

# 2021 PROGRAM REPORT

**National Society of Black Engineers**

**SUMMER  
ENGINEERING  
EXPERIENCE FOR  
KIDS (SEEK)**



NATIONAL SOCIETY OF BLACK ENGINEERS

**SEEK**

SUMMER ENGINEERING EXPERIENCE FOR KIDS

# 2021 PROGRAM REPORT

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# 2021 PROGRAM REPORT

## THRIVING IN THE MIDST OF UNCERTAINTY: THE POWER OF PARTNERSHIP

For the past two years, we have been called to reimagine how hands-on, virtual experiences can be scaled to accelerate student participation and cultivate science, technology, engineering and mathematics (STEM) engagement. With momentum from the 2020 Summer Engineering Experience for Kids (SEEK) program year, we were able to secure funding that enabled us to do just that: grow to 4,423 participants, create a new partnership with Techbridge Girls and Chevron to expand to middle school ages, and integrate the SEEK program into the summer school curriculum of Richmond Public Schools.

SEEK is generally the first touchpoint between NSBE and our SEEK participants and, for many, is their first exposure to engineering concepts. Since 2007, we have proudly served more than 24,000 students in the SEEK program. Along the way, SEEK has welcomed new partners, encountered challenges and, most importantly, persevered. The pandemic and the continued racial unrest reinforced our vision for SEEK:

- ◆ To offer participants greater exposure to STEM at an early age;
- ◆ To engage them daily in hands-on engineering design activities with mentor/teachers; and
- ◆ To fulfill NSBE's mission, *to increase the number of culturally responsible Black engineers who excel academically, succeed professionally and positively impact the community.*

Despite the distance, our team has continued to connect with our students virtually and prioritize one-on-one conversations and outreach. The virtual environment has also led us to create and implement the first e-STEM NSBE Jr. Chapter, designed to provide engaging STEM experiences at home for 3rd-12th grade students living in areas not being served now by NSBE Jr. chapters.

I invite you to learn more about the SEEK program and its impact, the demographic we were able to serve, and our financial summary. It is a privilege to lead this team of innovators dedicated to future engineers' education and development, and I encourage you to stay connected to NSBE and SEEK.

Thank you for your ongoing trust and support.

Rochelle L. Williams, Ph.D.  
Chief Programs Officer  
National Society of Black Engineers (NSBE)



## 2021 VIRTUAL SEEK PROGRAM

### 2021 PROGRAM HIGHLIGHTS

#### ABOUT SEEK

The National Society of Black Engineers (NSBE) created the Summer Engineering Experience for Kids (**SEEK**) to inspire Black students with the opportunities and wonders of the STEM fields.

**SEEK** is a free, three-week summer program that offers a fun and engaging educational experience for students in grades 3–5. **SEEK** aims to provide high-quality learning opportunities to students from groups underrepresented in STEM; students who otherwise may not have robust access to STEM education.



**Jessica R.** – I love it. I am extremely happy that my daughter was able to attend. It's such a great learning experience and just wow all together. The moderators/teachers are excellent. Thank you for helping her expand her mind and curiosity!!!

## 2021 VIRTUAL SEEK PROGRAM

### 2021 PROGRAM HIGHLIGHTS

#### COHORTS

The 2021 SEEK Virtual program divided students into two cohorts:

**Cohort 1** participated from June 14–July 3, 2020.

**Cohort 2** participated from July 13 – Aug. 7, 2020.\*

*\*Cohort 2 included the SEEK/Techbridge Girls pilot program for 6th–8th grade girls.*

#### STUDENT PARTICIPANT DEMOGRAPHICS



**4,715 applications** were submitted



**4,120 students registered**, with representation from **42 U.S. states, Bermuda, Canada, Germany, Kenya, Mexico and Nigeria**



**SEEK Virtual program student participants** were from many cities across the country. The **top five** cities were **Richmond, Virginia; Long Beach, California; Washington, D.C.; Cleveland, Ohio; and Houston, Texas.**

Average Daily **STUDENT ATTENDANCE**, Cohort 1 **90.4%**

Average Daily **STUDENT ATTENDANCE**, Cohort 2 **91.6%**

**GRADES Represented**  
3rd Grade - **1,400**  
4th Grade - **1,334**  
5th Grade - **1,227**

**GENDER IDENTITY**  
**1,681 Girls**  
**2,132 Boys**  
**205 Did Not Disclose**

#### MENTOR DATA

**Number of Mentors – 89**

- ◆ Mentors from **23 states** and **two countries** participated

**Areas of Study of Mentors**

- ◆ **Engineering – 76%**
- ◆ **Education – 24%**

**GENDER IDENTITY**  
**39% Male**  
**60% Woman**  
**1% Non-Binary**

**More than 2,000 points of feedback** received from sponsors for Showcase Friday

**Over 2,000 Showcase Friday** student submissions

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2021 SEEK VIRTUAL PROGRAM  
PARTICIPANT LOCATIONS

LOCATION	BOY	GIRL
Atlanta, GA	80	88
Birmingham, AL	66	48
Charlotte, NC	91	79
Chicago, IL	73	59
Detroit, MI	57	48
Houston, TX	109	82
Kansas City, MO	29	20
Los Angeles, CA	62	45
Minneapolis, MN	42	50
New Orleans, LA	51	79
Oakland, CA	62	55
Pittsburgh, PA	1	5
Richmond, VA	928	873
Sacramento, CA	32	27
Washington, D.C.	162	191

In addition to our legacy SEEK cities, we had strong student participation from the following:

- Baltimore, MD

Baton Rouge, LA

Charleston, SC

Chattanooga, TN

Denver, CO

Des Moines, IA

Indianapolis, IN
- Kansas City, MO

Las Vegas, NV

Little Rock, AR

Memphis, TN

Newark, NJ

Newark, NJ

New York, NY
- Orlando, FL

Philadelphia, PA

Phoenix, AZ

Raleigh, NC

San Diego, CA

Seattle, WA



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LEADING CHANGE

MENTORS AS LEADERS

SEEK uses a near-peer mentor model in which students are able to see themselves in their classroom leaders to strengthen their engineering identities. Developing a strong pipeline for development of capable STEM professionals from underrepresented communities requires providing role models dedicated to their success. This year, 976 mentor applications were received during the submission period: Dec. 1, 2020 to June 9, 2021. To increase efficiency, a new position, Virtual Moderator, was introduced to manage the substantial growth of SEEK students. In total, 69 mentors, majoring in either engineering or education, were selected to lead our students through this virtual experience.EK students through this inaugural virtual experience.

STAFF ASSIGNMENTS BY GRADE LEVEL:

3RD GRADE	4TH GRADE	5TH GRADE
29 MENTORS	30 MENTORS	30 MENTORS

HARNESSING TECHNOLOGY TO EXPAND CAPABILITIES

Given the circumstances, a particular focus was on leveraging technology to enhance the efficiency of our training and the connectivity of our work. The 2021 SEEK Virtual program was delivered using the Zoom platform. The staff learned the platform's intricacies, including how to utilize the waiting room function, breakout rooms and other vital tools to deliver a lifelike classroom environment.

This year, we held a live, traditional parent orientation that included brief welcome remarks from sponsors. Parents had the opportunity to identify their students' classroom mentors before the program began and ask questions of the SEEK team.

Developing our leaders for the online experience required shifting how we train and prepare them. The SEEK team hosted the first Virtual Facilitator Training on June 7-9, 2021 It included virtual facilitation training led by Audrianna Williams to enhance our mentors' ability to make SEEK modules interactive and keep student engagement and participation high through the program.

UPDATING THE CURRICULUM

Once the decision was made to deliver a 100% virtual program, the SEEK team immediately transformed the curriculum to facilitate an online yet hands-on experience. Based on the Engineering Design Process (EDP), students completed the following challenges:

WEEK 1	DRONE CHALLENGE
WEEK 2	ROBOTICS CHALLENGE
WEEK 3	CODING CHALLENGE

Our new partnership with Techbridge Girls in a pilot program for 6th-8th grade girls brought additional curricular expertise and content to 2021 SEEK Virtual. (See the narrative on page ???.)



## 2021 PROGRAM REPORT

### SPOTLIGHT ON ACCESS

A key tenet of the SEEK program is to expose underserved students to high-quality STEM curricula at no cost. Although digital inequities existed and impacted students before COVID-19, the shutdown of school buildings and in-person after-school programs has further widened the gap and brought necessary attention to the issue of access and educational equity. With Amazon's support, we were able to provide Amazon Fire 7 tablets to all new SEEK students and mentors to enable ease in accessing the SEEK curriculum and live sessions. In addition to digital access, each student received shipped materials to participate in each week's STEM challenge. Each student received one of each of the following curriculum kits:

- ◆ UFO3000 Drone by Force1RC
- ◆ micro:bit Coding kit by BBC
- ◆ mBot Robotics kit by Makeblock
- ◆ Youth Large T-shirt courtesy of our vendor EDForTech
- ◆ An official Virtual SEEK T-shirt

#### LAB DRAWER

As a thank-you for participation, each student was given a Lab Drawer STEM kit, which taught students how to build their own model of a DNA double helix.

##### ABOUT LAB DRAWER

The Lab Drawer is an Ed-Tech monthly subscription box full of cross-functional learning experiences for children aged 10-14. Inspired by the look of a chemistry lab drawer, every box includes materials and instructions for a unique STEM experiment. Each month, your child will have the opportunity to learn and experience the STEM disciplines through augmented reality (AR) and the arts. The Lab Drawer has everything your children need to unleash their potential as world future leaders in STEAM (STEM + the arts).

**Kisha W.** – She LOVED every day! The wealth of knowledge she gained and her confidence in her abilities – especially what she could do already and what she learned – is priceless! Thank you for this opportunity and reinforcing the great intelligence, history, capabilities and spirit of US! We are Kings and Queens and they can be too.

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### SUCCESS: POWERED BY PARTNERSHIPS



Engaging in experiences outside of the traditional learning environment provides students with additional opportunities for hands-on STEM learning, reinforces the content and skills learned in the previous week and exposes students and parents to new STEM programming they can utilize year-round. This year, three program partners provided hands-on sessions to students and parents.

#### NORTHROP GRUMMAN

**Northrop Grumman** – Northrop Grumman is a multinational aerospace and defense technology company. With 90,000 employees, the company solves the toughest problems in space, aeronautics, defense and cyberspace. On June 25 and July 23, 2021, Northrop Grumman engineers led the SEEK students in a hands-on activity about programming drones.

#### MAKE MUSIC COUNT

**Make Music Count** – Through the Make Music Count program, students utilized an exciting app centered on mathematics. By solving math problems, students could determine how and where to place their fingers on a keyboard to play popular songs. Students participated in these workshops on July 2 and Aug. 6, 2021.

#### CLUB OF THE FUTURE

**Club for the Future** – Founded by Blue Origin, Club for the Future is a nonprofit whose mission is to inspire future generations to pursue careers in STEM and to help invent the future of life in space. On July 23, 2021, a group of Blue Origin engineers led a workshop in which students designed and built their own rockets at home then learned what an actual space launch is like.

#### GROWING THE NSBE ECOSYSTEM

NSBE Jr. Night gives NSBE staff the opportunity to promote NSBE's year-round pre-college programs as the next step in SEEK students' development. During this event, which was hosted twice this year with a total of 234 attendees, parents and guardians learned more about our program directly from NSBE Jr. chapter advisors and alumni from across the country. The event succeeded in generating considerable interest in NSBE Jr. The NSBE SEEK team sent personal communications to guardians after the event to connect them with their nearest NSBE Jr. chapter. On Sept. 26, 2021, a virtual NSBE Jr. chapter was launched to enable SEEK students to have access to year-round NSBE programming if they live in areas not now being served by chapters in-person.

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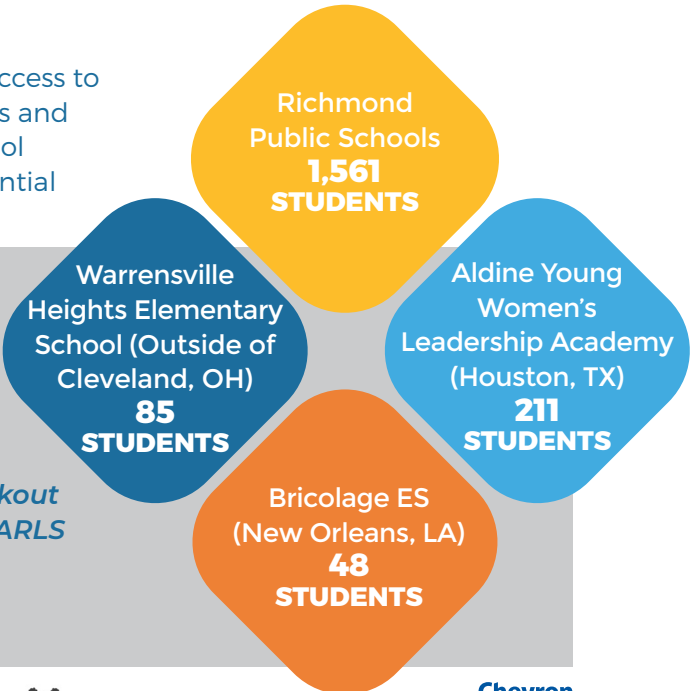
SUCCESS: POWERED BY PARTNERSHIPS (CONT'D)

PUBLIC SCHOOL PARTNERSHIPS

This year, to increase the number of students with access to SEEK curricula, we partnered with individual schools and school districts to integrate SEEK into summer school programming. The pilot programs can serve as potential models to expand SEEK's footprint nationally.

*"Students enjoyed the virtual camp. The instruction was engaging and organized. I greatly appreciate the math and history lessons: this gave the students extra practice. Since you've provided me with the class codes, I was able to ensure that our students were able to log into the virtual breakout sessions during their time at our in-person PEARLS summer camp."*

– Principal Jericah Jackson, Aldine Young Women's Leadership Academy, Houston, Texas



SEEK POWERED BY: techbridge girls™



NSBE has partnered with Techbridge Girls to expand the reach of SEEK to middle school-aged girls. SEEK powered by Techbridge Girls was designed to increase the capacity of SEEK mentors to deliver high-quality, gender- and culture-relevant STEM programming as well as increase the impact by strengthening STEM identity, increasing social/emotional skills, improving career awareness and deepening understanding of how STEM can create change. This partnership brings together NSBE's broad influence and history of community impact with Techbridge Girls' expertise in curriculum development and training in girl-focused STEM programming.

The 2021 SEEK powered by Techbridge Girls virtual program took place on July 19–Aug. 6.

- ◆ 671 applications were submitted
- ◆ 288 students registered, from the U.S., Kenya and Nigeria
- ◆ Students of the SEEK powered by Techbridge Girls virtual program were recruited from Houston, Texas; New Orleans, Louisiana; the San Francisco Bay Area; and Washington, D.C.
- ◆ Grades represented
  - ◆ 6th – 183
  - ◆ 7th – 81
  - ◆ 8th – 24
- ◆ Number of mentors = 8 women
- ◆ Mentors' areas of study
  - ◆ Education – 12.5%
  - ◆ Engineering – 87.5%
- ◆ More than 330 points of feedback received from 13 Chevron sponsors for Showcase Friday



THE CURRICULUM

SEEK powered by Techbridge Girls enhanced the SEEK curriculum by including social emotional learning, gender expansiveness, cultural relevance and academic vigor for middle school girls. The curriculum was built on the framework of Being STEM, Doing STEM and Using STEM. This allowed students in the program to affirm their identity as girls\* in STEM, learn scientific concepts in girls' own language, have hands-on experiential learning, identify social issues that can use STEM for change, and experience role models who intentionally talk proudly about their identities in STEM. The SEEK powered by Techbridge Girls curriculum is steeped in Social Emotional Learning, Gender Expansiveness and Cultural Relevance best practices, creating a safe space for girls to be their full selves, explore hands-on STEM and develop their ability to think critically and apply STEM to their own lives and communities.

Lessons are grounded in the following: safe space, strong sense of community and belonging, expressing creativity, meaningful participation, critical thinking and BIPOC (Black, Indigenous, People of Color) lineage.

Based on the Engineering Design Process (EDP), students completed the following challenges:

- ◆ Week 1 – Drone Challenge: Girls design a vaccine delivery system using drones
- ◆ Week 2 – Robotics Challenge: Girls use automotive robots to address an issue within their community
- ◆ Week 3 – MicroBit Challenge: Girls code a biomedical device using a microbit

\*cis girls, trans youth, gender non-conforming and/or non-binary youth who experience girlhood as part of their journey



**Candice F.** – I will admit, I was only expecting my son to log in and get some interesting information from SEEK that would keep his creative mind active during the summer. What I didn't expect was a full cadre of educational materials and the amazing team of leaders from all over the world! My son enjoyed getting his own separate mail of items he would need for the program all at no cost! I won't tell you what he received, but trust me, it's worth investing the time in!



# ACKNOWLEDGMENTS

The swift transition to a virtual format was made possible by a team of dedicated staff with expertise in training and development, curriculum design and informal education.

- DAVID VARNADO** – Manager, Pre-College Programs
- THOMAS HARRIS** – SEEK Curriculum and Resources Coordinator
- SHERNARI COUNCIL** – SEEK Recruitment and Training Coordinator
- DANIA ROACH** – Pre-College Initiatives Coordinator
- PHILLIP JONES** – Senior Manager of Fund Development-Programs



**Acacia M.** – The NSBE SEEK Program is absolutely amazing! The skills and applications for students were endless. Kudos to the entire team! Excellent program!

**Tyniesha D.** – My twin sons are learning so much. One is very interested in engineering and coding. The other is a gamer, however this camp has given him the STEM bug so for that I am super grateful! The materials are great and the instructors are amazing. If more advanced camp is offered for middle schoolers, it is my hope that they will be able to attend next summer in person.

# APPENDIX I – LIST OF ORGANIZATIONS ENGAGED AS 2021 SEEK VIRTUAL PROGRAM PARTNERS

## NATIONAL SPONSORS

1. Northrop Grumman Foundation
2. Chevron

## PRESENTING SPONSORS

1. Nissan North America
2. The Boeing Company
3. Techbridge Girls
4. Amazon Web Services
5. Cummins
6. Ann Theodore Foundation
7. Honeywell
8. Trane Technologies
9. Ford
10. General Motors

## ANCHORING SPONSORS

1. BL Habert Foundation
2. Howmet Aerospace
3. Arconic
4. PPG
5. Shell
6. The Bechtel Corporation
7. Lockheed Martin
8. Medtronic
9. John Deere
10. Dominion Energy

## CHAMPION SPONSORS

1. General Mills
2. 3M
3. Discover Card
4. Joseph Drown Foundation
5. SMUD
6. Aura
7. Goldman Sachs
8. Dow Chemical

## SUPPORTER SPONSORS

1. Boston Scientific
2. Alabama Power
3. Hargrove Engineering
4. Bluecross Blueshield of Alabama
5. BP
6. Cal Engineering and Geology
7. Petroleum Equipment & Services Association
8. Aerojet Rocketdyne
9. Rosedin
10. Coeur Mining
11. Triumph Group
12. Progressive Design Inc
13. Timmons Group
14. Tredegar
15. Hourigan Group
16. McGuireWoods, LLC
17. Rudy Hawkins
18. Schnabel Energy



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