

## **Biography of a Lesser-Known Scientist**

Your final project in Chemistry this year will be to profile a scientist who is not widely known, and who belongs to a minority group in terms of race, gender and/or sexuality. You may notice my list leaves out famous female scientists like Marie Curie, and famous scientists of color, like George Washington Carver. This is by design to push you toward the work of someone you have not heard about before. You will profile a scientist that fits this description in the manner of your choosing (see below). The list of possible scientists is also not limited, if there is a female scientist, or scientist of color you would like to profile who is not on my list, please check with me for approval.

### **Requirements**

You must include the following aspects of your scientists life:

- Birth/Death dates (or indicate they are still living)
- Notable life events (children, marriage, loss of a family member, illness) that shaped the scientist
- Accomplishments, discoveries, and/or inventions (**go into greatest detail here**)
- Modern legacy of their work (How does it impact us today?)
- Hardships faced/overcome (in general, but specifically as a result of being a member of a minority group)

You must discuss barriers the scientist faced that are specific to their race, gender, and/or sexuality. If you cannot find explicit mention of how the scientist's race/gender/sexuality impacted their life and their ability to carry out their work, you must consider their geographical location, world events, and time point in history to make a reasonable estimation of what difficulties they may have faced as a result.

### **Format**

I will allow many different formats, including, but not limited to the suggestions below:

- Writing
  - Short story, historical fiction, essay, poem, play, or other written piece
  - Required elements may be woven into the written work in any manner, as long as I can tell where they are
- Video
  - Documentary, oral presentation on camera, dramatization or other video recorded presentation
  - Required elements may be woven into the video in any manner, as long as I can tell where they are
- Art Project
  - Detailed poster, drawing/painting, sculpture, etc

- Must be accompanied by a short written description (or oral presentation) of the artwork including details about the required elements of the scientist's life.
- Powerpoint slides
  - Must be presented to the class and include all required elements of their life, including visuals.
- Miscellaneous
  - Get creative! I am open to many possible suggestions if you have a passion for an idea not listed here. In past years students have written and illustrated children's books, presented AS the scientist (dressed up and everything), performed a dance or song, among many others. Come talk with me and we can work it out.

**Scientist choice will be first-come-first-served, and only one student may profile each scientists. You must check in with me about your choice of scientist AND your style of project before getting started on any research.**

**In limited cases, I will approve a small (no more than 2 or 3) group to work together, but again, you must check with me.**

**Scientists:** (Must get approval for anyone not on this list, but I am very open to suggestions)  
Any scientist on the list below who is a white man falls under the LGBTQ umbrella. Many others who are women or people of color also identify/ied as LGBTQ, so make sure to search for those details.

## **Chemistry**

**Yuan T. Lee** - Taiwanese chemist and winner of the Nobel prize in Chemistry for the “dynamics of chemical elementary processes”

**Dr. Nitza Margarita Cintrón** - Puerto Rican scientist who originated the Biochemistry Laboratory at the Johnson Space Center. She is the Chief of Space Medicine and Health Care Systems Office at NASA's Johnson Space Center.

**Marie Maynard Daly** - The first African American woman to earn a Ph.D. in Chemistry.

**Zenaida Y. Monsada** - Filipino chemist who served as first woman Secretary of Department of Energy from October 23, 2015 until July 30, 2016

**Yellapragada SubbaRow** - Indian-American biochemist responsible for research leading to the synthesis of folic acid, discovery of tetracycline, the first broad-spectrum antibiotic, as well as anti-cancer drugs.

**Olga D. González-Sanabria** - Puerto Rican scientist and inventor. She is the highest ranking Hispanic at NASA Glenn Research Center, and a member of the Ohio Women's Hall of Fame

**Ma. Assunta Caoile-Cuyegkeng** - Filipino Professor of Chemistry at the Department of Chemistry, School of Science and Engineering, Ateneo de Manila University.

**Tuan Vo-Dinh** - Vietnamese biophysical chemist who specializes in photonics, the science of the interaction between light and matter like biophotonics, laser-excited luminescence Spectroscopy. Ranked 43 on a list of top 100 living geniuses.

**Percy Lavon** - African American researcher known for being a pioneer in the chemical synthesis of medicinal drugs from plants.

**Prof. Samuel Massie Jr** - An organic chemist who was the first African American to teach at the U.S. Naval Academy.

**Prince Nguyễn Phước Bửu Hội** - Vietnamese chemist with extensive research into chemical carcinogenesis (cancer-causing compounds)

## **Biology**

**Louise Pearce** – Pathologist at the Rockefeller Institute who helped develop a treatment for African sleeping sickness. She, along with fellow pathologist Wade Hampton Brown, and two chemists, developed trypanamide. With Brown, she discovered and developed the Brown-Pearce tumor, systematically studied syphilis in rabbits, explored how a virus might spread cancer, and researched immune reactions to rabbit pox.

**Margaret Mead** – American anthropologist and psychologist, author of Coming of Age in Samoa, and Curator of Ethnology at the American Museum of Natural History. While President of the American Association for the Advancement of Science in 1975 she presided over the passage of a AAAS policy statement deploring discrimination against

gay and lesbian scientists. Mead helped pioneer, through cross-cultural studies, greater understanding for the natural variety of sexual behaviors that occur in human societies.

**S. Josephine Baker** – Physician who organized the first child hygiene department under government control in New York City. Her tenure led to the lowest infant death rate

in any American or European city during the 1910's. She was instrumental in identifying "Typhoid Mary". Baker was a consultant to many child care organizations, and the president of several child health professional societies.

**Lue Gim Gong** - 19th century Chinese-American horticulturist who bred oranges that matured in August, ensuring they would not freeze, as well as varieties of grapefruits and 7 varieties of roses.

**Charles Drew** - African-American physician, surgeon and medical researcher known as the inventor of the blood bank.

**Angel C. Alcala** - Filipino biologist who was named a National Scientist of the Philippines in 2014. He created the artificial coral reefs that help a lot to the Philippines' aquatic ecosystem.

**Mario José Molina-Pasquel Henríquez** - Mexican chemist reputed for his pivotal role in the discovery of the Antarctic ozone hole.

**Dr. Carlos Del Castillo** - Puerto Rican Program Scientist for the Ocean Biology and Biogeochemistry Program at NASA Headquarters, in Washington, D.C.. Del Castillo is the recipient of the Presidential Early Career Award for Scientists and Engineers (PECASE) award, the highest honor bestowed by the United States government on scientists and engineers beginning their independent careers.

**Rosalind Franklin** - British chemist and X-ray crystallographer who made contributions to the understanding of the molecular structures of DNA (deoxyribonucleic acid), RNA (ribonucleic acid), viruses, coal, and graphite. Most famous for providing the main Evidence for the structure of DNA for which Watson and Crick received Nobel prizes, but her work was not awarded.

**David Ho** - Taiwanese-American AIDS researcher famous for his pioneering work with drug "cocktails" to treat AIDS, and Time's Man of the Year in 1996.

**Susan LaFlesche Picotte** - (Omaha) First Native American woman doctor of medicine in the late 1800s

**Barbara McClintock** - American biologist responsible for discovering "crossing-over": that genes could move within and between chromosomes.

**Patricia Bath** - American ophthalmologist and inventor known for being the first African American woman doctor to receive a patent for a medical invention.

**Har Gobind Khorana** - Indian-American biochemist and Nobel Prize winner in physiology for "for interpretation of the genetic code and its function in protein synthesis"

**María Esther Orozco Orozco** - Mexican biologist, researcher and politician. She has received the UNESCO/Institut Pasteur Medal (1997) and the L'Oréal-UNESCO Award for Women in Science (2006).

**Dr. Daniel Hale Williams** - African American physician who performed the first prototype open-heart surgery

**Donna Rose Addis** - Samoan psychologist studying: How do memory abilities change with

advancing age and disease? What impacts do such changes have on other aspects of psychological functioning?

**María del Socorro Flores González** - Mexican physician who patented a way to diagnose invasive amebiasis, a seriously horrific parasitic disease that often leads to death and is common in areas with poor sanitation. The new, sensitive test's greater accuracy means that people can be given help faster.

**Emmett Chappelle** - African American scientist and researcher and a recipient of 14 U.S. patents, who discovered that a particular combination of chemicals caused all living organisms to emit light.

**Pauline Dy Phon** - Cambodian botanist specializing in the flora of South East Asia. She wrote an extensive directory of the plants of Cambodia.

**Ruby Hirose** - Japanese biochemist and bacteriologist who conducted research that led to groundbreaking treatments for infantile paralysis and other illnesses, including polio and diphtheria. She also conducted research into hay fever treatments, helping to increase the intensity of pollen extracts in order to desensitize allergy sufferers. Native of Washington!

**Ernest Everett Just** - African American biologist and author known for his work on egg fertilization and the structure of the cell.

**Bob Ainuu Afamasaga** - Samoan inventor and scientist who invented a tool and technology called "24 DNA-2 Blood Types Kit" that test for a person's 2 Blood Types, Rh Factors, Secretors/Non-Secretors status, genetic, gender and master DNA sequence.

**Dr. Helen Rodríguez-Trías** - Puerto Rican Pediatrician and activist. She was the first Latina president of The American Public Health Association, a founding member of the Women's Caucus of the American Public Health Association and the recipient of the Presidential Citizen's Medal

**Mae Jemison** - American physician and NASA astronaut known for being the first black woman to travel in space.

**Amy Maslan-Miller** - Samoan scientist whose research focuses on characterising the genetic makeup of a fungi like organism called *Phytophthora colocasiae*, the pathogen that Causes blight on taro, as well as looking at the infection of the fungi like organism on various taro species.

## **Astronomy**

**Subrahmanyan Chandrasekhar** - Indian astrophysicist and Nobel prize winner in Physics for his "theoretical studies of the physical processes of importance to the structure and evolution of the stars"

**Kalpana Chawla** - Indian-American astronaut and first Indian-American woman to go into space. Was a crew member on the space shuttle Columbia when it broke up on re-entry to the earth.

**Ellen Ochoa** - First Hispanic female astronaut. Flew many missions, including 4 shuttle missions

**Benjamin Banneker** - African-American astronomer and mathematician who constructed America's first working clock

**Dr. Jane X. Luu** - Vietnamese astronomer responsible for "discovering and characterizing the

Kuiper Belt and its largest members, work that led to a major advance in the understanding of the history of our planetary system”

**Neil Divine** – American Astrophysicist, major contributor to modern theory of star formation and prediction of meteoroid and space debris environments. During his 25 years at Caltech’s Jet Propulsion Laboratory, Divine made many fundamental scientific contributions, including defining the radiation belts around Jupiter, Saturn, Neptune, and Uranus, and the dust environment around Halley and other cometary targets. During his tenure at JPL, he often served as a mentor and inspiration to many younger space physicists who benefited from both his scientific incisiveness and quick wit.

## **Physics**

**Fred Begay (also Fred Young or Clever Fox)** - Navajo/Ute nuclear physicist. His work is in the alternative use of laser, electron and ion beams to heat thermonuclear plasmas for use as alternative energy sources.

**Albert Vinicio Báez**- prominent Mexican-American physicist, and the father of singers Joan Baez and Mimi Fariña. He made important contributions to the early development of X-ray microscopes and later X-ray telescopes.

**Amar Bose** - Indian-American Physicist responsible for designing Bose speakers

**Steven Chu** - Chinese-American physicist and Nobel prize-winner for his “development of methods to cool and trap atoms with laser light”

**Narinder S. Kapany** - Indian-American “father of fiber optics”

**Miguel Alcubierre Moya** - Mexican theoretical physicist. Alcubierre is known for the proposed Alcubierre drive, a speculative warp drive by which a spacecraft could achieve faster-than-light travel.

**Xuong Nguyen-Huu** - Vietnamese pioneer of protein crystallography technology for the determination of protein structures and biological macromolecules.

**Ana Maria Cetto** - Mexican Physicist specializing in quantum mechanics

**Samuel Chao Chung Ting** - Chinese-American physicist who won the Nobel Prize in Physics for his discovery of a new heavy particle, the J-particle.

## **Engineering**

**Wen Ho Lee** - Taiwanese engineer arrested for improperly downloading US nuclear secrets

**Garrett Morgan** - African American inventor who made both the first traffic signal invention and the first patented gas mask.

**Adriana Ocampo** - Hispanic engineer who works for NASA as a Program Executive. She played instrumental roles in several space probe missions, including Galileo, the New Horizons mission to Pluto, and the recent Juno mission that is now in orbit around Jupiter. In 2016, she was named the National Hispanic Scientist of the Year by the Museum of Science and Industry in Tampa, Florida.

**Nguyễn Xuân Vinh** - Vietnamese aerospace engineer who worked on the guidance, dynamics and optimal control of space vehicles and their interaction with the atmosphere has

played a fundamental role in space exploration and technological development

**James West** - African-American inventor who developed the mic in the 1960s; holds 47 U.S. and more than 200 foreign patents on microphones and techniques for making polymer foil-electrets.

**Philip Emeagwali** - Nigerian-born scientist and inventor known for first using a Connection Machine supercomputer to help analyze petroleum fields.

**Deepika Kurup** - Indian-American currently 17, was part of *Forbes's* 2015 30 Under 30 energy influencers, but she's already been working on her invention for a few years: it won her a major award back in 2012. It's a solar-powered water purification system using photocatalytic composites that aims to provide clean, fresh water worldwide, particularly in underprivileged areas.

## **Computing**

**Bùi Tường Phong** - Vietnamese inventor of the Phong reflection model and the Phong shading interpolation method, techniques widely used in computer graphics.

**André Trương Trọng Thi** - Vietnamese computer engineer known as the “father of personal Computing”

**Alan Turing** – British mathematician, considered the father of modern computer science. He is credited with creating the theoretical framework and design for the earliest modern computer. He also invented the Enigma machine, which deciphered the secret German military code, contributing enormously to the Allied victory in World War II

## **Geology/Paleontology**

**Allan Cox** – American Geophysicist, specialist in paleomagnetism, and author of two well-known books on plate tectonics. Cox and his colleagues developed a calendar showing the complicated and irregular schedule of polarity changes in the earth's past, and discovered evidence of plate tectonics. His work brought him many honors, including election to the National Academy of Sciences, and the American Geophysical Union's Fleming medal.

## **Mathematics**

**Sonja Kovalevsky** - Russian mathematician, developed Kovalevsky's theorem, editor of *Acta Mathematica*. Showing aptitude in mathematics at an early age, Kovalevsky is an example of a brilliant woman who encountered barriers solely because of her gender. Women were not allowed to study in Russian universities, and her father considered it improper for her to study abroad. Kovalevsky went to Germany to study with Karl Weierstrass. For her 1888 work “On the Problem of the Rotation of a Solid Body about a Fixed Point,” she was awarded the famous Prix Bordin of the French Academy of Sciences.