# Women in Science and Jefferson Lab

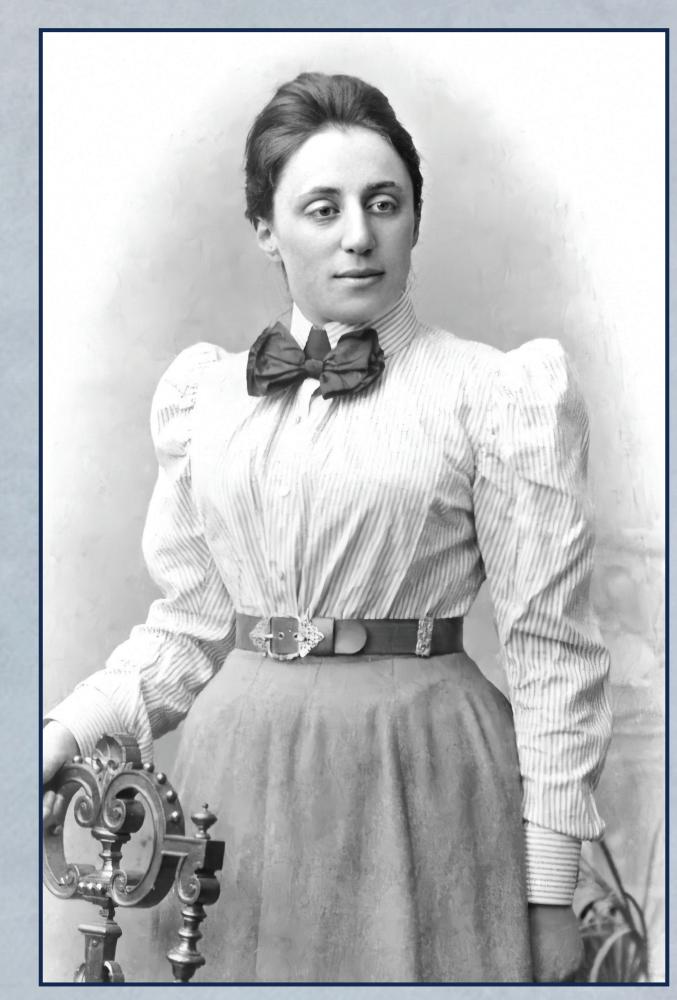
Honoring the innovators, scientists, engineers and inventors whose research has impacted the work we do at Jefferson Lab in the past, present and into the future.



## Beatrice Hicks

**American**Jan. 2, 1919 – Oct. 21, 1979

Beatrice Alice Hicks was an engineer and the first female engineer to be hired by Western Electric. Hicks eventually became the owner of an engineering firm, where she patented a gas density switch that would be used in the U.S. space program, including the Apollo moon landing missions. The switch technology was later used for patents dealing with cryogens. At the lab, we use cryogens to cool materials to very low temperatures so that we may operate CEBAF.



### **Emmy Noether**

**German**Mar. 23, 1882 – April 15, 19

Amalie Emmy Noether was a mathematician who proved that the conserved quantities for every system of physical laws possess some continuous symmetry and vice versa. Because physical experiments will have the same outcome at any place and time, then its laws are symmetric under continuous translations in space and time. Noether's theorem relates these symmetries to the conservation laws of linear momentum and energy, laws which are directly used in the analysis of our experiments.



Chien-Shiung Wu

Chien-Shiung Wu, also known as Madame Wu, was a particle and

xperimental physicist who made significant contributions to her

pest known for conducting the Wu experiment, which proved

parity-violating electron scattering experiments that measured

the weak charge of the proton, the neutron skin in heavy nuclei,

that parity is not conserved. This discovery led to the lab's

ield, earning her the nickname, the "First Lady of Physics." She is

**Chinese American** 

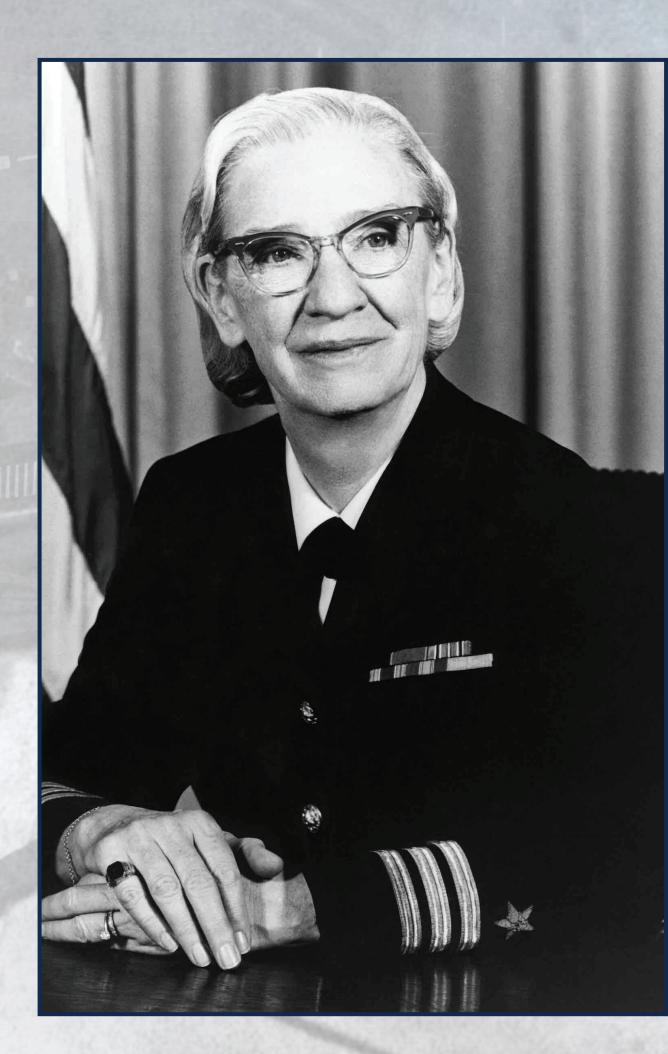
and the MOLLER project.

May 31, 1912 – Feb. 16, 1997

#### Helen Thom Edwards

**American**May 27, 1936 – June 21, 2016

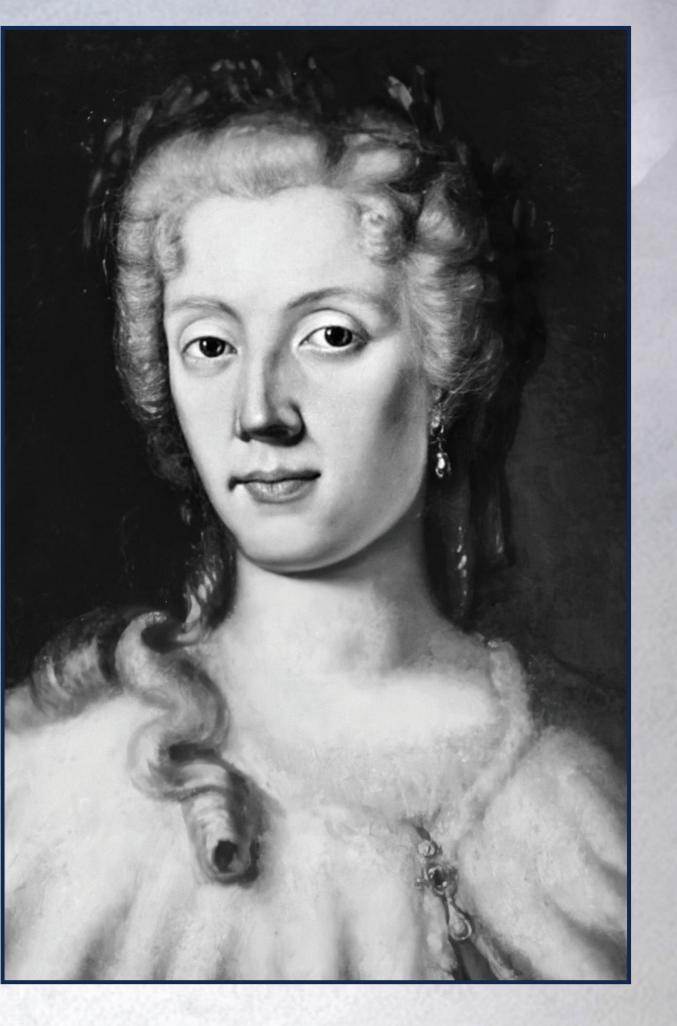
Helen Thom Edwards was an accelerator scientist who got her start building and commissioning the Cornell Synchrotron. She later moved to Fermilab, where she led the design, construction and operation of the Tevatron. In 1989, she was awarded the National Medal of Technology by President Bush for her work on the Tevatron. Her career and her research interests helped pave the way for "big science" powered by particle accelerators, including the one we use today at CEBAF.



## Grace Hopper

**merican** ec. 9, 1906 – Jan. 1, 1<sup>o</sup>

Grace Brewster Murray Hopper was a computer scientist and U.S. Navy rear admiral. She pioneered the concept of a compiler, which allowed people to write computer algorithms in English with the instructions translated into a machine-executable version. This democratized the ability to write computer code and made it possible to develop complex programs of instructions, which has been an essential element of nuclear physics research.



## Laura Bassi

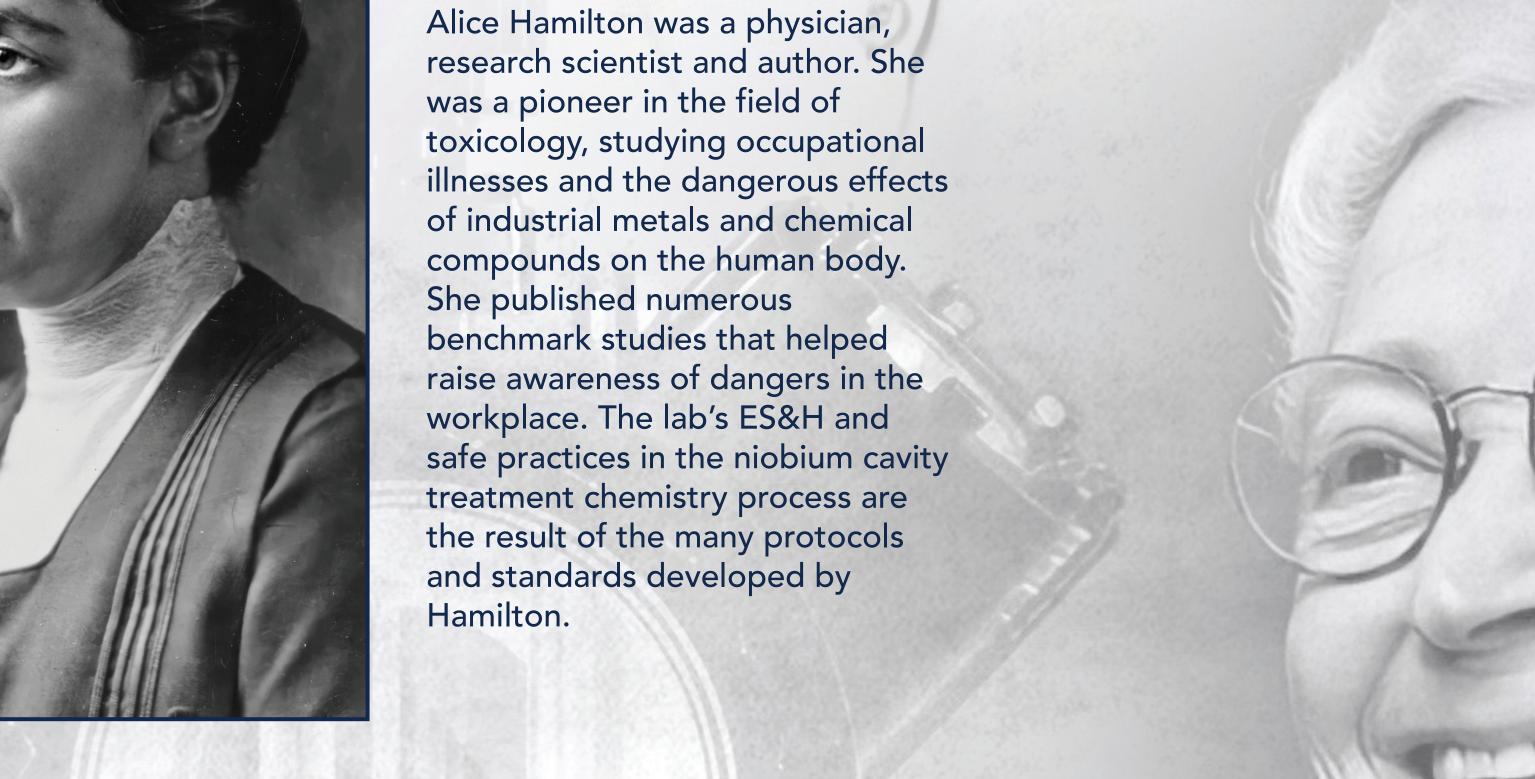
**Italian**Oct. 31, 1711 – Feb. 20, 1778

Laura Bassi was a physicist and the first female physics professor in the world. At the age of 20, she became the first female member of the Bologna Academy of Science. She was inducted by the Pope to the Benedettini and served as the Chair of Experimental Physics until she died. Bassi used differential calculus and Newtonian mechanics to determine the motion of bodies moving along any curved paths in a plane, similar to the way the electrons move on the CEBAF



## Alice Hamilton

**American** Feb. 27, 1869 – Sept. 22, 1970

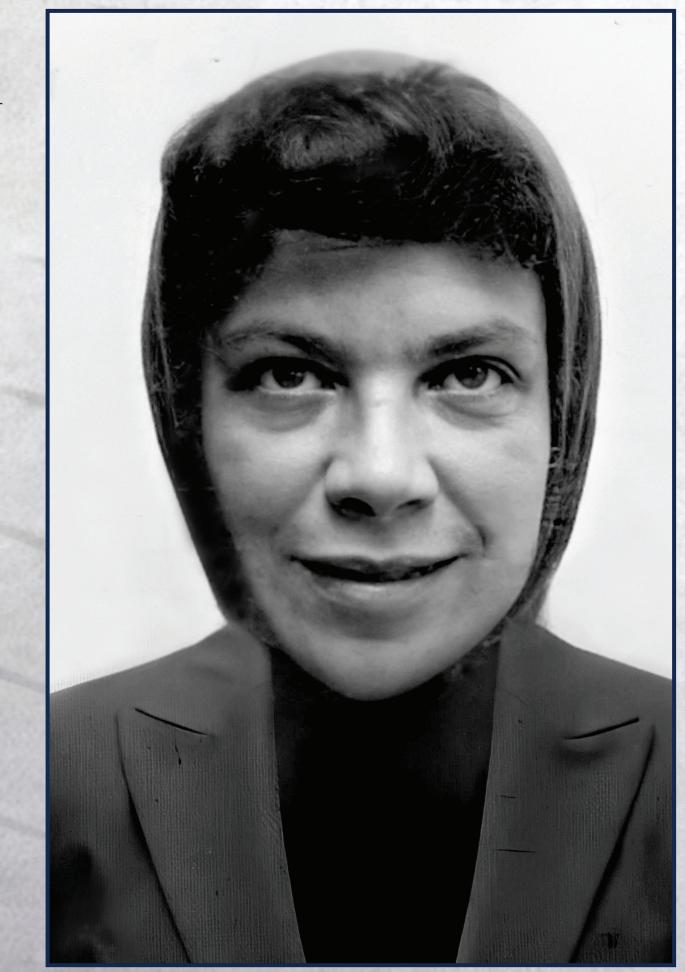




Marie Van Brittan Brown

**American**Oct. 2, 1922 – Feb. 2, 1999

Marie Van Brittan Brown was an innovator who invented the first closed circuit television system, which consisted of peepholes, a sliding camera, TV monitors and microphones. The cameras were connected to TV monitors inside her home for remote, safe observation – the first closed circuit television. At the lab, we utilize closed circuit TV monitoring while running experiments to safely observe our equipment remotely.



### Mici Teller

Hungarian American Apr. 30, 1909 – June 4, 2000

Born Auguszta Mária Harkányi, Mici Teller was a scientist and computer programmer who worked on the Manhattan Project in the computations division at Los Alamos National Lab. She later moved to Argonne National Lab, where she was involved in the invention of the Metropolis Algorithm which is used in the lab's lattice QCD and other Monte Carlo simulations.



#### **Hedy Lamarr**

Austrian American

Hedy Lamarr was a film actress and inventor. With no formal training she was able to pioneer a technology that involves "frequency hopping" amongst radio waves. This allows the manipulation of radio frequencies at irregular intervals between transmission and reception, which also facilitates the generation of the helicity sequence of the CEBAF polarized beam, which, during offline processing, is decoded by using the original code sequence.

## Mildred Dresselhaus

American
Nov. 11, 1930 – Feb. 20, 2017

Mildred S. Dresselhaus was a solid-state physicist and professor at the Massachusetts Institute of Technology. Her research helped unlock the mysteries of carbon, earning her the nickname the "Queen of Carbon Science." Her work helped develop technology based on thin graphite. Due to its strength and electrical and heat conductivity, graphene leads to use at the lab in smartphones, hard drives, micro-electronics and lightweight detector supports.



Shirley Ann Jackson

Shirley Ann Jackson is a scientist. She

began her career as a nuclear physics

high-temperature superconductors,

Bell Laboratories in theoretical

which are used extensively in

superconducting magnets for

for the development of

Aug. 5, 1946 - present