



## Sharing the Power of STEM

Michele Stuart, PMP

# Scientist vs. Engineer

- Scientist
  - See how things work
- Engineer
  - Make things work

Turn Ideas into Reality!



# Me!

## Michele S. Stuart

- Project Management Professional (PMP)
- Professional Engineer (original license in Virginia in 1985)
- Double Master's in Industrial Engineering and Operations Research
- Expert in Lean 6 Sigma
- Consulting Firm since 1994:

[www.encyengineers.com](http://www.encyengineers.com)

# My Influencers

- Father – Nuclear Engineer
- Math teachers in middle school
- Personal Traits
  - Always an organizer
  - Great at math and science
  - Puzzles, puzzles, puzzles....

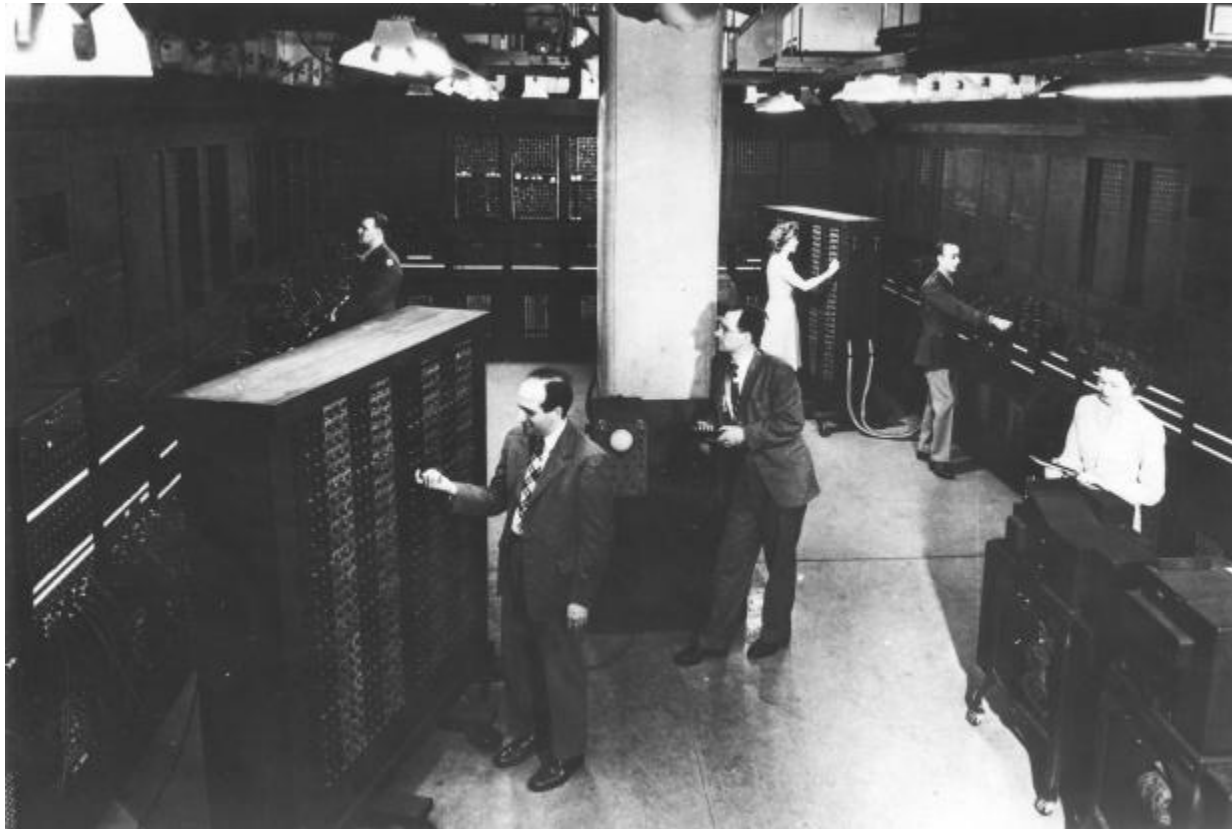
# My Life

- VA Tech 1975-79
- Master's
- EIT/PE
- Lifestyle selections
- From employee to manager to owner

# Career Pathway

- Manufacturing
- Europe and NATO
- Internal consultant for DC
- Family issues
- Efficiency Engineers
- Global Entrepreneur of the Year - SWE
- Teaching all along the way....

# ENIAC Refrigerator Ladies





## Current Status

- Women comprise only 9% of engineering faculty
- Undergraduate women total only 23.5% with little change over the past 15 years
- Yet – 70% of small businesses are owned by women
- AND, overall **only 20%** of adult population have problem solving skills!!



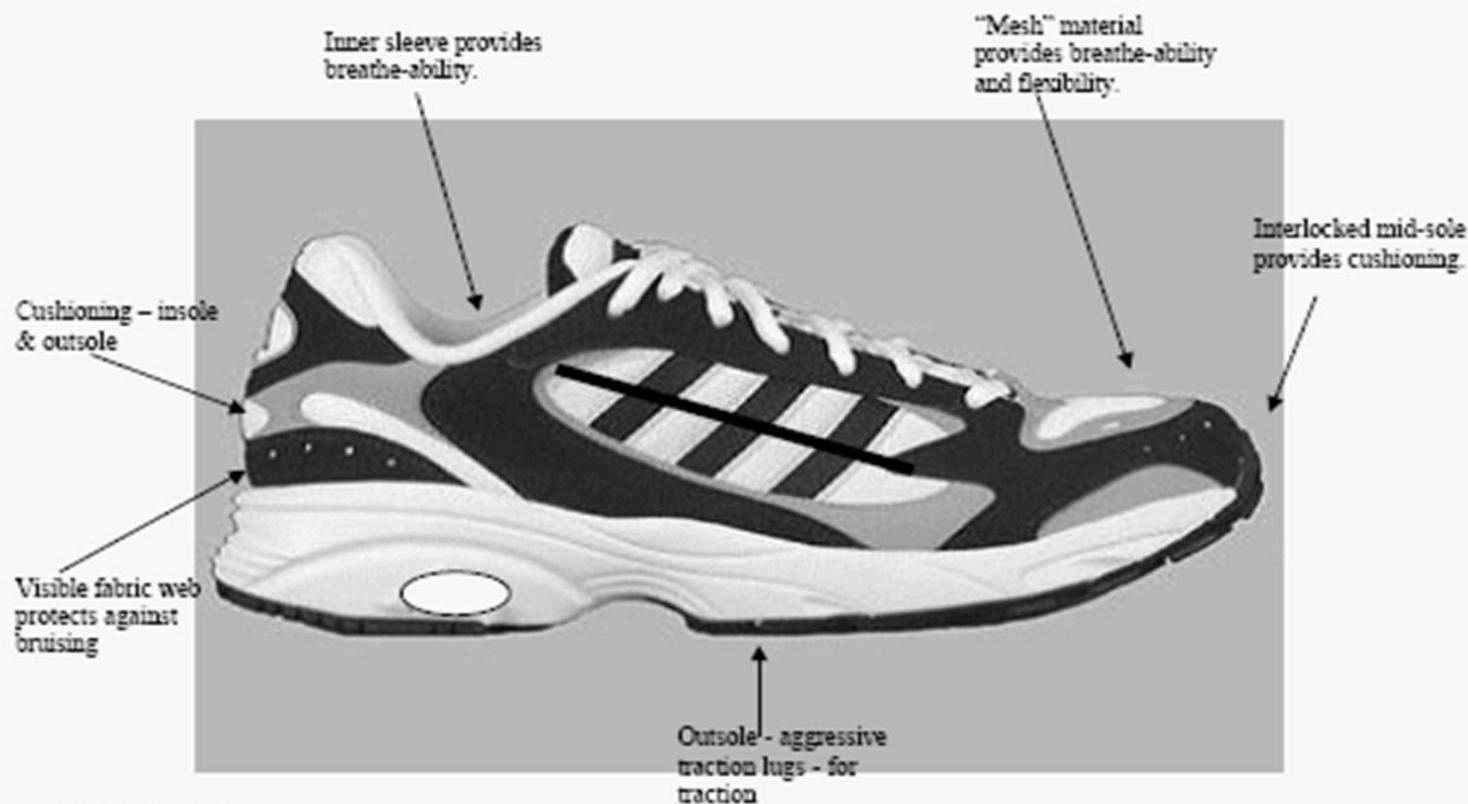
# Lillian Gilbreth

Mother of Industrial Engineering

America's First Lady of Engineering

- Born 1878, BS at Berkley in 1900
- MS in ME in 1902, married in 1904
- 12 children in 16 years while earning PhD
- Husband dies in 1924
- What was next for her?

# What Makes Up Your Sneaker



Making the Connection  
M. Cyr, Tufts University, CEO  
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# How Do Engineers Help?

- **BioMedical** - design to support the foot and make racers/basketball players better
- **Chemical** – chemicals for the soles
- **Mechanical** – equipment to make and test
- **Electrical** – controls the machines
- **Civil** – water & sewer facilities, roads to get people to work

# Do YOU Know any Engineers?

- Family
- Friends
- TV Buddies??

# Do you like to make things better?

- Do you like to watch things that work well?
- Does the line at the grocery store or McDonald's make you crazy?
- Do you like to organize things?

You may be an Industrial Engineer!

# Industrial Engineers

- Always looking for a better way
- Improve quality – make things better
- Increase productivity – get things done more easily

# Why I like being an IE

- Valuable: Save money and make workplace better
- Flexible: Apply same principles to many areas
- “Change Engineers” - always looking for the better way to do things
- Work with people and processes

# What I do as an IE

Are things arranged the best way? –  
Layout

What is the best order to do things? –  
Scheduling

What is the best way to do something? -  
Methods



# The Problem

What would Lillian Gilbreth do with one bathroom and five kids to get off to school?

# The Details

- Ann – 14, has to be sure every hair is in place, shows off on the way to school
- Bridget – 10, quick in the bathroom, fast walker
- Charlie – 12, just an average guy
- David – 8, only brushes his teeth, gets easily distracted on the way to school
- Emily - 6, likes the mirror, and her friends on the way to school

# Times

Child	Time in Bathroom	Walking Time
Ann	7	8
Bridget	4	6
Charlie	5	7
David	2	9
Emily	6	6

# Objective

- What is important?
- What does “late” mean?

# Assumptions

- Everyone finished breakfast at 8 AM and school starts at 8:15 AM
- Only one in the bathroom at a time
- School assumes late = 10 minutes
- Everyone is waiting at the door to take their turns

# Who's First?

- In what order should the children go?

# Calculations

Order	Child	(1) Start Time 8:00	(2) Bathroom Time	(3) End Time Time (1) + (2)	(4) Walk Time	(5) Arrive at School (3) + (4)	(6) Lateness School Starts at 8:15 15 - (5)
1st		0					
2nd							
3rd							
4th							
5th							

# Results

Order	Total Min Late	# Late	Avg Min Late	# Late Over 10 Min
First Come, First Served	37	4	9.25	2
Shortest Processing Time (Bathroom)	28	3	9.33	1
Longest Processing Time (Bathroom)	45	4	11.25	3
Earliest Due Date (Shortest Walker)	41	4	10.25	2
Latest Due Date (Longest Walker)	34	4	8.5	2



# Now you are an Engineer!



# Sharing Our Legacy

- Reach out to the youth
- Bring fun to the table!
  - Play games to develop/discover skills
- Make them see their options
  - Exposure to REAL people

# Our Future = Their Future

- Do not stand in the way of a person's dream – even your own
- World is more flexible & virtual
- Use support systems – professional organizations
  - SWE - Society of Women Engineers
  - LVEC – Lehigh Valley Engineering Council

# In Closing

What ever you can do,  
Or dream you can,  
Begin it,  
Boldness has genius,  
Power, and magic in it.

# Support....

- Contact me at:  
[mstuart@efficiencyengineers.com](mailto:mstuart@efficiencyengineers.com)
- Ready and able to present to students of any age!!