NGCP

CONNECT + CREATE + COLLABORATE

Brite Practices: Research-Based Guidance for Supporting STEM Identity Online

January 15, 2026

NGCP Vision

The vision of the National Girls Collaborative Project is to **support and create STEM experiences that are as diverse as the world we live in**.

NGCP Resources

- **National Webinars**
  - Offered regularly on relevant topics. Speakers include educators, researchers, authors, and diverse STEM professionals
- **Monthly Newsletter**
  - National events, STEM resources for girls and youth, professional development opportunities for educators, and research and reports
- **NGCP Website**
  - Exemplary Practices pages on Engaging Girls in STEM and Access and Equity, blog posts, and statistics and research related to girls and women in STEM

NGCP Podcast: Inspiring Curiosity from Early Childhood to Break Gender Stereotypes

In our first episode, we explore the crucial role of early childhood experiences in shaping girls' interest and engagement in STEM

5 Ways to Be an Ally to Girls and Women in STEM

If you think of gender equity in STEM as a "women's issue" we encourage you to think again!

Today's Webinar

Brite Practices: Research-Based Guidance for Supporting STEM Identity Online

Brite Team Speakers

Dr. Roxanne Hughes
Principal Investigator, BRITE
Associate Professor, Florida State University

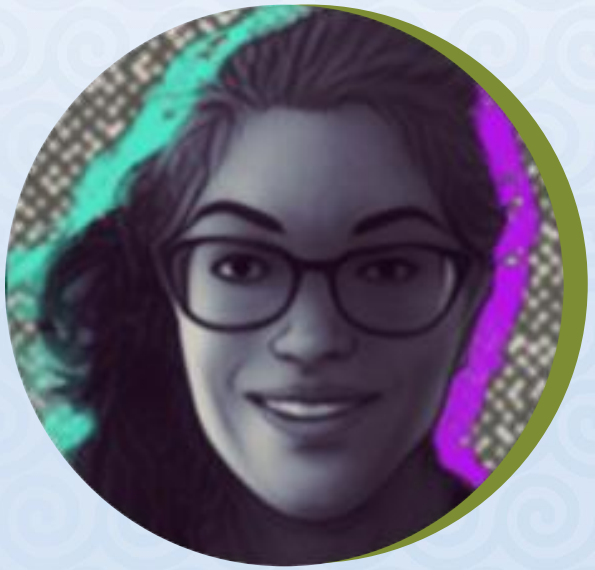
Abi Olukeye
Co-PI, BRITE
CEO, Smart Girls HQ

Kata Lucas
Co-PI, BRITE
Senior Researcher, NGCP

Brite Educator Speakers

Eileen Healy
CSO International Program Director
SciTech Institute

Giselle Escajeda
Program Coordinator
Scientific Adventures for Girls



Dr. Lorena Harris
Assistant Professor of Biology
SUNY Schenectady

BRITE Girls Online STEM Practices: Building Relevance and Identity to Transform Experiences

- 3-year National Science Foundation Research in Service to Practice project, cancelled in 2025, but continuing through other funding

- **Central Project Goal:** Examine the STEM identity development of girls of color in an online program by testing the influence of three approaches:
  - Community building
  - Interaction and learning with diverse women role models
  - Hands-on activities

- **Outcome/Product:** Research-based, tested Brite Practices, online collaborative platform, a transformative toolkit to foster girls' identification and long-term participation in STEM

BRITE

National Girls Collaborative Project

SMARTgirlsHQ

SJLR Solutions

NSF #2215138

Core Project Elements

- Smart Girls HQ designed and developed the digital learning community
- The National Girls Collaborative Project developed curricular resources, trained educators and role models, and facilitated the online program
- Dr. Hughes and her research team studied the impact of the three core approaches on girls' STEM identities in an online setting

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Program Overview

- Three weeks in the summer of 2023 and 2024
- Interdisciplinary themes related to computer science, physical science, and engineering

- Employ three approaches:
  - Community building
  - Interaction with role models
  - Hands-on activities

- 100 girls participated in Year 1
- 190 girls participated in Year 2
- 17 informal STEM programs; trained 50 educators

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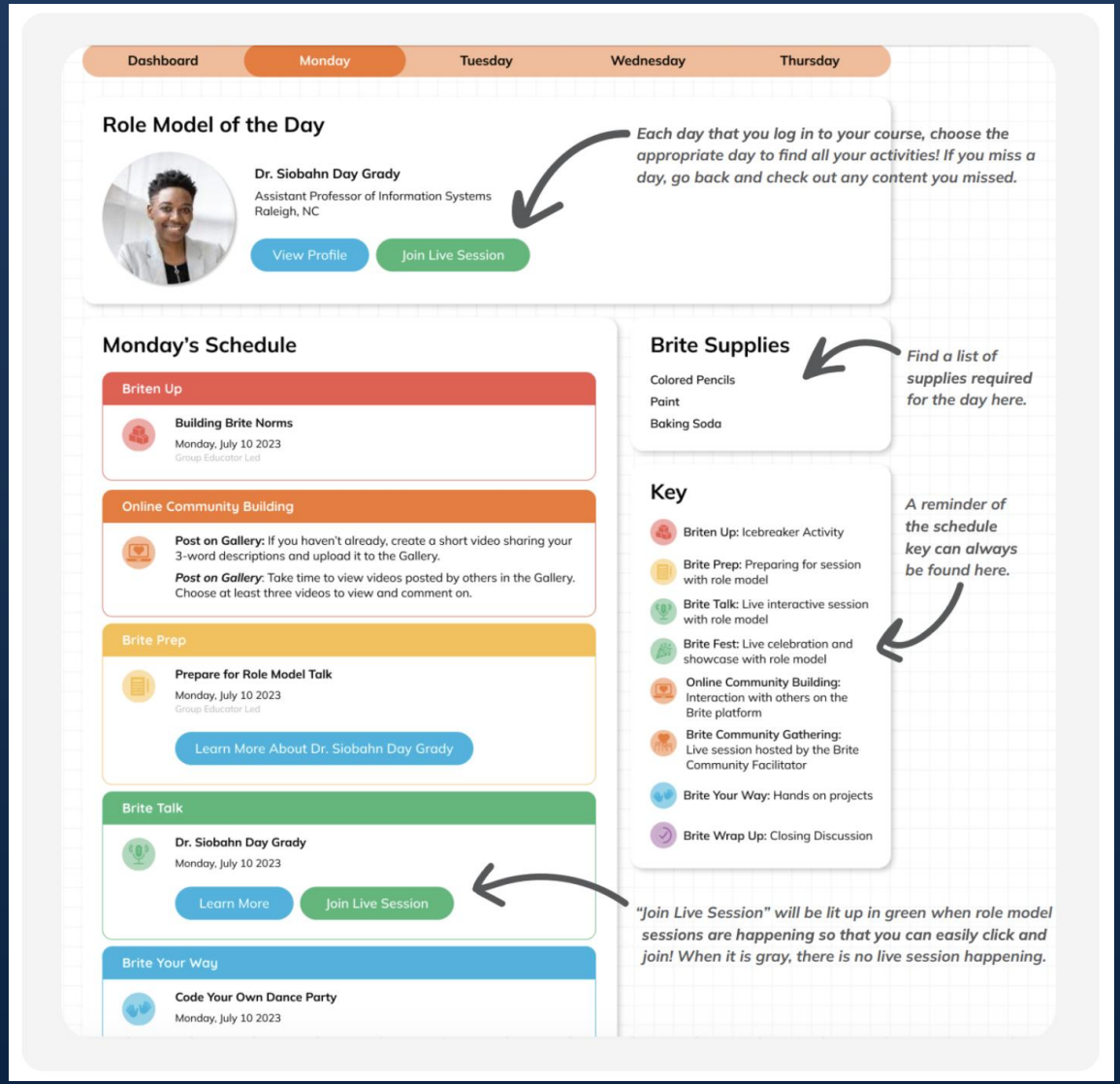
Digital Platform Design

Goals

- A **safe, inclusive, and engaging** online environment where girls can connect with peers, educators, and STEM role models.
- Equip girls with tools and experiences **that spark curiosity and encourage self-directed discovery**.
- Offer educators and administrators **intuitive tools** to facilitate curriculum implementation, track progress, and drive sustained engagement.



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Digital Platform Design

Key Features

- **Daily Planner** – Clear view of activities, live sessions & tasks.
- **Team Pages** – Central hub for group resources, communication & collaboration.
- **Global Prompts** – Daily reflections & cross-team discussions.
- **Project Gallery** – Showcase work, explore peers' projects, comment & like.
- **Profiles** – Interactive bios to connect through interests & achievements.
- **Messaging** – Safe, moderated group chats for authentic peer interactions.
- **Gamification** – Badges for milestones & peer recognition to boost motivation.
- **Educator Dashboard** – Real-time engagement tracker to support participants.

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Digital Platform Design

Key Learnings

- Structured interactivity boosts engagement. Participants are more engaged when they can interact meaningfully with peers, educators, and role models through features like messaging, prompts, and commenting.

Outcomes

- Global prompts fostered a sense of belonging and encouraged cross-group interaction and support.
- Enhanced features led to more consistent platform use, with girls showing higher rates of session attendance, project submission, and peer interaction.

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Brite Research Overview

Quantitative and qualitative data focused on four constructs of identity development:

- Competence, performance, recognition (Carlone & Johnson, 2007).
- Sense of belonging (Archer et al., 2016; Carlone et al., 2014).

Purpose: Determine how the three core components of community-building, role models, and hands-on activities, as implemented through the Brite Program, influence girls' STEM identity

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Data Sources

Pre-Survey

- Quantitative Likert Scale questions measuring competence, recognition, and sense of belonging - STEM skills/practices
- Qualitative open-ended questions asking about interest and STEM career awareness

Weekly Post-Survey

- Quantitative Likert Scale questions
- Qualitative open-ended questions asking about favorite activities; stand out role models; other aspects of the program

Additional Data Sources

- Transcripts from daily zoom sessions (Brite Talks, Community Gathering, and Brite Fest): these include transcription of audio and the chat
- Videos, audio files, pictures and comments posted to the Gallery and Profile pages
- Comments on these posts and each other's pages
- Badges: Girls received some badges automatically (posting so many times on others' pages; Girls could give badges to each other)

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Quantitative Data

- Competence: 8 items (Dou & Cian, 2021)
- Recognition: 4 items (Vincent-Ruz & Schunn, 2018)
- Sense of belonging: 6 items (Anderson-Butcher et al, 2002)

Competence Items
I think I'm pretty good at understanding science topics.
Compared to other people my age, I think I can quickly understand new science topics.
It takes me a long time to understand new science topics.[1]
I feel confident in my ability to explain science topics to others.
I think I'm pretty good at following instructions for scientific activities.
Compared to other people my age, I think I can do scientific activities pretty well.
It takes me a long time to understand how to do scientific activities.[1]
I feel confident in my ability to explain how to do scientific activities to others.

Recognition Items
I am a STEM person
My family sees me as a STEM person
My friends see me as a STEM person
My teachers see me as a STEM person

Thinking about your experiences in STEM, how much do you agree with the following statements?
I don't have many friends interested in STEM[1]
I feel comfortable in STEM-related settings
Other people have made me feel wanted and accepted in STEM settings
I am committed to pursuing STEM opportunities
I am supported in STEM settings
I am accepted in STEM settings

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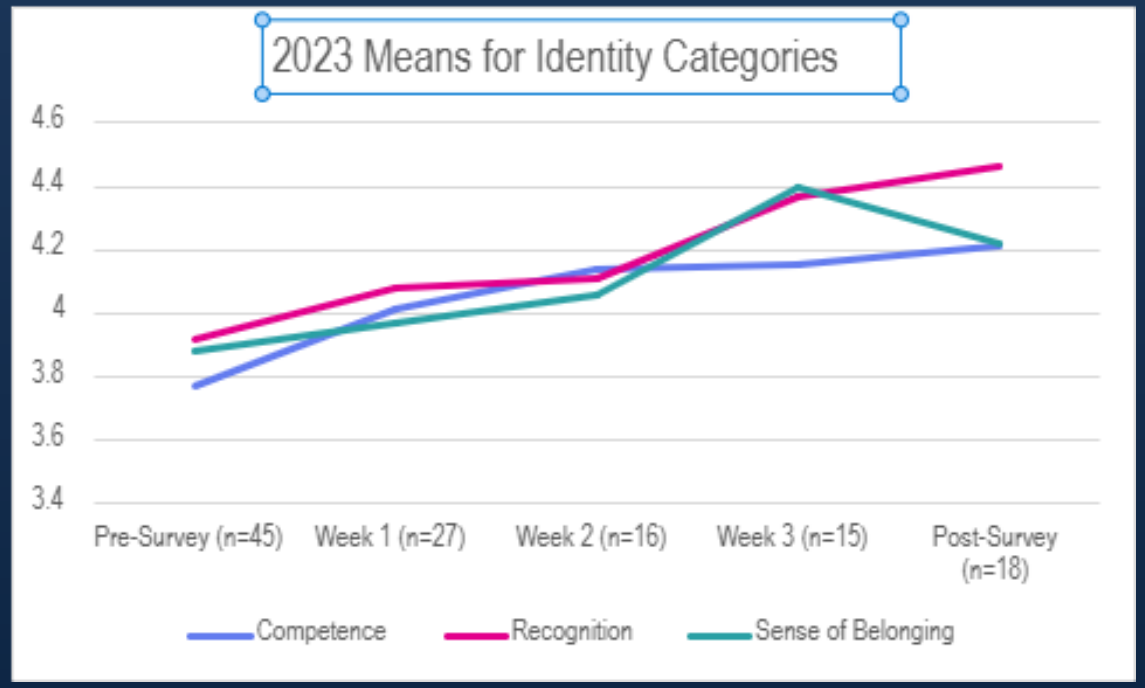
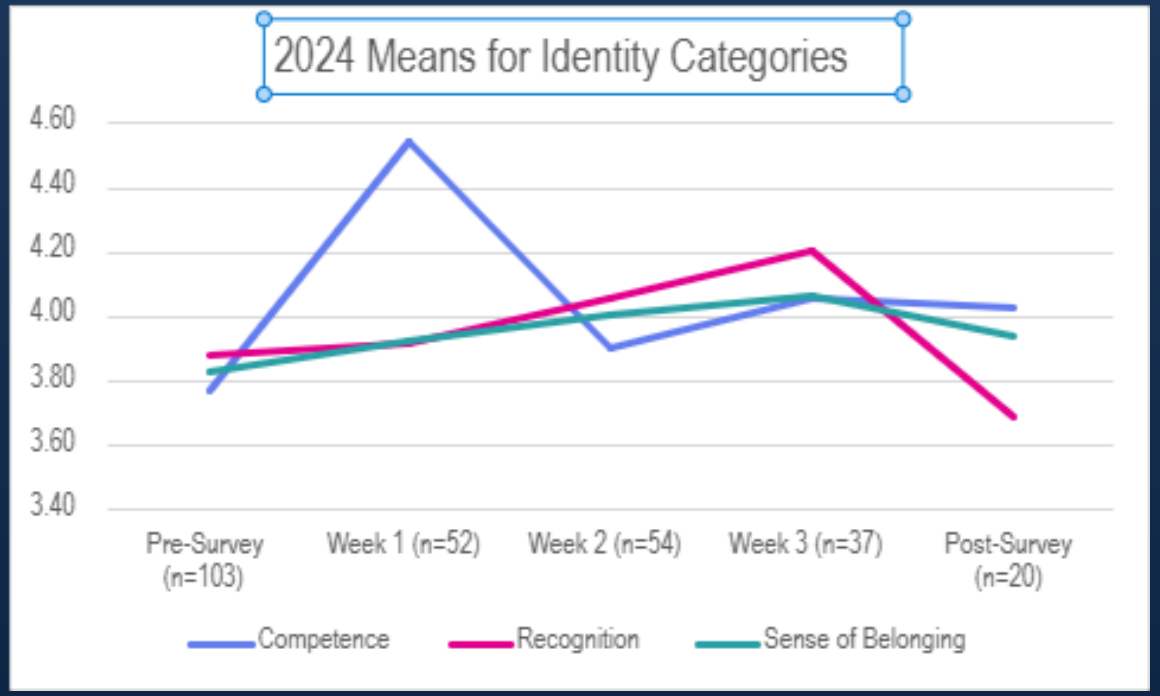
STEM Identity Changes Over Time





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Qualitative Data: Open-Ended Survey Questions

- *What activity from the program stands out to you the most? Why?*
- *Which role model stands out to you most? Why?*
- *Besides the role models, who stands out from the program? Why?*

Open Ended Survey Response Rates by Week

	2023			2024		
	Activities	Role Models	Other Aspects	Activities	Role Models	Other Aspects
Week 1	23	23	23	46	45	45
Week 2	15	15	14	48	45	45
Week 3	15	13	12	31	31	30
Final Survey	18	15	18	17	16	17

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Qualitative Data Comparison

Hands-on Activities:

- Similar activities referenced as favorites for both years but in 2024 there was more use of the terms “creativity” and “teamwork”

Role Models:

- Similar names referenced as favorite role models in year 1 and 2. But in 2024, educators and girls were also referenced as role models

Other Aspects of the Program:

- **Brite Facilitators:** Brite facilitators referenced 7% in 2023 to 22% in 2024 (2024 terms: responsive, motivated involvement, supportive)
- **Peers:** In 2023, peers were referenced by 33% of the respondents but in 2024 they were referenced by 60% of the respondents, with half of these referencing one girl in particular for being “positive” and “making everyone feel included”

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Brite Practices

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Brite Practices

- Six practices based on lessons learned from the implementation of Brite
- Designed to help educators support girls' positive STEM identity development through online and hybrid learning experiences
- Organized based on Brite program components:
  - Prioritize Community Building
  - Collaborate with Role Models
  - Incorporate Hands-on Projects that Weave Art and Creativity into STEM
- Two products: Overview and Educator Guide

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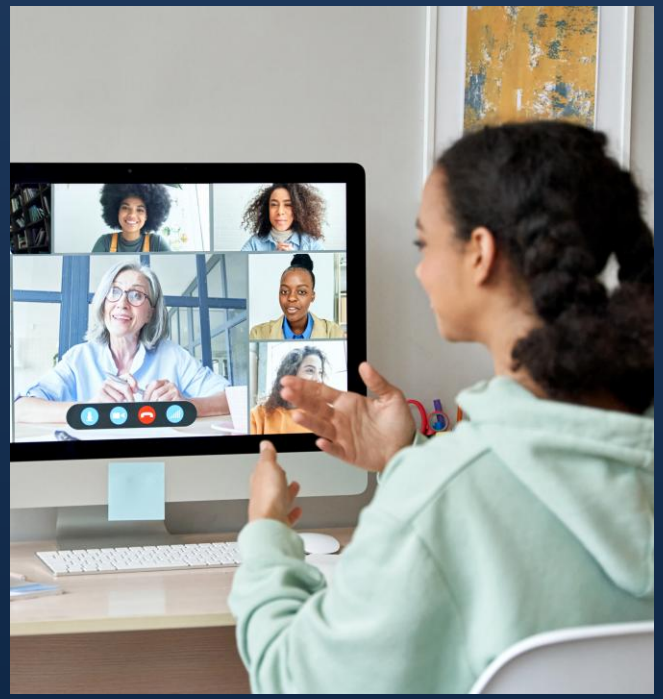
Prioritize Community Building

Practice: Encourage girls to share their lived experiences, interests, and hobbies (both STEM and non-STEM related) through facilitated discussions



- **Why:** Foster connection through shared interests with peers and educators and help girls see how STEM connects to their lives
- **How:** Engage girls in icebreakers in small groups, large group discussions, collaborative activities, and platform forum discussions

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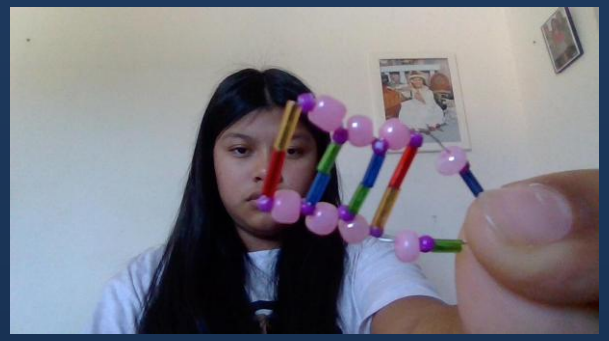
Examples & Resources

- **Technology Babies**: Reflect on your first memories with digital technology and discuss with peers in small groups
- **Reflection Collage:** Communicate your reflections from the week using words, photos, and digital graphics via Canva or art supplies
- **<u>DNA Necklace</u>**: Make your own necklace with beads, wire, string together with the whole community of peers



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Collaborate with Role Models

Practice: Prepare role models to share their STEM stories in interactive, conversational ways that encourage girls' participation and provide opportunities to recognize girls' contributions

- Why: Support girls in sharing their skills, interests, and lived experiences through interaction with role models, while also receiving real-time recognition for their contributions from role models
- How: Help role models develop their STEM stories and interactive presentations through training, resources, and meetings

"I love how the role model takes art and science and combines them together, combining her passions. This is something I can relate to because I love art, music, and science."

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Examples & Resources

- “Fun Facts” guessing game about the role model’s experiences
- “Would You Rather STEM Jobs” game about diverse career pathways
- Techbridge Girls Role Models Matter ™ training: Make connections, be mindful of implicit biases, and communicate work in age-appropriate ways

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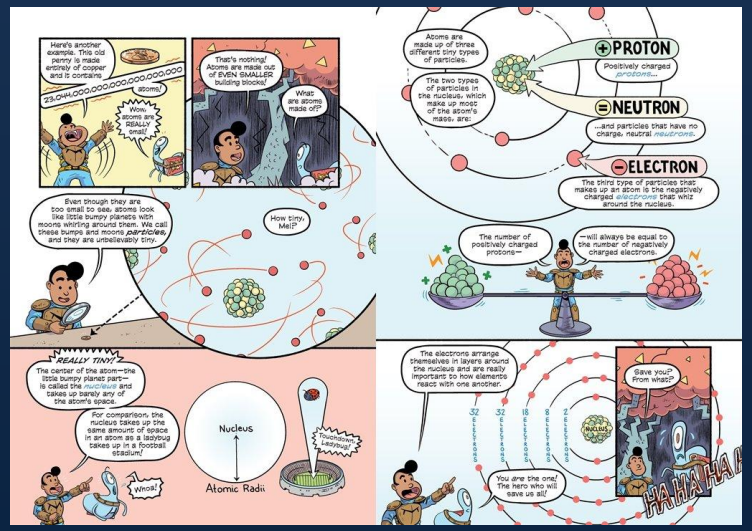
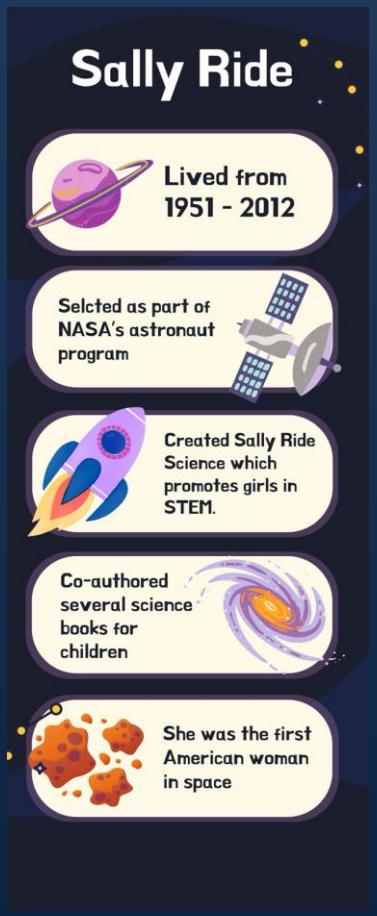
Incorporate Hands-On Projects that Weave Art and Creativity into STEM

Practice: Encourage girls' creativity and self-expression

- WHY: Help girls discover new and shared interests and experience how creativity and self-expression connect to STEM
- HOW: Engage girls in open-ended activities that integrate artistic creation with STEM content, offer opportunities for voice and choice, and connect activities to role models





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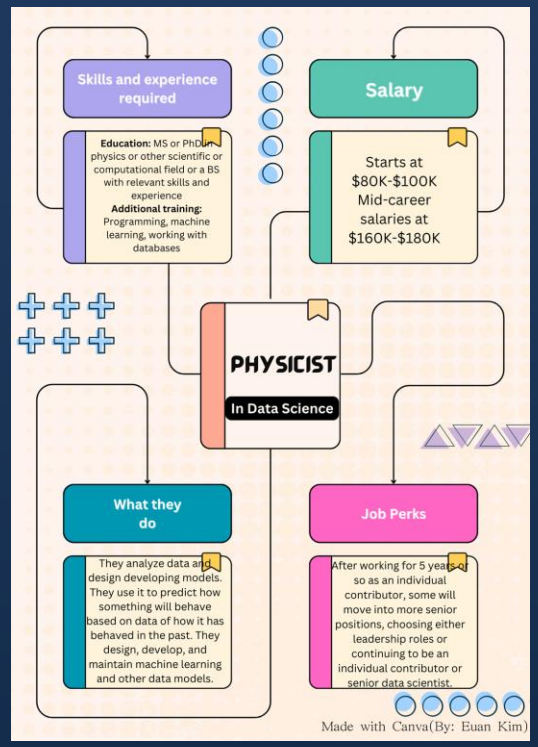
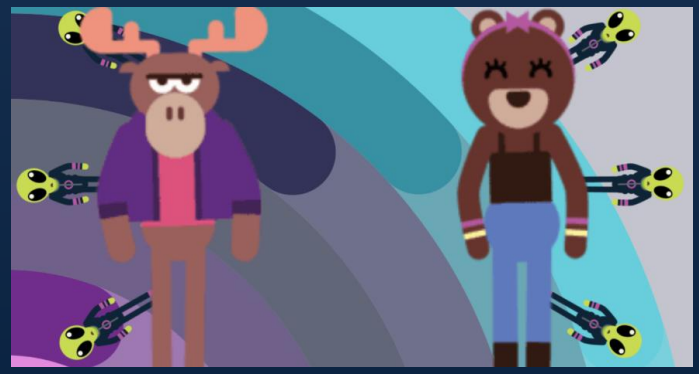
Examples & Resources

- **Code a Dance Party:** Using Code.org
- **STEM Fashion:** Design an article of clothing that combines fashion with STEM using Sketchpad or art supplies
- Dream Job: Create a job post about your dream STEM job





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Brite Practices Resources

Building on the successful learnings of the Brite Program, these six practices are for educators to support middle and high school girls in developing positive STEM identities and can be integrated into your own programming.

Prioritize Community Building around STEM

1. Encourage girls to share their lived experiences, interests, and hobbies (both STEM and non-STEM related) through facilitated discussions.

WHY: To foster connection through shared interests with peers and educators, and help girls see how STEM connects to their lives.

HOW: Engage girls in facilitated discussions through daily icebreakers in small groups, weekly large group discussions, collaborative activities, and daily platform forum discussions.

BRITE EXAMPLE: Technology Babies Icebreaker: Girls were prompted to think back to their first memories using digital technology. *How old were you? What type of technology did you use? What else do you remember?*

2. Provide multiple modalities for girls to engage with and support peers, educators, and role models.

WHY: To help girls build connections with peers, educators, and role models.

HOW: Provide opportunities for girls to engage with others through video/audio conferencing tools, an online forum space for conversation on daily prompts, and profile features where girls can share more about their own interests, while also learning about others' interests.

BRITE EXAMPLE: The Forum was a shared space on the platform where all community members could share their perspectives on the Question of the Day, such as *What kind of music do you enjoy listening to? How can you use engineering skills to solve problems in your daily life?*

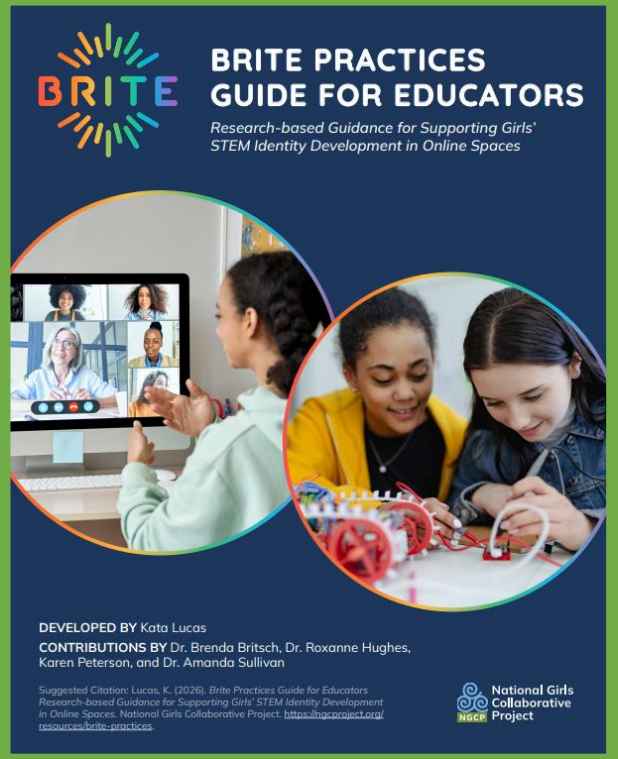
Collaborate with Role Models

3. Recruit and prepare role models who challenge stereotypical perceptions of STEM.

WHY: To provide multiple opportunities for girls to connect with STEM role models who break stereotypes about STEM people and career pathways.

HOW: Recruit and prepare STEM professionals in your community or use free digital resources like the IF/THEN® Collection to counter STEM stereotypes through role models' identities and lived experiences, career pathways, and hobbies.

BRITE EXAMPLE: Through one-on-one meetings and a virtual group training, role models were trained to share their early life experiences, STEM hobbies and interests, hobbies and interests outside of STEM, any challenges and barriers they faced, and how they persevered.



BRITE · Florida State University 1851 · National Girls Collaborative Project · SMARTgirls HQ · SJLR Solutions · NSF

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Activity Resources

- **Technology Babies**: Reflect on your first memories with digital technology and discuss with peers in small groups
- **DNA Necklace**: Make your own necklace with beads, wire, string together with peers
- **Reflection Collage:** Communicate your reflections using words, photos, digital graphics using Canva Collage Marker or art supplies
- **Techbridge Girls Role Models Matter ™ training:** Join our Brite group and access the 1-hour asynchronous, online training for free
- **Code a Dance Party**: Using Code.org
- **STEM Fashion**: Design an article of clothing that combines fashion with STEM using Sketchpad or art supplies
- **Dream Job:** Create a job post about your dream STEM job. Think about STEAM-skills broadly. What skills have you been utilizing? What skills have role models demonstrated?

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Let's Stay Connected

https://britesummer.org/

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Kata Lucas, Senior Researcher, NGCP, klucas@ngcproject.org

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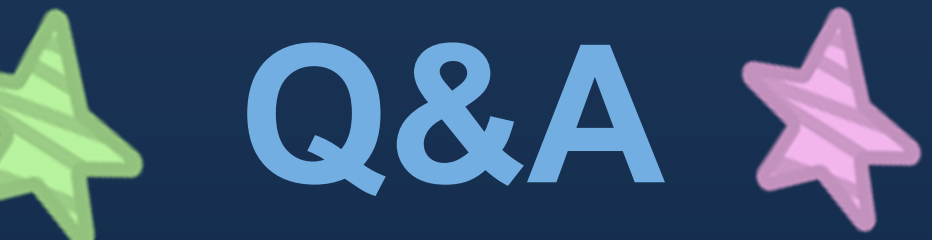
Q&A



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Brite Group Experiences: Learnings & Highlights from Educators

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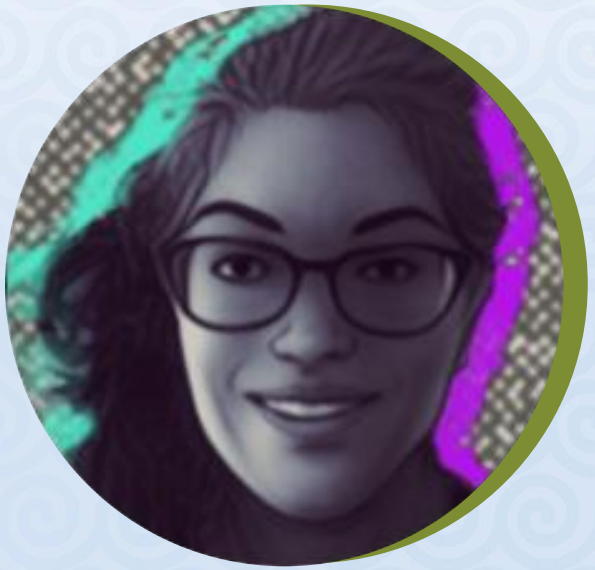
Brite Educator Speakers

Eileen Healy
CSO International Program Director
SciTech Institute

Giselle Escajeda
Program Coordinator
Scientific Adventures for Girls



Dr. Lorena Harris
Assistant Professor of Biology
SUNY Schenectady

SciTech Institute's Chief Science Officers Program

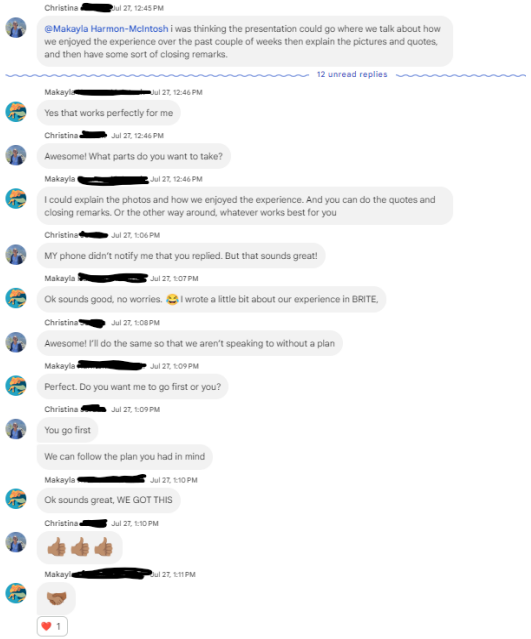
BRITE Program Facilitation

- 9 CSOs
- Representing: Arizona, California, Michigan, Georgia, India, and Mexico
- Age range: 14-17
- Online- live and recorded sessions

SciTech Institute's Chief Science Officers Program

BRITE CSOs

- Recruitment
- Program Uniques
  - STEM Identity, Technology use, age,
- Feedback from girls



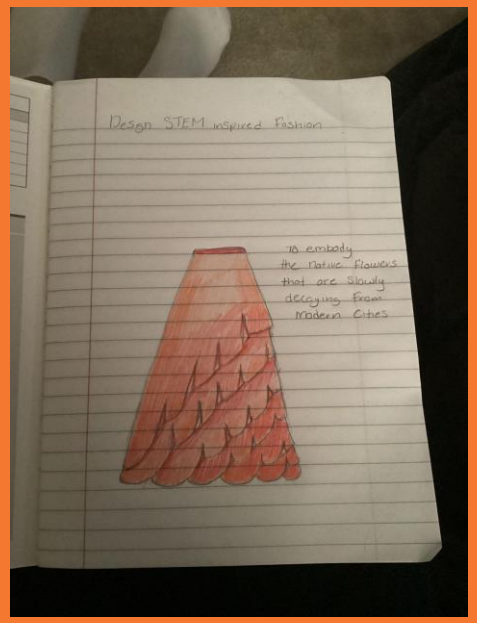
TRANSFORMING THE VOICES OF SCIENCE
CSO
CHIEF SCIENCE OFFICERS

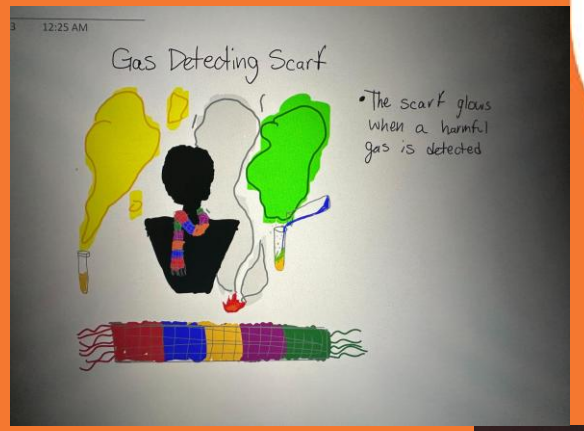
SCITECH INSTITUTE

SciTech Institute

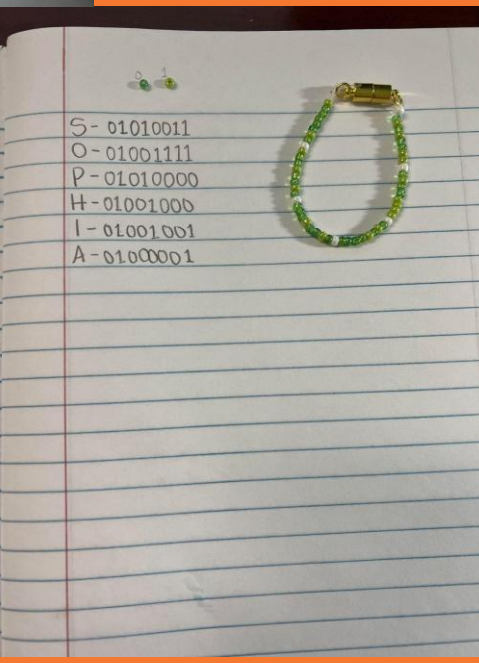
Presenters: Jasmin and Saanvi

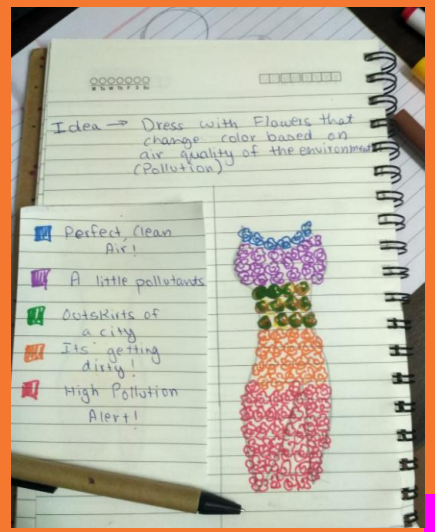
Collaborative





Informative





Motivational

CSOs: Christina, Gloria, Jasmin, Kianna, Makayla, Saanvi, Sahiba, Sophia, Valentina

Educator: Eileen

STEM-tastic!

Scientific Adventures for Girls

Oakland, CA

Scientific Adventures for Girls
Changing the Face of Science

Giselle Escajeda, Program Coordinator

Brite Impact

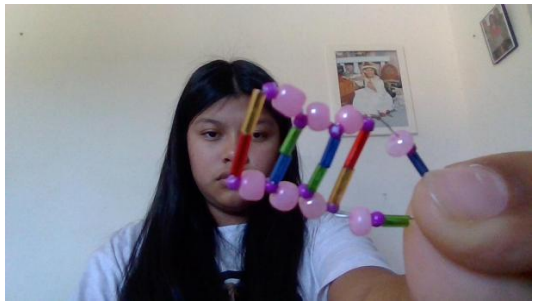
- **Small, Virtual Cohort:** 15 girls (ages 13–17) learning together online
- **Growing Confidence:** Increased comfort sharing ideas and asking questions
- **Stronger STEM Identity:** Girls began seeing themselves as capable in STEM spaces
- **Community & Belonging:** Built meaningful connections despite being virtual
- **Curiosity & Creativity:** Encouraged exploration, imagination, and problem-solving
- **Connection to Role Models:** Exposure to women in STEM expanded possibilities

3 word wonder

I am kind

Funny

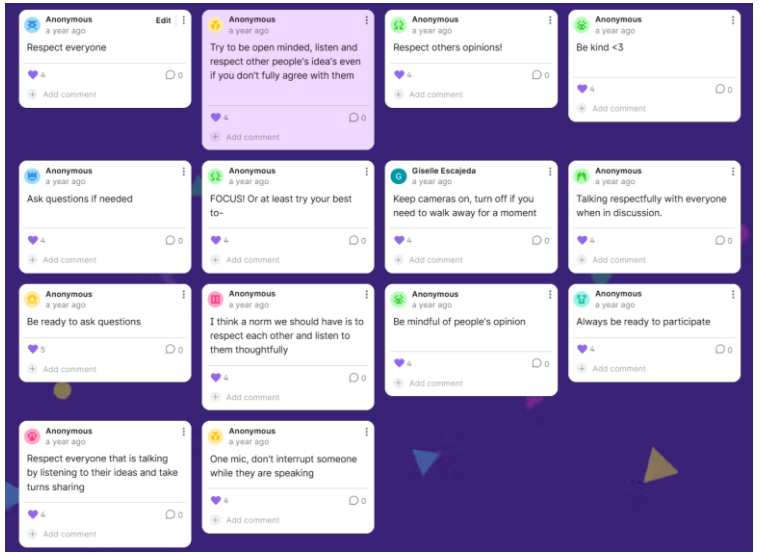
A stem girl!



Changing the face of science

Tailoring Brite

- **Accessible Educator Guide:** Designed for educators of all backgrounds, including those without STEM experience
- **Visual, Engaging Slides:** Translated guide content into interactive, student-friendly visuals
- **Intentional Virtual Design:** Prioritized participation and connection in an online space
- **Multiple Ways to Engage:** Used Padlet for creative responses, reflection, and collaboration



Scientific Adventures for Girls
Changing the Face of Science

Voices of Brite

Scientific Adventures for Girls
Changing the Face of Science

"I find the role models talk quite interesting! It's such an experience being able to connect and learn from them."

"I found the role models very valuable as we were able to hear their stories and what got them to where they are. I think it really inspired many of us girls in the program. I found most enjoyable the actives we did such as the volcano, bracelet, and dance party!"

"The activities [were] the most enjoyable and the role models I found the most valuable, since it provided me with more insight and knowledge on stem in a fun and engaging way."

"I think the most valuable and enjoyable parts of the STEM summer program, was talking to the mentors, because then I got to learn about people from the industry and and learn their tips."

Changing the face of science

Summer Brite Program

@SUNY Schenectady CSTEP

Building STEM Identity Through Collaborative Learning

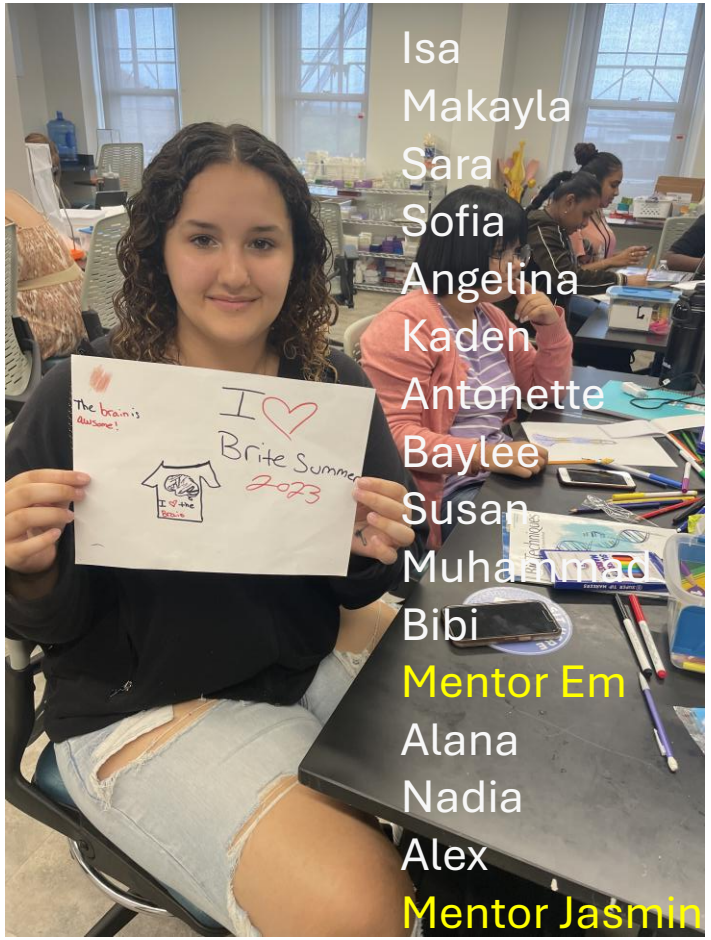
Summer 2020-2024

What is BRITE ?

- Online, interdisciplinary STEM program for ages 13-16
- Partnership with National Girls Collaborative Project
- Focuses on collaborative learning and community building
- Features inspiring women role models in STEM fields

Learning Outcomes

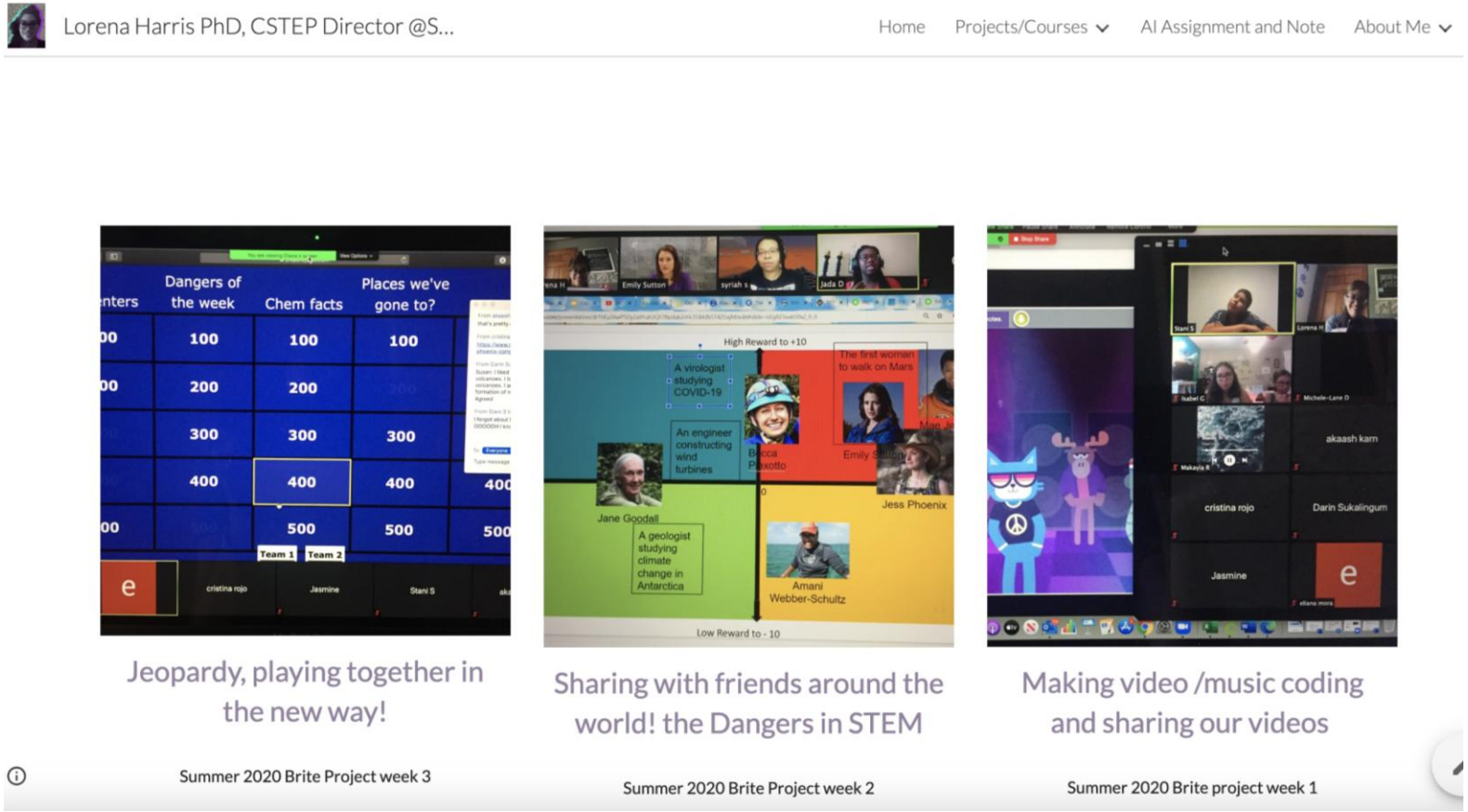
- **Foster STEM Identity**
  - Build sense of belonging and success in STEM
- **Spark Curiosity**
  - Encourage creativity and inquiry-based learning
- **Build Community**
  - Create networks of peer and mentoring support



Gargee
Tara
Darin
Aya
Jasper
Eliana
Cristina
Deviani
Michele
Stanis
Tamesh
Mathis

Program Growth & Evolution

- **2020:** Initial pilot offering partnership with World Science Festival
- **2021:** Expanded with Art × Science and Dream Big programs
- **2022-2024:** Continued growth with diverse STEM curriculum offerings



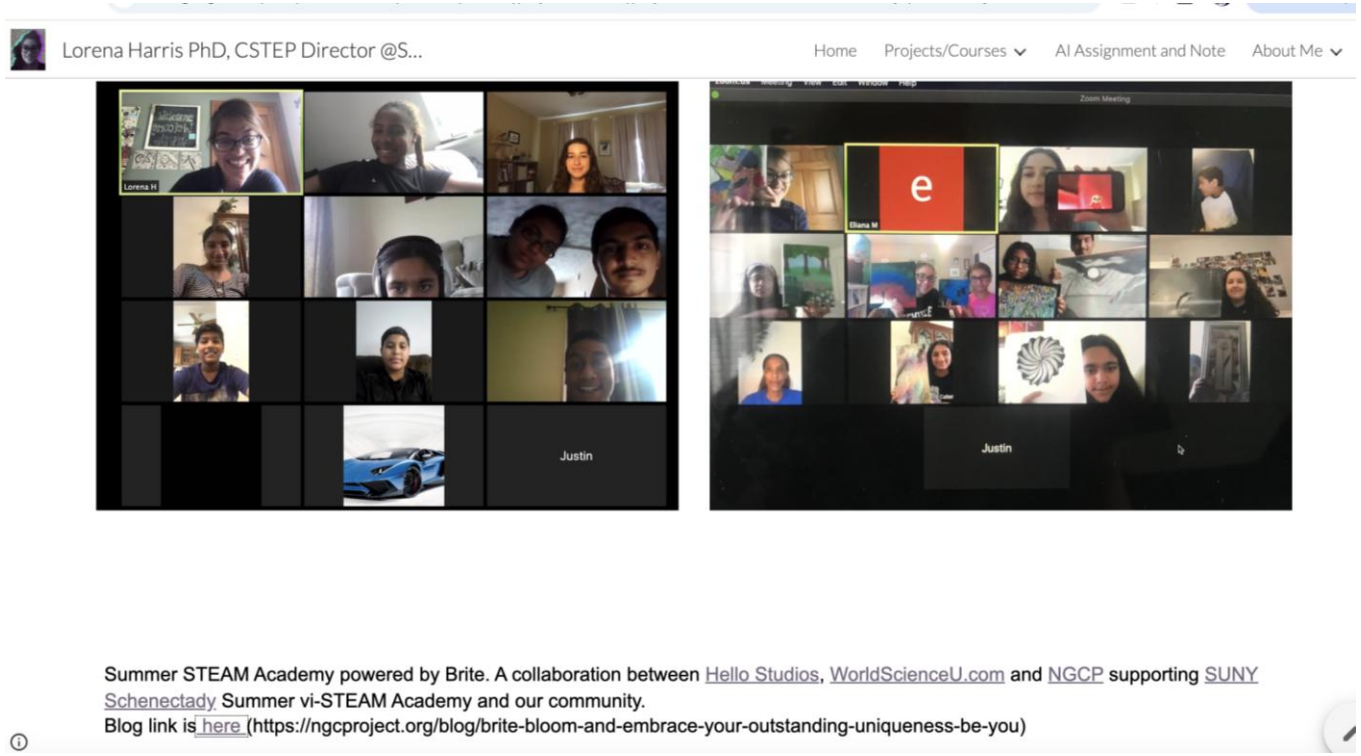
Program Impact

Blog written in collaboration with NGCP and Tara G Brite’22 participant

- We met Nicole Stott (Lead STEM Astronaut and Artist) at a poetry proctors' concert @ Schenectady (thanks Kata L).

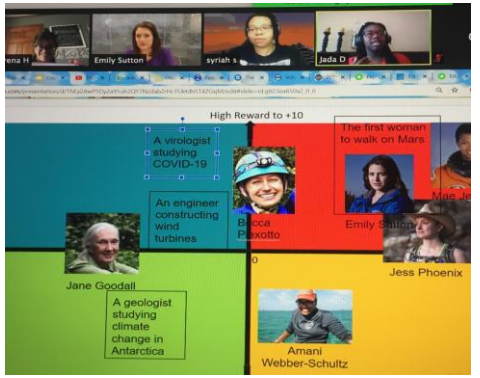
- We enjoyed every minute, activity and speaker during the Brite Fest.

- Supporting diverse pathways in STEM careers for young women
  Hundreds of students engaged in hands-on STEM learning, many more nationwide.
  National Science Foundation & others…



Brite impact

- 2020 ~10 girls | 3 boys | 5 mentors
- 2021 ~13 girls | 4 boys | 2 non-binary | 7 CSTEP mentors
- 2022 ~13 girls |5 boys | 2 cis | 7 CSTEP mentors
- 2023 ~12 girls | 2 boys | 2 non-binary | 10 CSTEP mentors
- 2024 ~12 girls | 3 boys | 2 non-binary | 9 CSTEP mentors



- Makayla R became a mentor after participating in Brite, got her AS and now she is is pursuing her Bachelor in Education (ECE) at Cortland Uni
- Darin S is about to complete his PhD in Chemistry at UA
- Parmesh T is one of the Obama-Chesky Voyager Scholarship'25 recipients @ UA planning to go to Med School soon after completing his Master.

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Questions?

+ Thanks