

# Ready, Set, Create! How Engineers and Libraries can Collaborate to Make a World of Difference

**The webinar will begin at 2:00 p.m. (MT) and will be recorded.**

**While you're waiting:**

- 1) Find the toolbar – it will either be on the bottom or top of your Zoom window
- 2) Introduce yourself in the chat box (please select “Share with All” *not* “Share with Panelists”)
- 3) Click audio “Join by Computer” – you won’t have microphone access

Tip for viewing: You can resize and move the location of the video and slide screens by clicking and dragging them

# Facilitator Introduction

Brooks Mitchell (Space Science Institute)

Justine Rose (AECOM)

Susannah Hamm (Cuyahoga County Public Library)

Jeannine Finton (American Society of Civil Engineers)

Claire Ratcliffe (Space Science Institute)

# Today's Agenda

**Welcome**

**Poll Question**

**What is Project BUILD?**

**American Society of Civil Engineers**

**Hands-on Activity:** *Who Dirtied the Water: A Role-Playing Activity*

**Hands-on Activity:** *Low Tech Water Filter for High Impact Clean*

**Share-outs from the Library/Engineer Duo**

**Q&A**

# Poll Question

- What percentage of US bridges are deemed “structurally deficient”

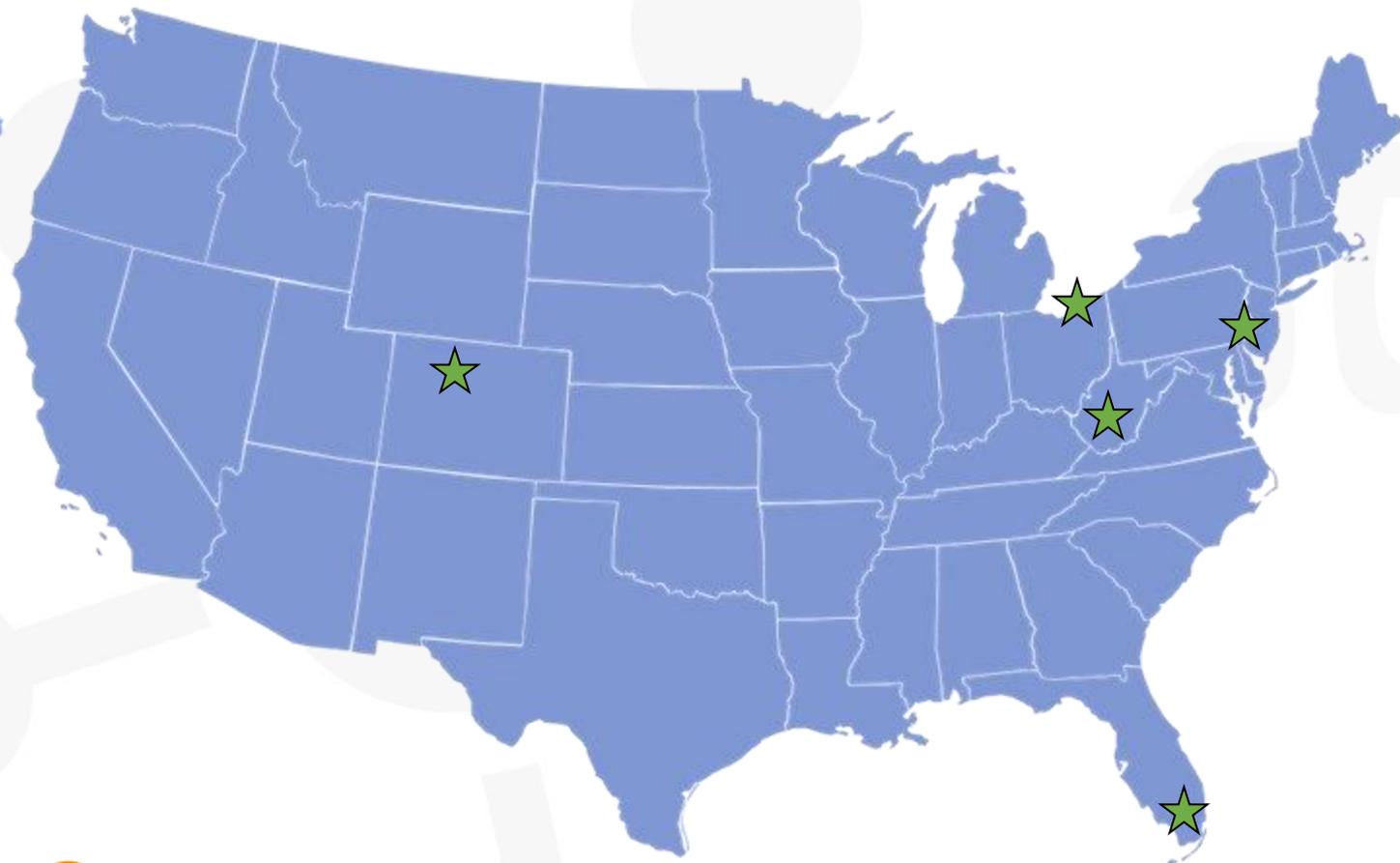
# Poll Question

- Where can you find the longest bridge that travels continuously over water?

# Project BUILD



- Anchorage, AK
- Philadelphia, PA
- Kanawha Co., WV
- Ft. Lauderdale, FL
- Cleveland, OH
- Greely, CO



# Project Goal

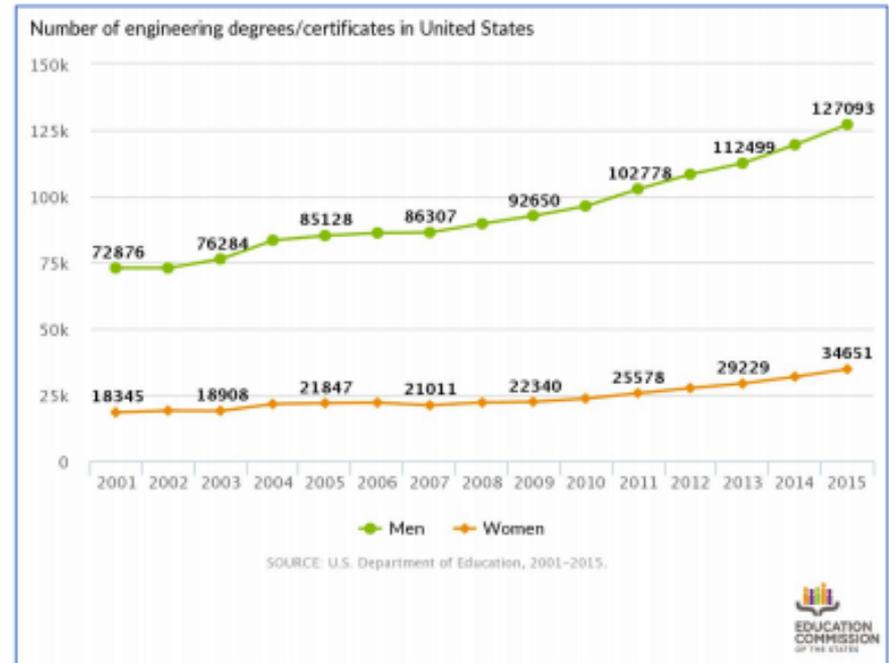
Investigate whether the infusion of public library resources and services with STEM-related technology resources, challenge-focused learning experiences, and partnerships with ASCE volunteers increases the interest and engagement of youth in grades 2-5 in STEM activities and awareness of STEM-related career opportunities.

# Our Challenge

- African Americans: 14.8 percent of the college-age population (18 to 24 years old); earned only 3.8 percent of engineering degrees.
- American Indian/Alaska Natives: 0.9 percent of the college-age population; earned only 0.3 percent of engineering degrees.
- LatinX: 21.4 percent of the college-age population; earned only 9.6 percent of engineering degrees.

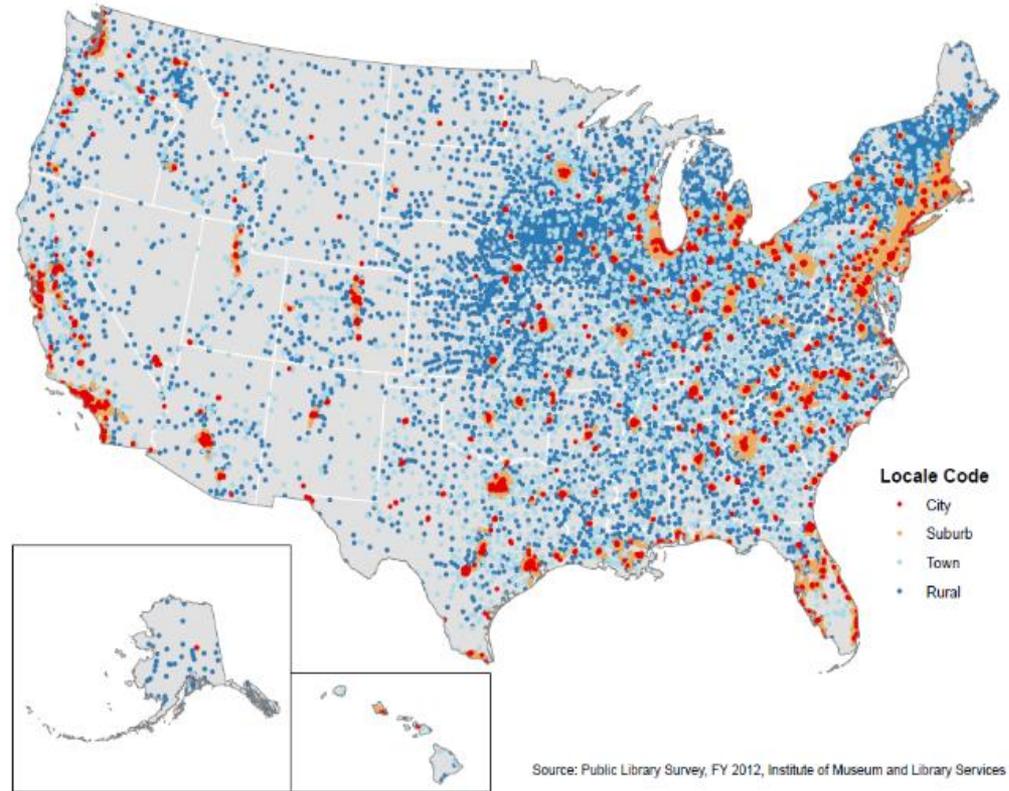
Source:

<http://www.nacme.org/news/blog/183-a-status-report-on-minorities-in-engineering>  
(2016)



77% of public libraries serve populations of less than 25,000 people

Figure N-1. Public Library Outlets in the United States, Fiscal Year 2012



Source: Public Library Survey, FY 2012, Institute of Museum and Library Services

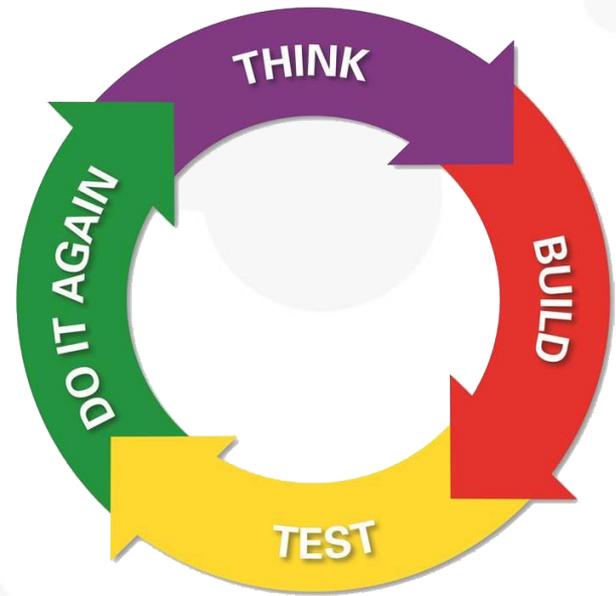
- **16,000 library locations**
- **1.5 billion visits per year**
- **Latino Use: 72%**
- **African-American Use: 69%**



Photo Credit (1 and 2): AARLC, Broward Co., FL



Credit: Philadelphia Free Library





# Project BUILD



- Anchorage, AK
- Philadelphia, PA
- Kanawha Co., WV
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***What do these places have in common?***

# *They Use Engineering to Solve Real-World Problems!*

They build bridges to connect communities



They clean up pollution



They deal with natural disasters



They promote sustainability

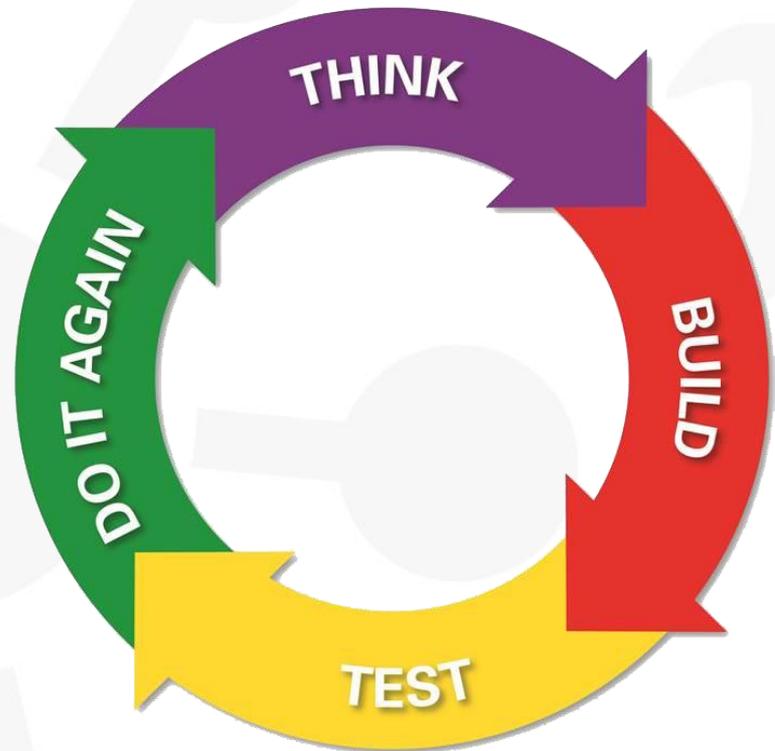


# Promotional Materials

Program Icon



Engineering Design Process





Span-tastic Bridges



Designed to Survive



Clean Up Our World



Power from Nature

[www.clearinghouse.starnetlibraries.org](http://www.clearinghouse.starnetlibraries.org)









The logo for the American Society of Civil Engineers (ASCE) features the acronym 'ASCE' in a bold, blue, sans-serif font. The letter 'A' is stylized with three horizontal white lines that curve upwards from the left side. The background is white and contains several faint, light gray icons: a bridge on the left, a dome in the upper center, and a globe at the bottom center.

**ASCE**

AMERICAN SOCIETY OF CIVIL ENGINEERS



Civil engineers design, build, and maintain the foundation for our modern society – our roads and bridges, drinking water and energy systems, sea ports and airports, and the infrastructure for a cleaner environment

**ASCE** AMERICAN SOCIETY<sup>®</sup>  
OF CIVIL ENGINEERS

Jeannine Finton,  
Sr. Manager, Pre-College Outreach



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# LEAP: Science is Fun!



# Get the Engineers Involved!

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MACGILLIVRAY FREEMAN'S

# DREAM BIG

ENGINEERING OUR WORLD

# Dream Big materials and Project BUILD

## Activities and Lesson Plans



### Strongest Shapes

Using index cards and only one shape in a bridge that can support a toy car.



### Slender Tower Challenge

Build the tallest tower you can with the supplies possible.



### Design a Dome

Design a 12-inch domed structure strong enough to hold pennies.

## Videos: Behind the Scenes



*Meet the Women Engineers of Dream Big*



*Angelica Hernandez (Spanish)*



*Kids React to Dream Big*

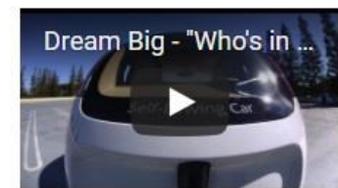
## Videos: Educational Webisodes



*Holding Sway: Wind Engineering*



*Virtual Modeling: Engineering the Future*



*Who's in the Driver's Seat: Autonomous Vehicles*

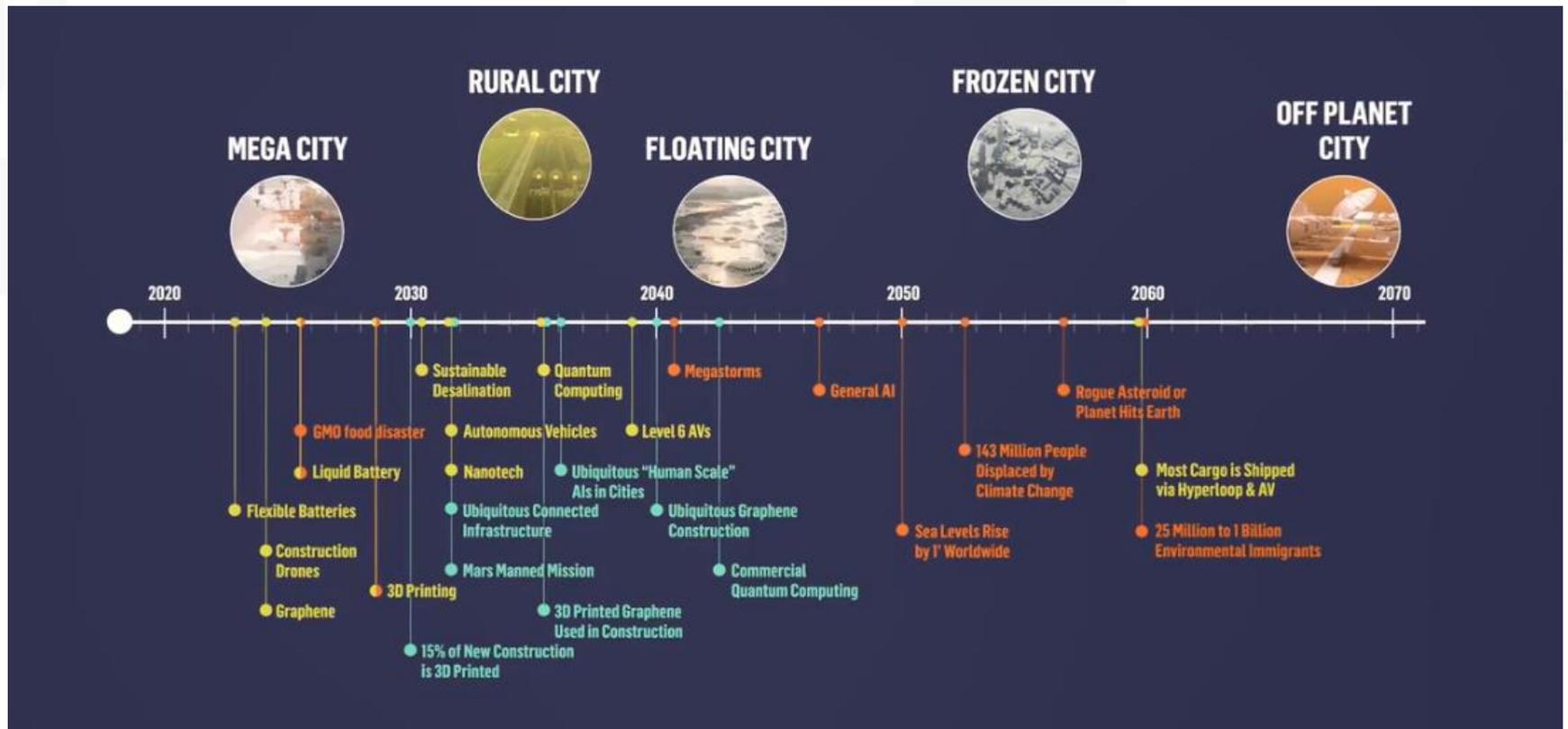
[www.discovere.org/dreambig](http://www.discovere.org/dreambig)



# Summer Reading Themes

- 2019 A Universe of Stories (space)
  - Building in Space or on other planets
- 2020 Imagine Your Story (fairy tales / mythology / fantasy)
  - Castles / Building a castle to withstand attack
  - Minecraft
  - ASCE's Future World Vision (<https://www.futureworldvision.org/>)
- 2021 Tails and Tales (animals)
  - Environmental and Water Engineering
  - Animal houses
  - Design a zoo

# Future World Vision





# Finding Engineers

- Reach out to ASCE: [outreach@asce.org](mailto:outreach@asce.org)
- Local industries: HR Department
- Universities: Engineering Departments, Student Chapters
- IEEE, ASME, ASABE, SWE, NSBE, SHPE, AISES

# Hands-On Activity: Who Dirtied the Water: A Role-Playing Activity



Credit: U.S. National Archives and Records Administration

# Who Dirtied the Water?

## OVERVIEW:

This interactive story asks students to take on the roles of different historical and modern characters who have had a role in the pollution of Boston Harbor. As a story is read, each character in turn adds a film container full of pollutants to a jar of clean water representing the Harbor. The story may be modified to fit any local, polluted body of water.

- This activity is meant to engage and set a stage!
- “Storytime” Activity = Literacy Connection
- Local Connection

# Who Dirtied the Water?

Section 1: Pre-History

(Chorus)

Section 2: First Settlers

(Chorus)

Section 3: European Settlers

(Chorus)

Section 4: Town Grows to a City

(Chorus)

Section 5: Modern Day

(Chorus)

Chorus:

Would you want to  
swim in this bay?

Would you eat fish  
caught in this water?

Would you like to go  
boating on this bay?

# “Pollutant” Ideas

RIVERS = Sand

SALT MARSHES = Dry Grass

SHELLFISH = Crushed sea shells

SETTLERS = Organic garbage

FARMERS = Potting soil

HOUSES = Toilet paper

FISHERMEN = Nylon line

BOATERS = Plastic pieces

LAUNDROMATS = Dish detergent

CLEANING = Baking soda

SUN BATHERS = Paper & plastic & popped balloons

FACTORIES = Vinegar

PORT = Vegetable oil (mix vegetable oil with powdered black tempura paint)

# Hands-On Activity: Low- Tech Water Filter for High- Impact Clean

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Some people in Bangladesh use cloth to clean their water...



Credit: National  
Science Foundation

...to take out small creatures in the water  
that help spread disease

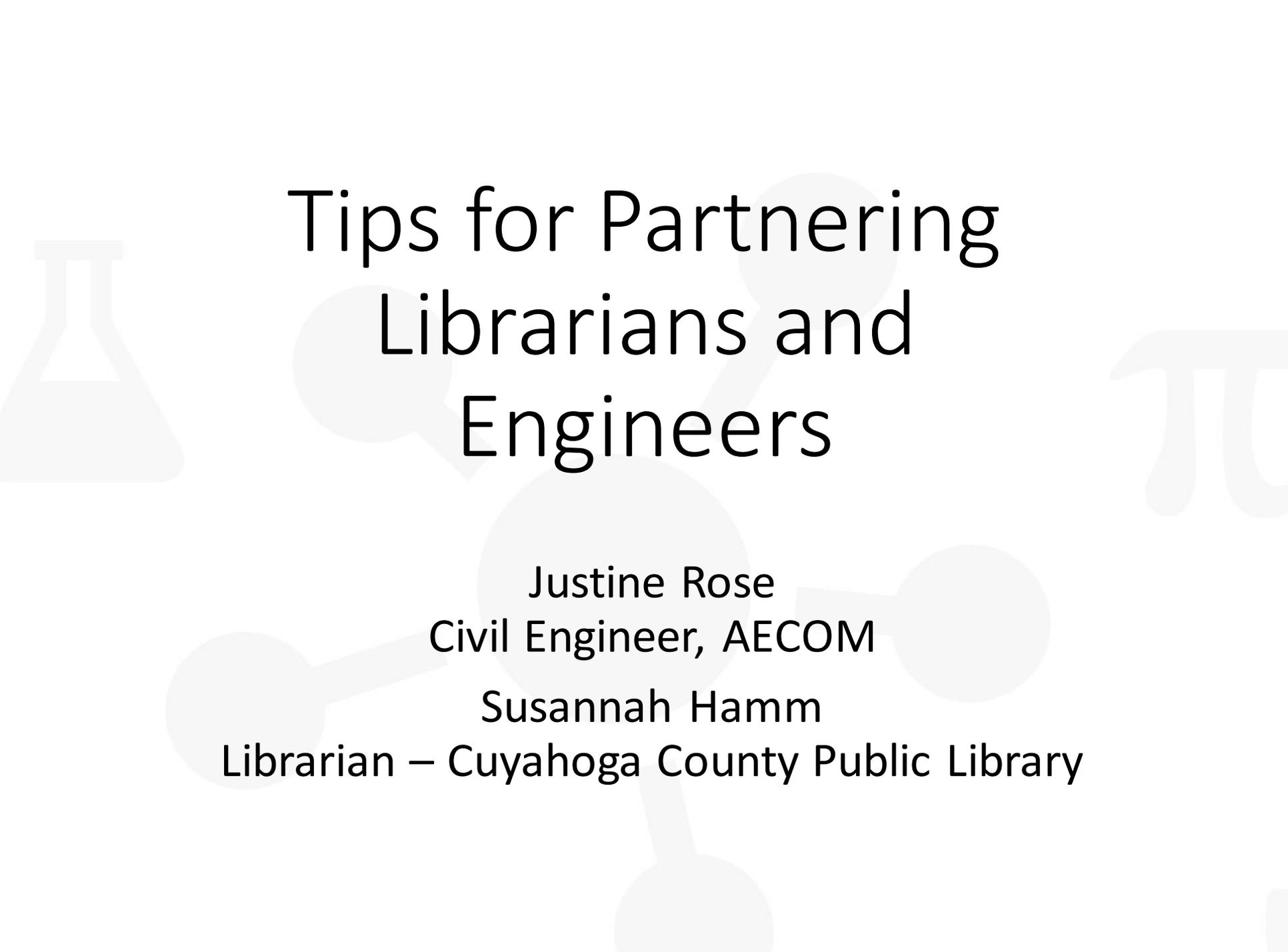


Credit: National Science Foundation

Susannah Hamm (Cuyahoga  
County Public Library)

Justine Rose (AECOM)

Share-Outs from the  
Library/Engineer Duo



# Tips for Partnering Librarians and Engineers

Justine Rose

Civil Engineer, AECOM

Susannah Hamm

Librarian – Cuyahoga County Public Library

# Define Your Roles

- Engineers are partners, not performers or teachers.
- Librarians control the room and maintain order.
- Everyone should join in, participate and encourage kids.



# Planning the Program

- Agree on goals.
- Keep it hands-on and active.
- Try each activity before you present it.
- Decide who will lead each part.

- More facilitators/volunteers are better.
- Afterwards, talk about how it went and how to improve.



# Presenting the Program

- Focus on the experience, not the product.
- Praise thinking, persistence and creativity.
- Don't take over or give the answer.
- Use open-ended questions.

- Be flexible about group sizes, agenda, etc.
- Be open to good stuff happening in the room.



# Tips for Librarians

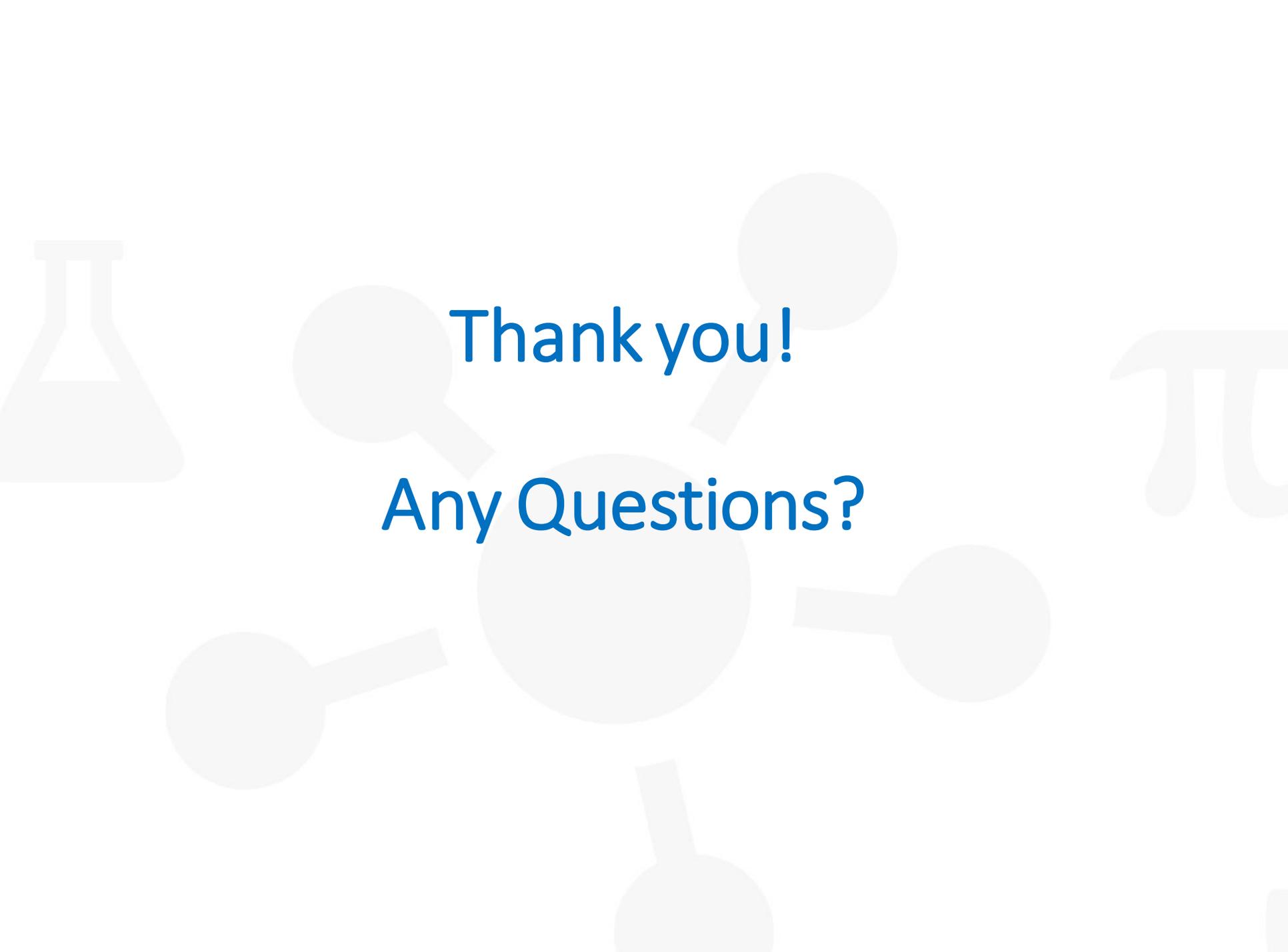
- Go over programming basics with your partners.
- Make clear any library policies about working with kids, safety, or photo/media use.
- Contribute ideas about what may excite kids and engage them in learning.
- You don't have to know everything. Work with the kids to figure it out.

# Tips for Engineers

- A public program is less structured than a class or lecture.
- Challenge kids to figure it out. Don't demonstrate or give them the answer.
- Encourage them to keep trying and redesigning.
- Talk about your work.
- Connect the activities to the kids' experiences.

Have fun!



The background features several faint, light gray icons: a flask on the left, the Greek letter pi ( $\pi$ ) on the right, and several molecular models consisting of spheres connected by lines, scattered across the slide.

**Thank you!**

**Any Questions?**