Women Inventors Who Changed the World

Dr. Cynthia Furse
cfurse@ece.utah.edu
Let Me Introduce Myself...

- Professor
- Teacher
- Business Executive
- Wife, Mom & Grandma
- Dreamer ....
- Inventor
I Became an Engineer to Change the World
BSEE -- Voice Controlled Wheelchair
MSEE – Oil Sands / Brain Cancer
PhD – Cell Phone Safety
Finding Faults in Flight
I Became an Engineer to Change the World
Let’s take a look at some of the things *women engineers* have designed to improve the world

Ling-Chi Si (2640 B.C.)

First Empress of China
Developed the process to remove SILK from the cocoon and set up silk cultivation farms.

Computer and Engineering Horizons, Fall/Winter 1998

https://64.media.tumblr.com/835e03163cae6f601e2eda6654e5ca92/tumblr_inline_myndlmn64r1riz1wu.jpg
Pentesilea (1187 B.C.)

Queen of the Amazons
Invented the BATTLE AX!

Computer and Engineering Horizons, Fall/Winter 1998
https://en.wikipedia.org/wiki/Pentesilea
Shi Dun (c. 105)

Empress of China
First PAPER, made from bark of mulberry trees.
Eliza Luca Pinckney

Developed techniques for INDIGO CULTIVATION in the early plantation days in the Carolinas.

Computer and Engineering Horizons, Fall/Winter 1998
Ada Byron Loveless (1843)

Wrote a technical paper envisioning SOFTWARE (and coined the term), ARTIFICIAL INTELLIGENCE, AND COMPUTER MUSIC

Computer and Engineering Horizons, Fall/Winter 1998
Sarah Mather (1845)

SUBMARINE TELESCOPE AND LAMP
http://www.geocities.com/Pentagon/Quarters/7433/two.jpg
Amanda Theodosia Jones (1880s)

OIL BURNING FURNACE
VACUUM PACK CANNING

http://www.pbs.org/wgbh/pages/amex/technology/forgotteninv.html
Susan Hibbard (1876)

Susan Hibbard's patent of the FEATHER DUSTER in 1876 was hard fought. In fact, it came down to her squaring off against her own husband, George Hibbard, in patent court before she was justly awarded ownership of the patent.

http://www.pbs.org/wgbh/pages/amex/technology/forgotteninv.html
Inventor of NITRATES for fertilizers and curing meat.
ENVIRONMENTAL ENGINEERING:
Her tests of sewage, streams, and water supplies of Massachusetts led to the formulation of the Normal Chlorine Map, the standard map for sanitary surveys.

MIT’s Chemistry Faculty 1900

http://w3.mit.edu/museum/fun/wgrad.html
Lyda Newman

- Hairbrush with bristles
- Active in Women’s Sufferage
1876 Elizabeth Bragg Received the FIRST ENGINEERING DEGREE awarded to an American woman in 1876 in civil engineering from the UC Berkeley. She never worked as an engineer.

1894 Julia Morgan (UC Berkeley) and Bertha Lamme (Ohio State U) both graduated as mechanical engineers.
Kate Gleason (1865-1933)

- First woman to be president of a national bank
- First woman member of the American Society of Mechanical Engineers.
- Developed a machine to produce INEXPENSIVE BEVELED GEARS, and promoted large-scale development of LOW-COST HOUSING.

http://www.netsrq.com/~dbois/gleason.html
Ellen Eglui (1888)

CLOTHES WRINGER for washing machines. In 1888 she sold the patent rights for $18.00 because:

“If it was known that a Negro woman patented the invention white ladies would not buy the wringer”

http://crux.astr.ua.edu/4000WS/EGLUI.html
http://www.oldewash.com/museum/lives.htm
Emily Roebling

- First female “field engineer” in charge of construction of BROOKLYN BRIDGE after her father and husband (the bridge designers) got the “bends” from building the caissons.

- She was the first person to cross the bridge on the cables, to demonstrate that they were safe to fearful workers.

http://www.ecn.purdue.edu/ESCAPE/special/women/Histore/roebling.html
Mary Anderson (1903)

After seeing that street car drivers had to lean out the window on rainy days to see where they were going, Mary Anderson invented WINDSHIELD WIPERS, operated from within the street car.
Mary Engle Pennington

Preservation and safeguarding of milk, development of refrigerated railroad cars, chief of the U.S. Department of Agriculture Food Research Laboratory.

http://www.upenn.edu/AR/Women_at_Penn/index.html
Lillian Gilbreth (1914)

• Mother of modern management. Pioneered industrial management techniques still in use today along with her husband, Frank.

• First "superwomen" to combine a career with her home life.

• Prolific author ("Cheaper by the Dozen"), the recipient of many honorary degrees, and the mother of 12.

http://www.sdsc.edu/ScienceWomen/gilbreth.html
Beulah Louise Henry

The “lady Edison” of the 1920s and 30s. Her inventions include the BOBBINLESS LOCKSTITCH SEWING MACHINE, a DOLL WITH BENDABLE ARMS, a vacuum ICE CREAM FREEZER, a DOLL WITH A RADIO INSIDE, and a TYPEWRITER THAT MAKES MULTIPLE COPIES without carbon paper.

Hedy Lamarr 1940s Actress and War-time Inventor

- ANTI-JAMMING DEVICES FOR RADAR (patent held by Sylvania still in use today)
- WIRELESS LOCAL AREA NETWORKING
- Redesign of aircraft wings for Howard Hughes

Manual for the ENIAC computer, right down to the transistors

Evelyn Boyd Granville (1949)

- Ph.D. Mathematics from Yale 1949
- First African-American Woman to earn a math Ph.D.
- Developed computer programs to calculate trajectory of Mercury and Apollo space projects.

http://www.lib.lsu.edu/lib/chem/display/granville.html
Grace Murray Hopper (1952)  
Computer Software, Computer Bugs!

- Development of COBOL.
- Digital computing: subroutines, formula translation, relative addressing, the linking loader, code optimization, and symbolic manipulation.

http://www.sdsc.edu/Hopper/tribute.html
Stephanie Kwolek (1966)

Polymer Fibers -- mooring ropes, fiber-optic cables, aircraft parts, canoes, and lightweight bullet-resistant vests.

The most famous product of her discovery was Kevlar, a polymer fiber five times stronger than the same weight of steel.

Valerie Thomas

- NASA’s image-processing systems for “Landsat,” the first satellite to send multi-spectral images to study the Earth’s resources from outer space.
- “Illusion Transmitter”
Erna Schneider Hoover (1971)

Computerized switching system for telephone call traffic

In science, as everywhere else in the domain of thought, woman should be judged by the same standard as her brother.

Her work must not simply be well done for a woman."
Perovskites for robust and reliable solar cells

Pictures from Yoon Lab and https://en.wikipedia.org/wiki/Perovskite
Dr. Tara Deans (Biomedical Eng.)

Synthetic biology for regenerative medicine, drug delivery, cell-based therapeutics, and disease monitoring

Dr. Kerry Kelly (Chemical Eng.)

Monitoring Utah’s Air Quality
Visualizing Data

https://www.cs.utah.edu/~miriah/
Dr. Brittany Coats (Mech. Eng.)

Utah Head Trauma Lab

https://pedtrauma.mech.utah.edu/
Dr. Krista Carlson (MSE)

Safe Drinking Water

Nanostructured Ceramics for Electrocatalytic Water Purification
This Academic Life

https://thisacademiclife.org

Pandemic impact on research productivity
Prof. Harold Park

Hosts:
Kim Lewis
Pania Newell
Lucy Zhang

REAL TALKS:
5 UNspoken TIPS FOR EARLY CAREER FACULTY

This Academic Life

Dr. Pania Newell (Mechanical Eng.)
Happy International Women’s Week! -- She Invents!

*Slightly modified by Dr. Yoon (3/30/2021)*