BUFFALO MUSEUM OF SCIENCE

Celebrate

LGBTQIA PRIDE MONTH

Presented by Turner

Countless scientific and technological accomplishments influence our lives and form the framework for our modern society, and most are led by individuals whose stories often go untold. As we honor Pride Month, we highlight lesbian, gay, bisexual, transgender, queer, questioning, intersex, and asexual (LGBTQIA+) scientists whose accomplishments contribute to scientific understanding, improving public health and medicine, and improve lives of countless individuals through their visibility. Many of these individuals are still living and working today across the country and around the world.

500 Queer Scientists is one project that highlights individuals working in STEM fields through submitted photos and biographies. You can find them as @500QueerScientists.

We honor the accomplishments of these individuals because science is limitless. The power to generate new ideas and reveal new discoveries lies within us all and these outstanding people are the embodiment of significant scientific achievement. Their work strengthens scientific understanding, generates new knowledge, breaks barriers in science and society, and advances the way we live today.

By making observations, asking questions, and striving to understand how aspects of our world are connected, each of us is an explorer. At the Buffalo Museum of Science, we hope all of our guests will be inspired to seek out hidden stories, and recognize their own potential to explore, to discover, and to advance our society.

We believe science creates opportunities and shapes our world.

JEMMA REDMOND
1978-2016
BIOPRINTING

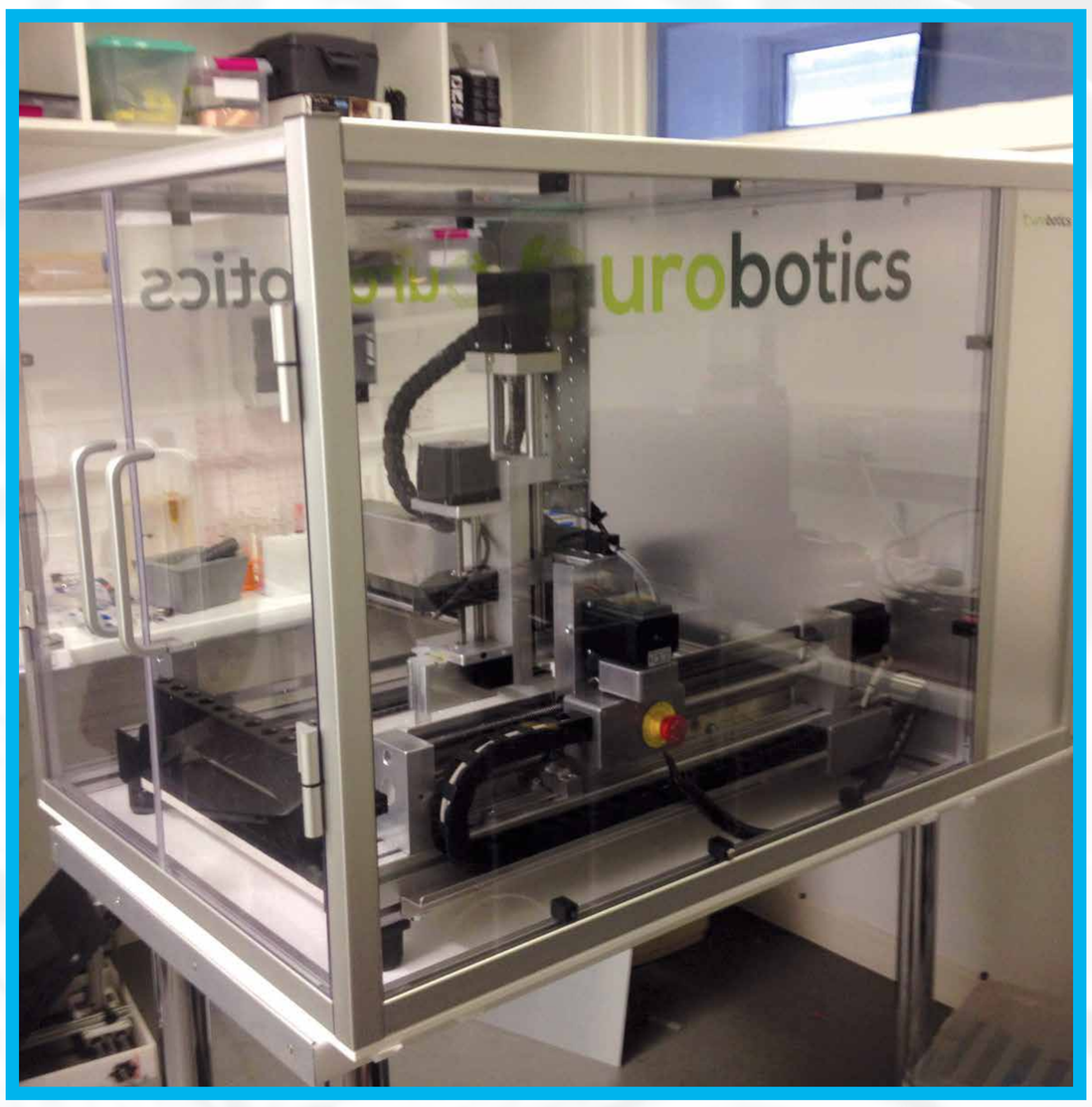
"There are a number of reasons I got into the field ... but I found out I couldn't have children. I have some differences in my body. I was trying to find solutions to the problem. I was trying to see if I could actually fix things, or re-generate tissue. And that's kind of how I got into bioprinting."

Irish innovator Jemma Redmond was a pioneer in biotechnology, particularly using biological tissues in 3D printing.

Redmond was born intersex, meaning that she had both male and female biological characteristics. This condition, and the poor treatment she received from medical professionals because of it, inspired her to work in biotechnology as a way to help her own condition.

In 2015, she co-founded Ourobotics - a company that first printed biological material for medical use. Redmond developed a method of keeping living cells alive during the printing process, creating complex tissues. Using mostly open-source software and low-cost components, she reduced the price of a bioprinter by nearly 93% from €175,000 to €12,500!

Tragically, Redmond died unexpectedly in 2016 at the age of 38.



POLLY ARNOLD
1972-
INORGANIC CHEMIST

"My childhood engendered a determination to not conform, and a pride in being different, which has helped me be comfortable with being queer, and to continue with science as a career. It has also no doubt helped shape the sort of research goals that we target."

Inorganic chemist Polly Arnold leads the Chemical Sciences Division at the Lawrence Berkeley National Laboratory at UC Berkley. She earned a BA from the University of Oxford, a DPhil from the University of Sussex, and was a Fulbright Scholar at Massachusetts Institute of Technology. Before joining UC Berkley, Arnold served as the Crum Brown Chair of Chemistry, University of Edinburgh, Scotland.

Arnold's work focuses on how small molecules made of carbon, nitrogen or oxygen bond to lanthanides and actinides - transition metals found at the bottom of the periodic table. This research can further our understanding of how nuclear waste behaves.

In 2012, Dr. Arnold was awarded the Rosalind Franklin award for her achievements. She used the funds from the award to create the documentary "A Chemical Imbalance", describing the history of women studying chemistry in Edinburgh and reasons for the gender imbalance in STEM careers and courses of study. She was appointed an OBE (Officer of the Order of the British Empire) in 2018 for her work in chemistry and diversity in STEM.

NERGIS MAVALVALA
1968-
ASTROPHYSICIST


Photo Credit: MacArthur Foundation

"We're in the middle of a global pandemic and economic challenge, and we're also in a moment, at least in U.S. history, where the imperative for racial and social justice is really strong. As someone in a leadership position, that means you have opportunities to make an important and hopefully lasting impact."

Nergis Mavalvala was born and raised in Pakistan. She was a religious minority in Pakistan, growing up in a secular Zoroastrian household. Supporting their daughter's interest in math and science, her parents encouraged her to pursue advanced education overseas.

In 1986, Mavalvala moved to the United States to attend Wellesley College, earning a bachelor's degree in physics and astronomy. In 1997, she completed a doctoral degree in physics from the Massachusetts Institute of Technology where she became involved in the Laser Interferometer Gravitational Wave Observatory (LIGO) research program. For the next two decades, she focused on instrument development for interferometric gravitational-wave detectors and helped to build the program as we know it today.

In 2016, Mavalvala was among the team of LIGO scientists that observed gravitational waves - ripples in the fabric of spacetime that confirmed part of Albert Einstein's theory of general relativity. In addition to her research and scholarship, she is also a tireless advocate on issues of well-being, respect, diversity, inclusion, collaboration, and mentorship in STEM. In the fall of 2020, she was appointed Dean of MIT's School of Science. She is the first woman to hold this position.

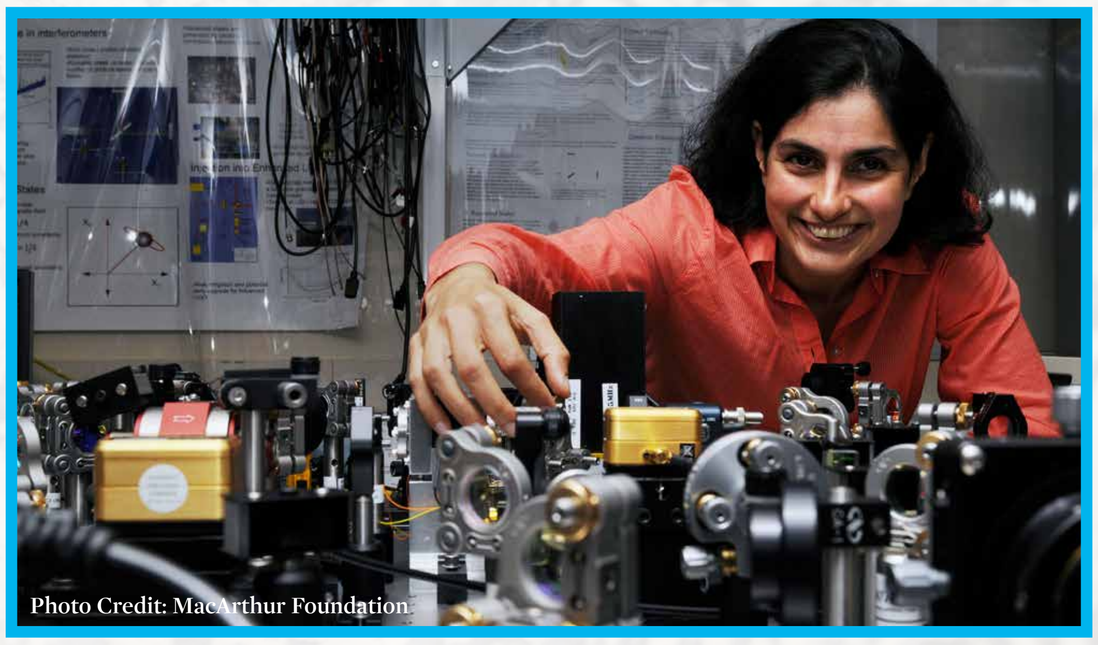


Photo Credit: MacArthur Foundation

BEN BARRES
1954-2017
NEUROSCIENTIST

"I am suspicious when those who are at an advantage proclaim that a disadvantaged group of people is innately less able," he wrote. "Historically, claims that disadvantaged groups are innately inferior have been based on junk science and intolerance."

- "Does Gender Matter?," 2006

Ben Barres was a neurobiologist at Stanford University. In 1997, he began living openly as a man and in 2013 became the first openly transgender scientist in the National Academy of Science.

His research focused on the function of glia cells in the brain. Glia cells were originally thought to be "junk" cells with no defined purpose, but Barres research revealed that these cells convey messages to neurons and form synapses between brain cells.

Barres' lab identified a type of glia responsible for degeneration of cells, and then a drug to block development of those cells. This drug has been successfully used in treatments of Alzheimer's, Huntington's, and Guillain-Barre Syndrome.

After transitioning, Barres spoke out against gender discrimination he experienced throughout his academic career. He noticed that people treated him with more respect than when he presented as a woman.

SALLY RIDE
1951-2012

PHYSICIST AND ASTRONAUT

"If you ask an 11-year-old to draw a scientist, she's likely to draw a geeky guy with a pocket protector. That's just not an image an 11-year-old girl aspires to. As she looks on the Web, she sees men as scientists. That's not particularly appealing to tween girls. And if an 11-year-old girl says she wants to be an engineer, she'll likely get a different reaction from peers than she would if a boy her age said the same thing, and maybe even different reactions from teachers and parents."

Sally Ride was born May 26, 1951 in Encino, California. She received a bachelor's degree in English and Physics from Stanford University and went on to receive a PhD in physics from Stanford in 1978. Later that year, she was selected to be a NASA astronaut.

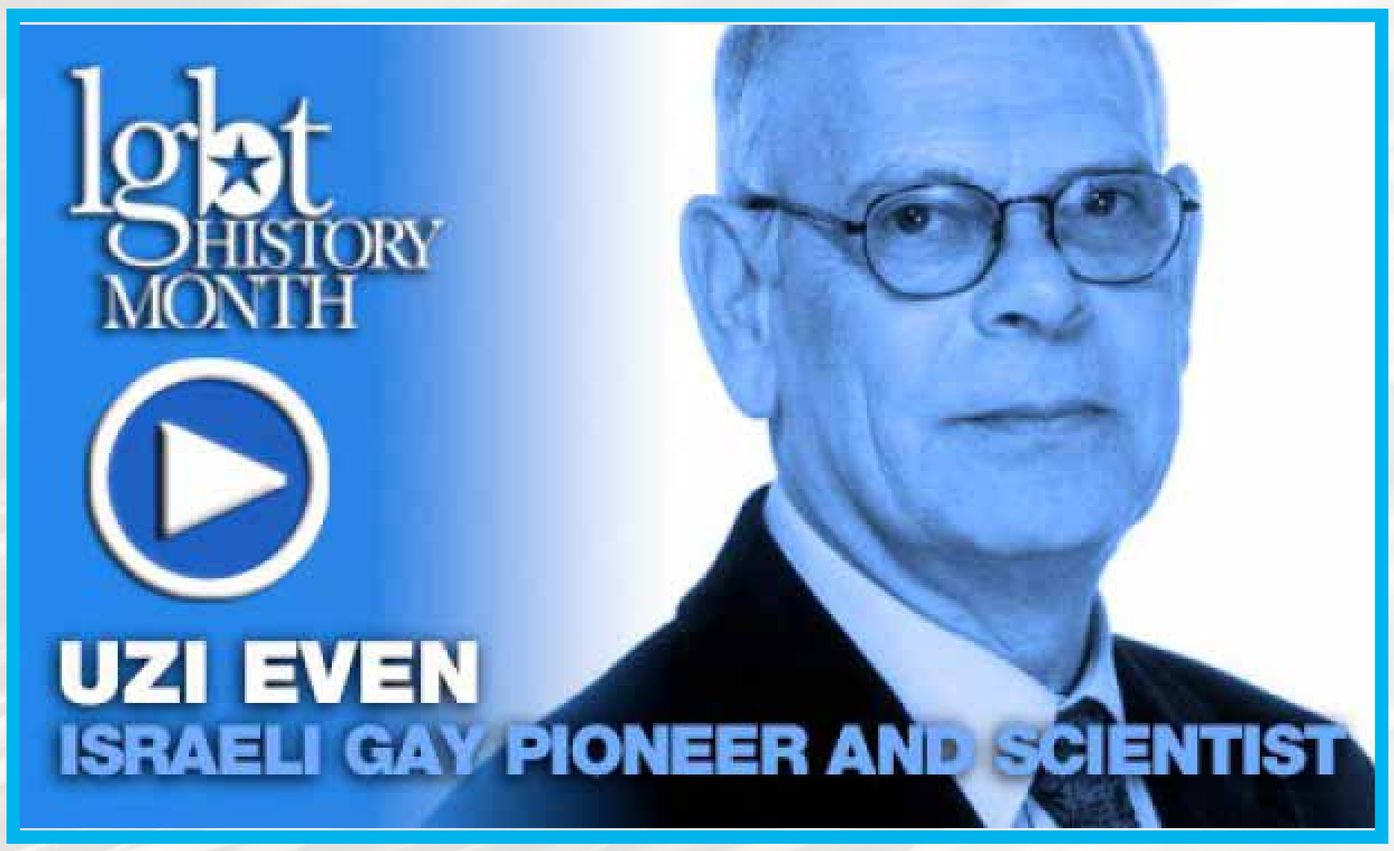
Before her flight, she fielded media questions related to her gender. Despite many derogatory questions and comments, she insisted that gender was irrelevant for her job - she saw herself only as an astronaut.

In 1983, she became the first American woman in space at age 32. She completed another mission in 1984, spending a total of 343 hours in space. Following her flights, Ride continued to work for NASA, including serving on the investigatory board for two shuttle accidents, Colombia and Challenger.

On July 23, 2012, Sally Ride died at age 61 after being diagnosed with pancreatic cancer. Her sexuality was only revealed after her death, when her longtime partner Tam O'Shaughnessy was named in her obituary.

UZI EVEN
1940-

PHYSICAL CHEMIST



Uzi Even was born in 1940 in Haifa, Palestine - eight years before the establishment of the State of Israel. He studied physics and chemistry, earning bachelors and masters degrees at Technion – Israel Institute of Technology, and a PhD at Tel Aviv University.

Even worked as a nuclear scientist at the Negev Nuclear Research Center, operated by the Israeli Defense Forces. He even reached the rank of Lieutenant Colonel, but was stripped of his rank and security clearance in 1968 when it was revealed that he was gay.

In 1993, Even addressed the Knesset - Israel's legislative body - on the subject of gays and lesbians. In part due to his testimony, Israeli law was changed to allow homosexuals to serve in the army in any position. In 1995, he successfully challenged Tel Aviv University over spousal rights for his partner. His work led to increased rights for gay and lesbian spousal protection, health care, adoption, and divorce in his home country.

Today, he is a professor emeritus of physical chemistry at Tel Aviv University.

CLYDE WAHRHAFTIG
1919-1994

GEOPHYSICIST

"I would not wish on anyone the life of repression, self-doubt, and dissimulation that Allan and I had to go through. No, the group whose attitudes I wish to affect are those of you who are not homosexual, but who may find yourselves with students, subordinate, or colleagues who are. I ask you to recognize that homosexuals can make as much of a contribution to science and humanity as anyone else."

Clyde Wahrhaftig was born and raised in Fresno, California. He earned a bachelor's degree in geology at CalTech in 1941, and a PhD in geology at Harvard in 1953. From 1941 until his death, he worked at the US Geological Service (USGS).

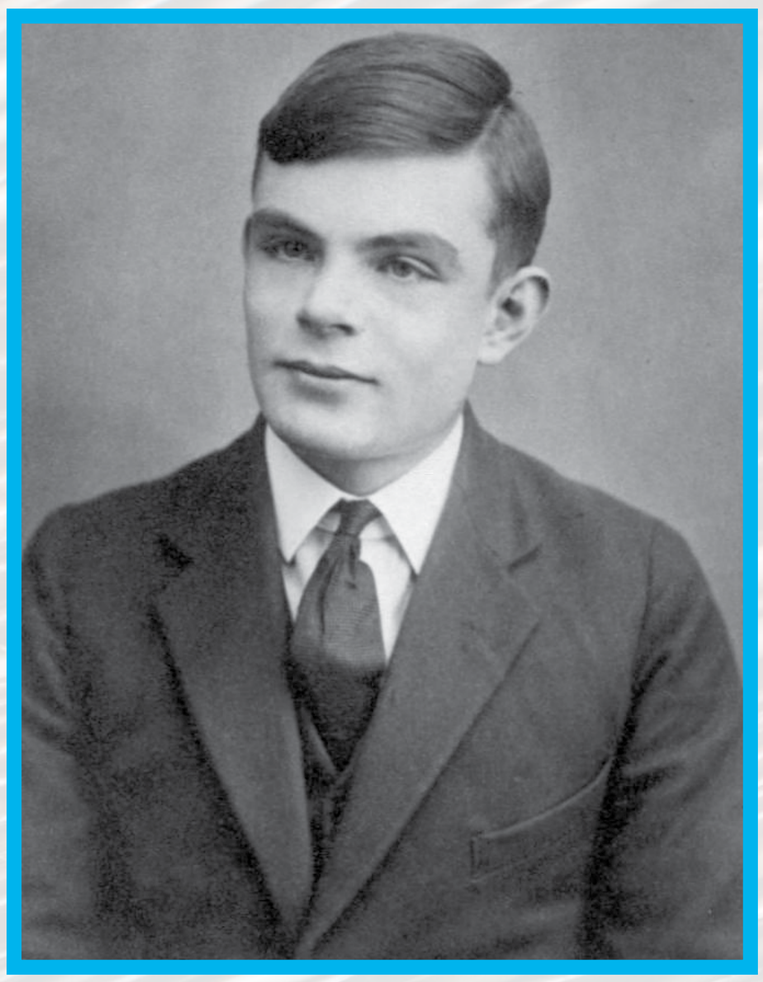
Working in California's Bay Area, he was one of the first scientists in the area to emphasize the role of plate tectonics in earthquakes and spent a great deal of time raising public awareness.

Dr. Wahrhaftig was honored with the 1989 Distinguished Career Award from the Geological Society of America. During his acceptance speech, he publicly came out as homosexual and honored the memory of his longtime partner, fellow geoscientist Allan Cox.

Throughout his career, he strongly supported minorities and women in geosciences. Later in life, he wanted to be seen a role model for what he called "a minority that has managed to survive largely because it is invisible".

ALAN TURING
1912-1954

MATHEMATICIAN AND CRYPTOGRAPHER



Alan Turing, born 1912, was an English mathematician whose work paved the way for the fields of theoretical computer science and artificial intelligence.

During World War II, Turing worked at the codebreaking center, which served to decode intercepted German transmissions between naval ships. His work helped the Allied forces defeat the Nazis in a number of battles.

Following the war, he helpled to design the first stored-program computer. He also developed the famed Turing Test, a test of a machine's ability to behave like a human.

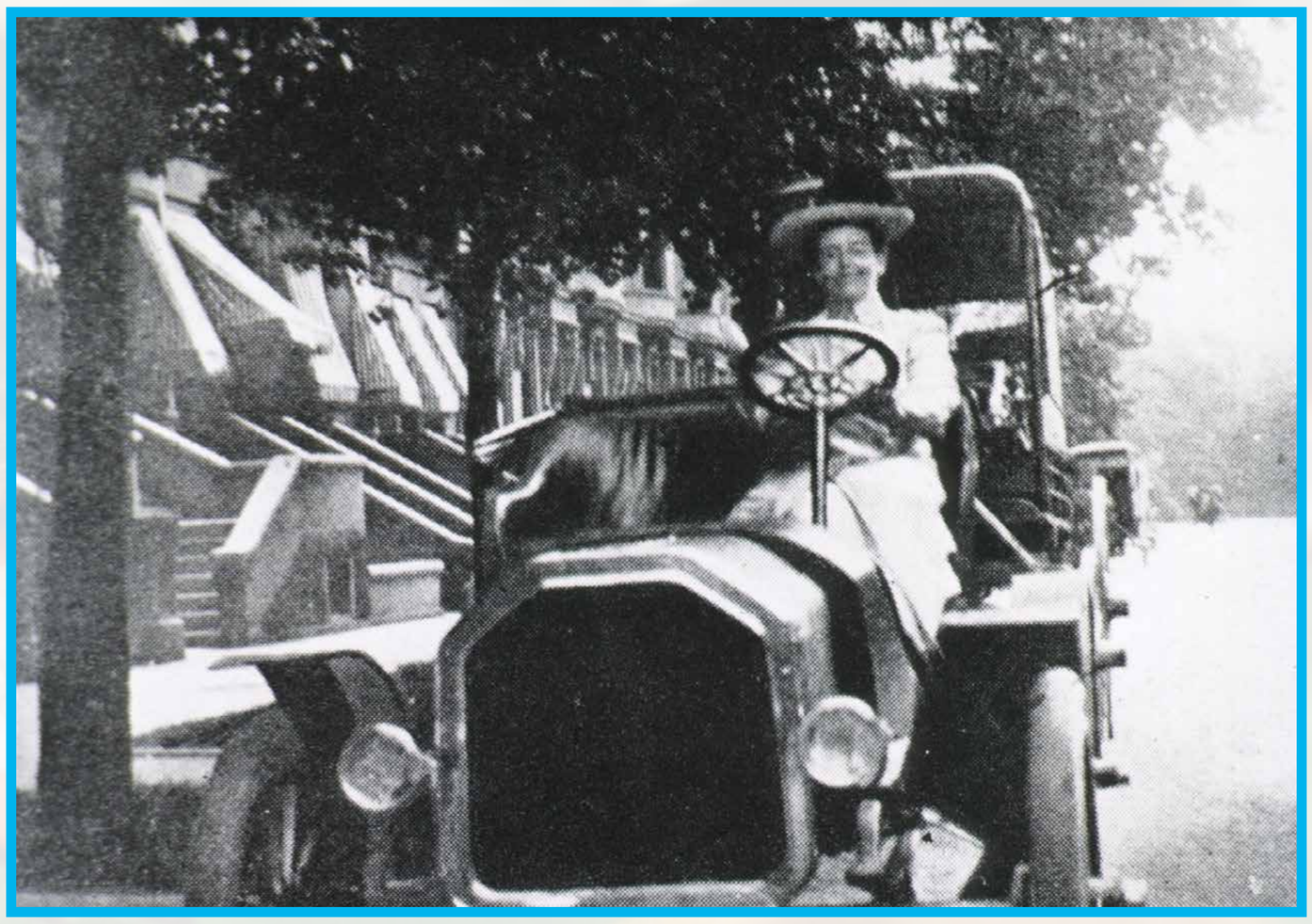
In 1952, Turing was convicted with "gross indecency" under the 1885 Criminal Law Amendment act for engaging in a homosexual act. He was sentenced to undergo hormonal treatments designed to decrease libido.

In the months that followed, the treatments altered Turing's body and thus his mental health deteriorated. In June 1954, he was found dead of an apparent suicide.

In 2009, British Prime Minister Gordon Brown issued a public apology for the "appalling way he was treated". Turing was pardoned posthumously.

SARA JOSEPHINE "JO" BAKER
1873-1945

PUBLIC HEALTH PROVIDER



Sara Josephine Baker was a physician that made huge strides in public health education and preventative medicine, particularly among immigrant communities in New York City.

During her time as medical inspector in New York City, Baker invented an infant formula to allow mothers to return to work and educated new mothers on how to care for their child. She developed a new way of storing silver nitrate, which was used to prevent blindness in infants exposed to gonorrhea. She also tracked down "Typhoid Mary", the source for two typhoid outbreaks.

After her retirement, she became the first female professional representative to the League of Nations, serving under the Health Committee for the United States.

Baker lived during a time when sexuality was not part of identity, and rarely commented on beyond physical appearance. She tailored her clothes to be more masculine. Baker lived with "woman-oriented woman" Ida Wylie for many years.

CHANDA PRESCOD-WEINSTEIN
1982-
THEORETICAL PHYSICIST

"Studying the physical world requires confronting the social world. I know personally that social barriers impact the practice of science, its results, and the people who comprise the community we call "science." In this book, I will reflect to readers both my love for science and the difficulties people like me face in holding on to that love."

- The Disordered Cosmos

Dr. Chanda Prescod-Weinstein is an assistant professor of physics and astronomy and core faculty in women's and gender studies at the University of New Hampshire. The author of *The Disordered Cosmos: A Journey into Dark Matter, Spacetime, and Dreams Deferred*, she is also a columnist for New Scientist and Physics World.

Her research in theoretical physics focuses on cosmology, neutron stars, and dark matter. She also does research in Black feminist science, technology, and society studies. Nature recognized her as one of 10 people who shaped science in 2020, and Essence magazine has recognized her as one of "15 Black Women Who Are Paving the Way in STEM and Breaking Barriers."

A cofounder of Particles for Justice, she received the 2017 LGBT+ Physicists Acknowledgement of Excellence Award for her contributions to improving conditions for marginalized people in physics and the 2021 American Physical Society Edward A. Bouchet Award for her contributions to particle cosmology. Originally from East L.A., she divides her time between the New Hampshire Seacoast and Cambridge, Massachusetts.

(Biography provided to Buffalo Museum of Science by Chanda Prescod-Weinstein)