disease.
- 1862 Dutch scientist J. Van Deen develops a presumptive blood test.
- 1862 Department of Agriculture establishes the Bureau of Chemistry, the organizational forerunner of the Food and Drug Administration.
- 1864 First photographic plates made for the purpose of identification of criminals and questioned documents.
- 1865 United States Secret Service is established to interdict counterfeit currency and its manufacturers.
- 1867 Secret Service responsibilities broadened to include “detecting persons perpetrating frauds against the government.”
- 1870 Lambert Adolphe Jacques Quetelet shows the importance of statistical analysis for biologists and provides the foundations of biometry.
- 1872 Ferdinand Julius Cohn publishes the first of four papers entitled “Research on Bacteria,” which establishes the foundation of bacteriology as a distinct field. He systematically divides bacteria into genera and species.
- 1876 Robert Koch publishes a paper on anthrax that implicates a bacterium as the cause of the disease, validating the germ theory of disease.
- 1877 Microscopic delineation of palm prints.
- 1877 Congress passes legislation prohibiting the counterfeiting of any coin, gold, or silver bar.
- 1878 Charles-Emanuel Sedillot introduces the term “microbe.” The term becomes widely used as a term for a pathogenic bacterium.
- 1879 German pathologist Rudolf Ludwig Karl Virchow studies and characterizes hair.
- c.1880 Two Englishmen working abroad notice that fingerprints are unique to individuals. Sir William Herschel, a British Magistrate working in India, uses the impressions of fingers of local businessmen to validate contracts. As Herschel collects these fingerprints, he notices that no two are alike. In Japan, British physician Henry Faulds studies fingerprints he finds on ancient

- pottery. He documents their individual patterns and develops a method for categorizing them. His work is published in the journal *Nature*.
- 1880 Louis Pasteur develops a method of weakening a microbial pathogen of chicken, and uses the term “attenuated” to describe the weakened microbe.
- 1882 Sir Francis Galton publishes a book titled *Fingerprints*, that proves that fingerprints do not change during a person’s lifetime. He also develops a set of characteristics called minutia that can be used to identify fingerprints. These characteristics, also called Galton’s Details, are still used in modern forensics.
- 1882 The German bacteriologist Robert Koch (1843–1910) discovers the tubercle bacillus and enunciates “Koch’s postulates,” which define the classic method of preserving, documenting, and studying bacteria.
- 1883 French police worker Alphonse Bertillon links criminal behavior to body measurement (anthropometry).
- 1887 Arthur Conan Doyle publishes first Sherlock Holmes story.
- 1889 In 1899 and 1900, Sir Edward Richard Henry improves on Galton’s classification system, allowing forensics experts to handle larger numbers of fingerprints in their filing systems. Henry’s system remains one of the most common systems used.
- 1892 Argentinean police worker Juan Vucetich advances the fingerprint classification system. Vucetich identifies a woman who murdered her own sons by finding her bloody print on the doorpost.
- 1898 In Germany, Paul Jesrich compares bullets using photomicrographs.
- 1900 Friedrich Ernst Dorn (1848-1916), a German physicist, demonstrates that the newly discovered radium gives off a gas as well as producing radioactive radiation. This proves to be the first demonstrable evidence that in the radioactive process, one element is actually transmuted into another.
- 1900 Karl Landsteiner discovers the blood-agglutination phenomenon and the four major blood types in humans.
- 1901 In England and Wales, fingerprints are incorporated into the criminal investigation system.
- 1903 The New York State Prison system begins systematically fingerprinting criminals.
- 1904 The St. Louis Police department uses fingerprint identification during the World’s Fair.
- 1904 Oskar and Rudolf Adler develop a benzidine-based presumptive test for blood.
- 1908 Formal beginning of the Bureau of Investigation (BOI) that became the FBI in 1935.
- 1911 Fritz Pregl (1869–1930), an Austrian chemist, first introduces organic microanalysis. He invents analytic methods that make it possible to determine the empirical formula of an organic compound from just a few milligrams of the substance.
- 1912 Joseph Thomson develops a forerunner of mass spectrometry and separation of isotopes.
- 1913 In Paris, Victor Balthazard identifies bullet marking classifications and techniques.
- 1915 The International Association for Criminal Identification, a precursor of the International Association for Identification (IAI), is founded, with founder Harry H. Caldwell as its presiding officer.
- 1915 Germany uses poison gas at the Battle of Ypres.
- 1916 Vacuums are used to collect trace evidence.
- 1918 Edmond Locard advances 12 point fingerprint matching scheme.
- Oct 28, 1919 Congress passes the National Motor Vehicle Theft Act, also known as the Dyer Act. This act authorizes the Bureau of Investigation to investigate auto thefts that cross state lines.
- 1921 William Marston develops first modern polygraph.
- 1921 Twenty-six year old J. Edgar Hoover named Assistant Director of BOI.
- 1922 White House police force created at request of President Warren G. Harding. Ultimately this will become the uniformed division of the United States Secret Service.
- 1924 United States consolidates fingerprint files in the Identification Division of the Federal Bureau of Investigation. By 1946, there are more than 100 million fingerprint cards in their files. Eventually this

- collection of cards becomes the Automated Fingerprint Identification System, or AFIS, and in 1999 it becomes IAFIS.
- 1924 Los Angeles Police Chief Vollmer establishes the first U.S. police crime laboratory.
- 1924 J. Edgar Hoover designated Director of the BOI.
- 1924 BOI establishes an Identification Division after Congress authorized “the exchange of identification records with officers of the cities, counties, and states.”
- 1925 Johannes Hans Berger (1873–1941), German neurologist, records the first human electroencephalogram (EEG).
- 1925 Special Agent Edwin C. Shanahan becomes the first BOI agent killed in the line of duty.
- 1930 *American Journal of Police Science* begins publication.
- 1930 United States Food, Drug, and Insecticide Administration is renamed Food and Drug Administration (FDA).
- 1930 U.S. Treasury Department creates Bureau of Narcotics, which will remain the principal anti-drug agency of the federal government until the late 1960s.
- 1930 Primitive anthrax vaccine developed.
- 1932 Federal Bureau of Investigation (FBI) crime laboratory established.
- 1932 The Bureau of Investigation starts the international exchange of fingerprint data with friendly foreign governments. Halted as war approaches, the program is not re-instituted until after World War II.
- 1932 In response to the Lindbergh kidnapping case and other high profile cases, the Federal Kidnapping Act is passed to authorize BOI to investigate kidnappings perpetrated across state borders.
- 1934 U.S. Congress passes National Firearms Act.
- 1935 The Federal Bureau of Narcotics, forerunner of the modern Drug Enforcement Administration (DEA), began a campaign that portrayed marijuana as a drug that led users to drug addiction, violence, and insanity. The government produced films such as *Marihuana* (1935), *Reefer Madness* (1936), and *Assassin of Youth* (1937).
- Jul 1, 1935 The BOI officially becomes the Federal Bureau of Investigation (FBI).
- 1941 Researchers publish studies of voiceprint identification.
- 1941 Arnold O. Beckman, American physicist and inventor, invents the spectrophotometer. This instrument measures light at the electron level and can be used for many kinds of chemical analysis.
- 1942 Formation of the American Society of Questioned Document Examiners
- 1942 Alcohol Tax Unit (ATU) formed and given responsibility for enforcing the Firearms Act.
- 1946 R. R. Race advances Kell blood group system.
- 1950 Duffy blood group system advanced.
- 1950 American Academy of Forensic Science (AAFS) established.
- 1950 Puerto Rican nationalists attempt to assassinate President Harry S Truman. As a result of this incident, in which a United States Secret Service (USSS) agent is killed, Congress greatly expands the duties of USSS.
- 1950 The FBI initiates the Ten Most Wanted Fugitives Program in May in order to draw national attention to dangerous criminals who have avoided capture.
- 1951 Kidd blood grouping system advanced.
- 1953 James D. Watson and Francis H. C. Crick publish two landmark papers in the journal *Nature*. The papers are entitled “Molecular structure of nucleic acids: a structure for deoxyribose nucleic acid” and “Genetic implications of the structure of deoxyribonucleic acid.” Watson and Crick propose a double helical model for DNA and call attention to the genetic implications of their model. Their model is based, in part, on the x-ray crystallographic work of Rosalind Franklin and the biochemical work of Erwin Chargaff. Their model explains how the genetic material is transmitted.
- 1954 Indiana State Police Captain R. F. Borkenstein invents Breathalyzer®.
- 1958 International Association for Identification establishes the John A. Dondero Memorial Award, first awarded to FBI Director J. Edgar Hoover.

- 1959 The microchip, forerunner of the micro-processor, is invented.
- Nov 22, 1963 Lee Harvey Oswald assassinates President John F. Kennedy in Dallas, Texas.
- 1966 Naval Investigative Service, predecessor of the Naval Criminal Investigative Service, formed as an office within the Office of Naval Intelligence.
- 1967 National Crime Information Center created by U.S. Federal Bureau of Investigation.
- 1968 U.S. anti-drug agencies in the Treasury and Health, Education, and Welfare departments merge to form the Bureau of Narcotics and Dangerous Drugs under the Justice Department.
- 1968 National Institute of Justice established under the authority of the Omnibus Crime Control and Safe Streets Act to provide independent, evidence-based tools to assist state and local law enforcement.
- Apr 4, 1968 James Earl Ray assassinates Dr. Martin Luther King, Jr. in Memphis, Tennessee. The FBI opens a special investigation based on the violation of Dr. King's civil rights so that federal jurisdiction in the matter could be established.
- Jun 5, 1968 Senator Robert F. Kennedy is assassinated by Sirhan B. Sirhan.
- 1968 As a result of Senator Robert F. Kennedy's assassination, Congress authorizes protection of major Presidential and Vice Presidential candidates and nominees.
- 1969 Microprocessor developed.
- 1969 Defense Department Advanced Research Projects Agency (ARPA) establishes ARPANET, a forerunner to the Internet.
- 1970 Forensic odontology division of the American Academy of Forensic Sciences created.
- 1970 United States Congress passes Controlled Substance Act (CSA).
- 1970 The Consolidated Federal Law Enforcement Training Center, a bureau of the Department of the Treasury, is established as an organization to provide training for all federal law-enforcement personnel. Today known as the Federal Law Enforcement Training Center, it is now part of the Department for Homeland Security.
- 1970 Congress approves the Organized Crime Control Act of 1970 in October. This law contains a section known as the Racketeer Influenced and Corrupt Organization Act or RICO. RICO becomes an effective tool in convicting members of organized criminal enterprises.
- 1971 B. J. Culliford publishes *The Examination and Typing of Bloodstains in the Crime Laboratory*.
- 1972 Recombinant technology emerges as one of the most powerful techniques of molecular biology. Scientists are able to splice together pieces of DNA to form recombinant genes. As the potential uses, therapeutic and industrial, become increasingly clear, scientists and venture capitalists establish biotechnology companies.
- 1972 The ATF Division of IRS becomes a separate Treasury bureau, the Bureau of Alcohol, Tobacco, and Firearms.
- 1974 Scanning electron microscopy with electron dispersive x rays (SEMEDX) used to identify gunshot residue.
- 1975 The Federal Rules of Evidence enacted.
- 1977 Forensic scientists begin to use Fourier transform infrared spectrophotometer.
- 1977 FBI advances Automated Fingerprint Identification System (AFIS).
- 1981 First corpse donated for study received at the Body Farm.
- 1982 In January, federal law enforcement reorganization gives Drug Enforcement Administration (DEA) and Federal Bureau of Investigation (FBI) concurrent jurisdiction in drug-related criminal matters.
- 1982 The FDA issues regulations for tamper-resistant packaging after seven people died in Chicago from ingesting Tylenol capsules laced with cyanide. The following year, the federal Anti-Tampering Act was passed, making it a crime to tamper with packaged consumer products.
- 1984 Crime-fighting efforts bolstered by the Sentencing Reform Act, which stiffens prison sentences, requiring mandatory terms for certain crimes and abolishing federal parole; and by the Victims of Crime Act. Throughout the 1980s, numerous national and community-based organizations are formed to provide support to victims of rape, spousal abuse, drunk driving, and other crimes.
- 1984 Congress enacts legislation making the fraudulent use of credit and debit cards a federal violation.

- 1984 The United States Department of Energy (DOE), Office of Health and Environmental Research, U.S. Department of Energy (OHER, now Office of Biological and Environmental Research), and the International Commission for Protection Against Environmental Mutagens and Carcinogens (ICPEMC) cosponsor the Alta, Utah, conference, which highlights the growing role of recombinant DNA technologies. OTA incorporates the proceedings of the meeting into a report acknowledging the value of deciphering the human genome.
- 1984 President Ronald Reagan issues a directive giving the NSA responsibility of maintaining security of government computers.
- 1985 Alec Jeffreys develops “genetic fingerprinting,” a method of using DNA polymorphisms (unique sequences of DNA) to identify individuals. The method, which is subsequently used in paternity, immigration, and murder cases, is generally referred to as “DNA fingerprinting.”
- 1985 Kary Mullis, who was working at Cetus Corporation, develops the polymerase chain reaction (PCR), a new method of amplifying DNA. This technique quickly becomes one of the most powerful tools of molecular biology. Cetus patents PCR and sells the patent to Hoffman-LaRoche, Inc. in 1991.
- 1985 The Global Positioning System (GPS) becomes operational.
- 1986 First use of PCR-based forensic DNA analysis in the United States. Henry Erlich confirms that two autopsy samples came from the same person in the case *Pennsylvania v. Pestinikis*.
- 1986 DNA is first used to solve a crime as Alec Jeffreys uses DNA profiling evidence to identify Colin Pitchfork as a murderer.
- 1986 Computer Fraud and Abuse Act enacted, defining federal computer crimes.
- 1986 U.S. intelligence community establishes Intelligence Community Staff Committee on MASINT (measurement and signatures intelligence) to oversee all relevant activities.
- 1987 Based on RFLP analysis, DNA profiling is introduced into a U.S. criminal trial.
- 1987 Congress passes the Computer Security Act, which makes unclassified computing systems the responsibility of the National Institute of Standards and Technology (NIST) and not the NSA with regard to technology standards development.
- 1987 The idea to use patterns of the iris of the eye as an identification marker was patented, along with the algorithms necessary for iris identification.
- 1988 International Association for Identification establishes peer-reviewed publication: *Journal of Forensic Identification*.
- 1988 Loss of Pan Am Flight 103 over Lockerbie, Scotland.
- 1988 The Human Genome Organization (HUGO) is established by scientists in order to coordinate international efforts to sequence the human genome.
- 1988 The federal Polygraph Protection Act prohibits employers from using polygraphs for employment screening.
- 1991 Forensic Science Service (U.K.) established as an executive agency of the Home Office of the U.K. government.
- 1992 National Crime Information Center consolidates with the FBI's Criminal Justice Information Services division.
- 1992 Naval Criminal Investigative Service formed as an entity separate from the Office of Naval Intelligence.
- 1993 A U.S. federal court relaxes *Frye* standard for admission of scientific evidence (*Daubert et al. v. Merrell Dow*).
- Feb 26, 1993 The World Trade Center in New York City was badly damaged when a car bomb planted by Islamic terrorists explodes in an underground garage. The bomb left six people dead and 1,000 injured. The men carrying out the attack were followers of Umar Abd al-Rahman, an Egyptian cleric who preached in the New York City area.
- 1993 After a 51-day siege by the Bureau of Alcohol, Tobacco, and Firearms, a federal team assaults a compound held by the Branch Davidians, a religious sect charged with hoarding illegal weapons. The Branch Davidians allegedly set the buildings on fire, killing 76 people, including cult leader David Koresh.
- 1994 DNA Identification Act of 1994 authorizes establishment of NDIS.
- 1994 The Genetic Privacy Act, the first United States Human Genome Project legislative

- product, proposes regulation of the collection, analysis, storage, and use of DNA samples and genetic information obtained from them. These rules were endorsed by the ELSI Working Group.
- 1995 Forensic Science Service (U.K.) established the world's first national criminal intelligence DNA database, the National DNA Database.
- 1995 Study by the Rand Corporation finds that every dollar spent in drug treatment saves society seven dollars in crime, policing, incarceration, and health services.
- Apr 19, 1995 A car bomb explodes outside the Alfred P. Murrah Federal office building in Oklahoma City, Oklahoma, collapsing walls and floors, killing 169 people, including 19 children and one person who died in the rescue effort. Timothy McVeigh and Terry Nichols are later convicted in the anti-government plot to avenge the Branch Davidian standoff in Waco, Tex., exactly two years earlier.
- 1996 Forensic Science Service (U.K.) merges with the Metropolitan Police Laboratory, London, England.
- 1996 First computerized searches of the AFIS fingerprint database.
- 1996 First use of mitochondrial DNA typing evidence in a U.S. trial (*Tennessee v. Ware*).
- 1997 The National Center for Human Genome Research (NCHGR) at the National Institutes of Health becomes the National Human Genome Research Institute (NHGRI).
- Dec 8, 1997 The FBI announces its new National DNA Index System (NDIS) allowing forensic science laboratories to link serial violent crimes to each other and to known sex offenders through the electronic exchange of DNA profiles.
- 1998 NDIS becomes operational.
- 1998 FBI and ATF agree to pursue joint development of one system, using only IBIS, and create the National Integrated Ballistics Information Network.
- 1998 DNA analyses of semen stains on a dress worn by Monica Lewinsky were found to match DNA from a blood sample taken from President Clinton.
- 1998 DNA fingerprinting used to identify remains of Russian Imperial Romanov family.
- 1999 The FBI teams with federal, state, and local criminal investigation departments to establish IAFIS, the Integrated Automated Fingerprint Identification System. This facility electronically stores the fingerprints and criminal history information of more than 47 million individuals.
- 1999 Osama bin Laden is added to the FBI's "Ten Most Wanted Fugitives" list in June, in connection with the U.S. Embassy bombings in East Africa.
- Jun 23, 1999 FBI personnel travel to Kosovo to assist in the collection of evidence and the examination of forensic materials in support of the prosecution of Slobodan Milosevic and others before the International Criminal Tribunal for the former Yugoslavia.
- 2000 Debut of the CBS television series *CSI: Crime Scene Investigation*.
- Sep 11, 2001 Islamist terrorists mount a coordinated terrorist attack on New York and Washington. The World Trade Center Towers are destroyed, killing nearly 3,000 people. In Washington, a plane slams into the Pentagon, but passengers aboard another hijacked airliner, aware of the other terrorist attacks, fight back. During the struggle for the aircraft, it crashes into a Pennsylvania field, thwarting the terrorist's plans to crash the plane into either the U.S. Capitol or White House, but killing all on board.
- 2001 The FBI dedicates 7,000 of its 11,000 Special Agents and thousands of FBI support personnel to the PENTTBOM investigation. "PENTTBOM" is short for Pentagon, Twin Towers Bombing.
- 2001 Letters containing a powdered form of *Bacillus anthracis*, the bacteria that causes anthrax, are mailed by an unknown terrorist or terrorist group (foreign or domestic) to government representatives, members of the news media, and others in the United States. One letter is postmarked to a U.S. senator on October 8, resulting in closure of the Hart Senate building and other government offices and postal facilities. More than 20 cases and five deaths are eventually attributed to the terrorist attack.
- Oct 18, 2001 In conjunction with the U. S. Post Office, the FBI offers a reward of \$1,000,000 for information leading to the arrest of the person who mailed letters contaminated with anthrax to media organizations and congressional offices.

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Oct 26, 2001 President George W. Bush signs the Patriot Act into law, giving the FBI and CIA broader investigatory powers and allowing them to share with one another confidential information about suspected terrorists. Under the act, both agencies can conduct residential searches without a warrant and without the presence of the suspect. The act also allows immediate seizure of personal records. The provisions are not limited to investigating suspected terrorists, but may be used in any criminal investigation related to terrorism. The Patriot Act also grants the FBI and CIA greater latitude in using computer tracking devices to gain access to Internet and phone records. Forensic science becomes more entwined with National Security interests.

2001 Enough closed-circuit television cameras (CCTV) are installed in public places in Britain that, on an average day in any large British city, security experts calculate that a person will have over 300 opportunities to be captured on CCTV during the course of normal daily activities.

2002 Cable television network Court TV launches its Forensics in the Classroom program.

Jan 24, 2003 The Office of Homeland Security becomes the Department of Homeland Security.

2004 Total number of DNA profiles in the FBI NDIS database reaches 2,132,470; the total number of forensic profiles is 93,956, and the total number of convicted offender profiles is 2,038,470.