DEFENSE STEM EDUCATION CONSORTIUM EVALUATION DATA CHAPTER 2021–22

Contents

DSEC STRATEGY

The **Defense STEM Education Consortium (DSEC)** is a collaborative partnership between academia, industry, not-for-profit organizations, and government that aims to broaden STEM literacy and develop a diverse and agile workforce to power the U.S. innovative defense infrastructure. Aligned to the 2018 Federal STEM Education Strategic Plan (opens in a new tab) and the 2021 DoD STEM Strategic Plan (opens in a new tab), DSEC seeks to inspire the next generation of scientists and engineers through investments in STEM enrichment programs for students and educators, STEM workforce engagement, program evaluation, and public outreach.

DSEC's work is organized around five "fundamentals" (see the description below). Figure 1 shows the alignment of the DSEC Fundamentals to the two strategic plans.

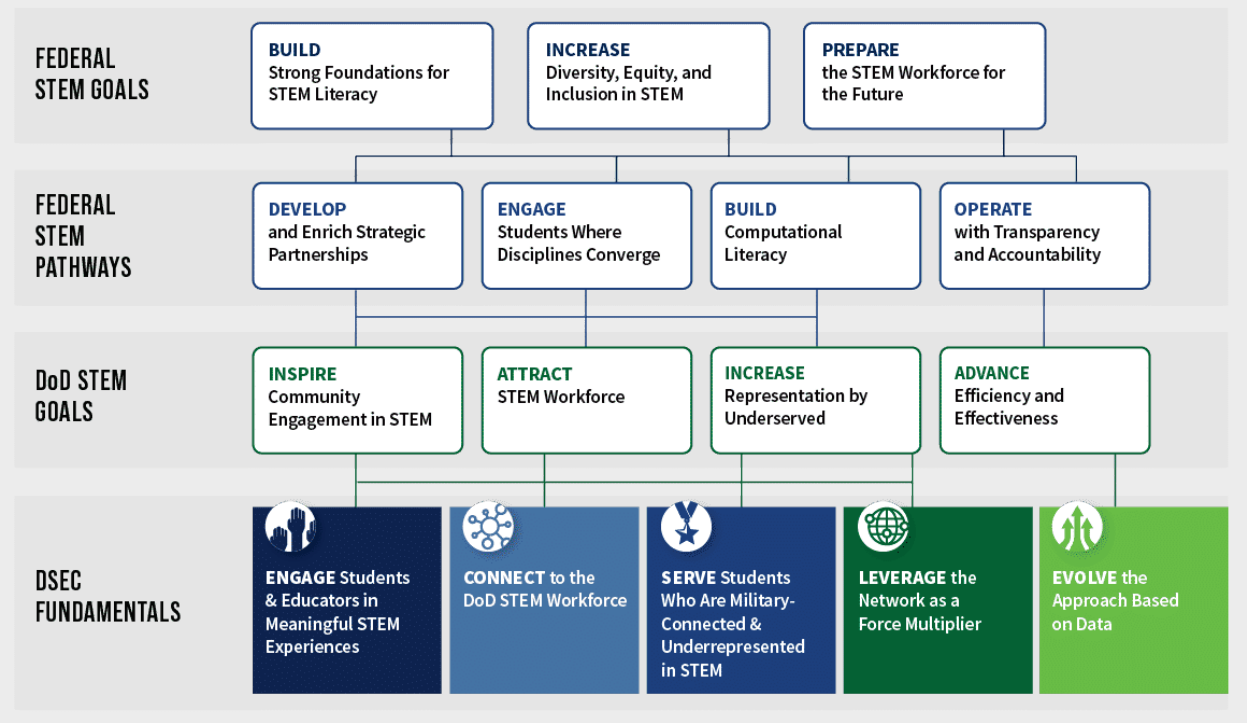

Figure 1. Display of how the DSEC fundamentals align with the 2018 Federal STEM Education Strategic Plan and the 2021 DoD STEM Strategic Plan

WHICH ORGANIZATIONS DID DSEC FUND?

Figure 2. DSEC-funded organizations

STEM EDUCATION AND OUTREACH PARTNERS

Within DSEC, STEM Education and Outreach Partners deliver programming and sustain networks of educators. They are categorized in the following manner:

- Consortium Management Committee (CMC) members

These partners received more than $1.5 million from DSEC and DoD STEM. The two DSEC partners in this category—National Math and Science Initiative (NMSI) and *FIRST*—were funded initially by DoD STEM and then became part of the Consortium when it was formed in 2019. Because of their large revenue source, both NMSI and *FIRST* have representatives on the CMC.

- STEM Outreach Partners

These partners receive funding ranging from $250,000 to $600,000 each year. This group includes original members of DSEC plus additional partners that have been added through three waves of Innovation Bloc funding.

This category includes the three Hub Leads (Dayton Regional STEM Center, Morgan State University, and UCSD CREATE) as they provide STEM outreach programming in addition to serving as a hub.

- Historically Black colleges and universities/Minority-serving institutions (HBCU/MI) pathways institutions

Working in conjunction with Morgan State University, DSEC funds four postsecondary institutions that form the Historically Black Colleges and Universities/ Minority-Serving Institutions Pathways Network. Two institutions (Bowie State University and Prince George's Community College) are in the DC/Maryland/Virginia hub area. The other two institutions (Sinclair Community College and Central State University) are in the Dayton hub area. Each pair of partners receives $250,000 in funding.

DSEC EVALUATION

DSEC ELEMENT 2

Program Evaluations: Data Collection, Assessment/Analysis, and Reporting

The American Institutes for Research® (AIR®) manages Element 2. Element 2's work is driven by four goals:

- Develop priority questions and evaluation agendas in collaboration with the DoD STEM and consortium members.
- Improve data availability, consistency, and quality for DoD STEM programs.
- Generate new evidence about DoD STEM programs.
- Support learning and continuous improvement throughout the consortium.

ELEMENT 2 MILESTONES

In Option Year 2, Element 2 worked toward the following milestones related to the four overarching goals:

- Set clear data expectations and requirement for STEM Education and Outreach Partners and Hub Lead organizations.
- Support STEM Education and Outreach Partners and Hub Leads in clearly defining DSEC activities, outputs, and outcomes.
- Work with DSEC members to ensure the completion of data requests and the timely reporting of evaluation findings.
- Develop products and reports that are useful to both DSEC and DoD STEM.

PURPOSE OF THIS REPORT

This report provides information to answer the following questions:

- Which participants (students, educators, or others) engaged in DSEC-funded STEM outreach programming?
- Whom did DSEC serve, in terms of gender, race/ethnicity, military connectedness, and grade level?
- Where did programming take place, and where do participants come from?
- How did DSEC connect as a network?
- Did STEM Education and Outreach Partners and Hub Leads make progress toward achieving the outcomes identified in their DSEC logic models?
- What did STEM Education and Outreach Partners and Hub Leads consider to be their greatest achievements and challenges during the past year?
- What was the impact of the COVID-19 pandemic on DSEC programming during 2021–22 compared with prior years?
- What are key findings based on this year's data?
- What recommendations should DSEC consider as it moves beyond Option Year 2?

Furthermore, this year's report provides evidence toward answering the following additional questions:

- In looking across all possible logic model outcomes for DSEC STEM Education and Outreach Partners and Hub Leads, how do the outcomes group by DSEC fundamental, participant type, program themes, and program intent?
- In what ways do partners incorporate meaningful STEM experiences into their programming?

- What role do DoD STEM personnel serve in programming?

- How are DSEC organizations intentionally working to provide programming for military-connected students and students historically underrepresented in STEM?

DATA REPORTING PROCESS

All data in this report were self-reported by the STEM Education and Outreach Partners and Hub Leads. Element 2 relied on five sources of data for this report, which are described below.

PARTICIPATION DATA COLLECTION

STEM Education and Outreach Partners and Hub Leads submitted program participation data into the RTI Amaze platform. Element 2 retrieved these data in August 2022. The data included overall participation counts, student and teacher grade bands, student demographics, and volunteer counts. Element 2 followed up with partners as needed for missing or duplicated data.

Data categories for student participants included the following:

- Grade level
    - Grades K–5
    - Grades 6–8
    - Grades 9–12
    - 2-year and/or tech college undergraduates
    - 4-year college undergraduates
    - Graduate students
    - Not in school
    - Unknown grade levels

- Gender
    - Female
    - Male
    - Nonbinary
    - Prefer not to say
    - Gender not collected
- Race/Ethnicity
    - Asian
    - Black or African American
    - Hispanic or Latino/a/x
    - Multiracial
    - Native American or Alaska Native
    - Native Hawaiian or Other Pacific Islander
    - White
    - Prefer not to say
    - Race/ethnicity not collected

- Military-connected status as defined by DoD STEM in Option Year 2
    - Military children—dependents of members of the Active Duty Armed Forces
    - Military-connected- military children plus the dependents of members of the National Guard and Reserves

Data categories for **educator and other participants** included the following:

- Role
    - Counselor
    - District administrator
    - School administrator
    - Teacher
    - Other (role not defined)
- Grade level
    - Pre–K
    - Grades K–5
    - Grades 6–8
    - Grades 9–12
    - Multiple Grades K–8
    - Multiple Grades K–12
    - Multiple Grades 6–12

- Multiple grades, other
- 2-year and/or tech college undergraduate
- 4-year college undergraduates
- Graduate students
- Postdoctoral
- Grade level not collected

Data categories for **volunteers** included the following:

- Alumni
- Community member (general public—not affiliated with the program or the school where programming occurs)
- DoD STEM personnel
- Education partner (educators, university/college students, after school program personnel)
- Mentor
- Team sponsor
- Other

Respondents provided their **method used to collect participant counts and demographic data,** which include the following:

- **Registration:** The partner used a registration form to collect data. In some cases, participants directly provided the data, whereas in others a teacher or coach registered a class or team.

- Headcount: The partner inferred information based on what was seen during program implementation.

- Inferred: The partner estimated information based on their knowledge of participants. Estimation varied considerably across partners. Some partners chose to report data as estimates because they lacked specificity for a small number of participants, whereas others broadly estimated the makeup of participants.

- Not reported: The partner did not collect these data from their participants.

OPTION YEAR 2 REFLECTION SURVEY

Element 2 administered the Option Year 2, 2021–2022, Reflection Survey in July–August 2022 to all STEM Education and Outreach Partners and Hub Leads, achieving a 100% response rate. Topics included the following:

- Accomplishments and challenges for the past year

- Challenges and opportunities arising from the COVID-19 pandemic

- Incorporation of characteristics of meaningful STEM experiences into their programming

- Intentional work to provide meaningful STEM experiences for military-connected students and/or students underrepresented in STEM

- The role of DoD STEM personnel in their DSEC-funded activities

- Use of data to inform programming decisions for DSEC-funded work

FOCUSED MEETINGS WITH PARTNERS TO CRAFT EVIDENCE STATEMENTS

To support a more rigorous use of data and evidence across DSEC, Element 2 conducted virtual meetings with STEM Education and Outreach Partners and Hub Leads to craft evidence statements aligned to their individual logic models and outcomes. Prior to these meetings, Element 2 informed partners which logic model outcomes required supporting data to show

progress toward or evidence of achieving these outcomes. As a follow-up to a quarterly meeting presentation on the topic, Element 2 also included guidelines and suggestions for crafting high-quality evidence statements and asked partners to write a first draft prior to our meeting with them. Element 2 followed up with partners after the meetings for any needed editing or additional data.

LOCATION DATA BY PROGRAM

STEM Education and Outreach Partners and Hub Leads provided location data via an Excel template. Data included school-based ZIP code information at the school level and, when possible, at the individual level. These data were used to create the static maps found in this report as well as to update the online ArcGIS maps (opens in a new tab).

QUARTERLY NETWORK CONNECTIVITY SURVEY

During 2021–22, STEM Education and Outreach Partners and Hub Leads completed the DSEC Network Connectivity Survey on a quarterly basis. This survey provided information on partner interactions, including who they interacted with, how they interacted, and how frequently those interactions focused on three of DSEC's focal populations (military-connected students, students who are traditionally or historically underserved and underrepresented in STEM, and the DoD workforce).

KEY FINDINGS FOR OPTION YEAR 2 (2021-2022)

Element 2 synthesized the data provided by STEM Education and Outreach Partners, Hub Leads, and the Hub Support Partner (TIES). Our overall key findings are organized by the DSEC Logic Model Outcomes shown in the graphic below. We also provide a comparison of Option Year 1 (OY1), 2020–2021, to Option Year 2 (OY2), 2021–2022, at the end of this section.

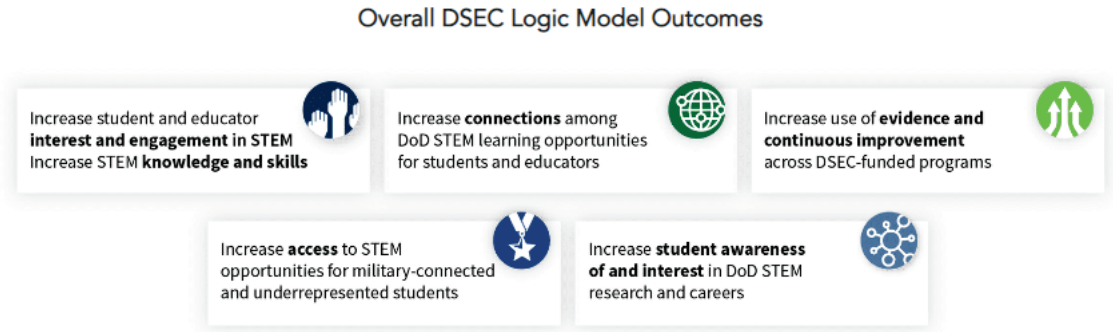

Figure 3. Overall DSEC logic model outcomes

INCREASE STUDENT INTEREST AND ENGAGEMENT IN STEM; INCREASE STEM KNOWLEDGE AND SKILLS

Data collection: DSEC partners provided participation counts by program. A review of partner statements of work and logic models provided information about program environments.

- Key Finding 1

    - Student and educator participation counts declined overall during OY2 (September 2021–August 2022), even though DSEC onboarded six new STEM Education and outreach partners. This is partially contributed to the United States Science and Engineering Festival (USASEF) exiting the DSEC consortium, resulting in approximately 25,000 fewer students. In addition, the National Math and Science Initiative (NMSI) revised their scope of work to a primary focus on educators, resulting in fewer students. See Table 1 at the end of this section for a comparison of OY1 to OY2 participant counts.

- Key Finding 2

    - **STEM outreach programming reverted from virtual environments back to in-person settings during OY2,** which may have contributed to lower participant numbers as participation became time-bound and dependent upon geographic proximity. See Table 2 at the end of this section to view the number of DSEC-funded programs offered in OY1 compared to OY2.

INCREASE ACCESS TO STEM OPPORTUNITIES FOR MILITARY-CONNECTED AND UNDERREPRESENTED STUDENTS

Data collection: DSEC asked partners to collect demographic data for students served that included gender identity, race/ethnicity, and military-connectedness; however, the extent to which partners met this request varied. Demographic information is detailed by program and partner in their individual snapshot sections, including how the partner collected the participant counts (e.g., registration, headcount, estimation, or not reported).

- Key Finding 3

    - **The number of students who identified with historically underrepresented racial/ethnic groups in STEM decreased.** This finding may be partially attributed to the decrease in participating students cited in Key Findings 1 and the decrease in virtual programming offered. See Table 3 at the end of this section for a comparison of OY1 to OY2 participant counts.

- Key Finding 4

    - **The number of female and male participants decreased, with a larger percentage decrease for female participants.** In addition, the number of nonbinary participants increased dramatically, likely attributed to more partners collecting gender identity demographic data in more expansive ways. See Table 4 at the end of this section to view female, male, and nonbinary participants in OY1 compared to OY2.

- Key Finding 5

    - **Fewer military-connected students participated in DSEC-funded programming in OY2 compared with OY1.** In OY2, 6,730 military-connected students participated in DSEC-funded programming compared with 16,361 in OY1, a decrease of 59%.

INCREASE STUDENT AWARENESS OF AND INTEREST IN DOD STEM RESEARCH AND CAREERS

Data collection: DSEC partners provided counts and affiliations of volunteers.

- Key Finding 6

    - **Of the 1,468 volunteers who worked with DSEC programs in OY2, 643 (44%) were DoD STEM personnel, with the majority working with *FIRST* programs.**

- Key Finding 7

    - **With COVID-19 visitation restrictions lifting, some DoD military installations, facilitations, and labs were able to host student participants.** Across programs, DoD STEM personnel volunteered as speakers at programs (to describe their own career pathways and experiences). As programming **has** started to shift from virtual to in person, some partners also included field trips to military installations, labs, and facilities as part of their programming.

INCREASE CONNECTIONS AMONG DOD STEM LEARNING OPPORTUNITIES FOR STUDENTS AND EDUCATORS

Data collection: DSEC partners completed a quarterly interaction survey.

- Key Finding 8

    - **On average, each DSEC partner reported connecting to 10 other partners, a slightly higher number than in OY1 (9 connections). Of total reported connections among DSEC partners, 92% included a focus on serving or connecting to at least one focal population (students historically**

underrepresented in STEM, military-connected students, or the DoD STEM workforce). When asked how their organization's interactions with DSEC partners added value to their work, one Citizen Schools representative wrote,

> [Citizen Schools'] interactions with DSEC partners have supported our growth as individuals and as an organization. Our breath of knowledge about offerings/programs across the nation has increased. Collaborations have supported educators, students, and community stakeholder[s]. Lessons learned have helped revise and shape our services, and we've been able to extend our reach and support more students/educators/communities.

INCREASE USE OF EVIDENCE AND CONTINUOUS IMPROVEMENT ACROSS DSEC-FUNDED PROGRAMS

Data collection: Working sessions with the DSEC partners led by the Element 2 team.

- Key Finding 9
    - DSEC partners often rely on data collected through the DSEC Alumni Survey to capture program progress and effectiveness. As these are post participation data, it can be difficult to measure participant change. For OY2, DSEC-funded programs worked with the Element 2 (evaluation) team to develop program logic models, which required them to identify the programs' expected immediate changes and primary outcomes. In addition, Element 2 worked with each partner to craft evidence statements to demonstrate progress toward changes and outcomes specified in their logic model.
- Key Finding 10
    - Partners have common difficulties in collecting student participant data, particularly if relying on educators to collect data on behalf of their students. Reliance on educators to collect data on behalf of their students sometimes resulted in a lower return rate and less confidence in the data overall, particularly for demographic data.

SUPPORTING DATA

- Table 1. Participant count changes from OY1 to OY2

PARTICIPANT TYPE	NUMBER OF PARTICIPANTS SERVED IN DSEC-FUNDED PROGRAMMING OVERALL		
	OPTION YEAR 1	OPTION YEAR 2	CHANGE (%)
Students	107,586	48,801	-58,785 (-55%)
Educators and others	4,172	2,784	-1,388 (-33%)

- Table 2. Program environments from OY1 to OY2

PROGRAM ENVIRONMENT	NUMBER OF DSEC-FUNDED PROGRAMS		
	OPTION YEAR 1	OPTION YEAR 2	CHANGE (%)
Virtual	24	5	-19 (-79%)
In person	9	34	25 (+278%)

- Table 3. Race/Ethnicity groups from OY1 to OY2

RACIAL/ETHNICITY GROUPS	NUMBER OF STUDENTS SERVED IN DSEC-FUNDED PROGRAMMING THAT IDENTIFY AS PART OF UNDERREPRESENTED RACIAL/ETHNIC GROUPS IN STEM		
	OPTION YEAR 1	OPTION YEAR 2	CHANGE (%)
Alaskan Native or Native American*	545	387	-158 (-29%)
Black or African American*	10,109	4,398	-5,711 (-56%)
Latinx/Hispanic American*	14,881	3,798	-11,083 (-74%)
Native Hawaiian or Other Pacific Islander*	999	62	-937 (-94%)
Asian	11,812	7,389	-4,423 (-37%)
White	30,720	16,158	-14,562 (-47%)

*Historically underrepresented in STEM as defined by DoD STEM.

- Table 4. Gender identity changes from OY1 to OY2

GENDER IDENTITY	NUMBER OF DSEC-FUNDED PROGRAMS		
	OPTION YEAR 1	OPTION YEAR 2	CHANGE (%)
Female	47,813	16,176	-31,637 (-66%)
Male	48,068	26,215	-21,853 (-45%)
Nonbinary	127	709	+582 (+458%)

NETWORK CONNECTIVITY

Element 2 used social network analysis to explore interactions among STEM Education and Outreach Partners, Hub Leads, and the Hub Lead Support Partner. Throughout 2021–22, partners participated in the quarterly DSEC Interaction Survey to provide information on which consortium members they interacted with, how they interacted with them, and how frequently those interactions focused on three of DSEC's focal populations: military-connected students, student groups who are traditionally or historically underserved and underrepresented in STEM, and the DoD workforce.

In the network maps, each organization is represented by a colored circle.

- **Solid blue circles** represent STEM Education and Outreach Partners.
- **Solid green circles** represent Hub Leads.
- The **blue circle with a green center** represents TIES, indicating their role as a Hub Lead Support Partner.

For the network map depicting overall connectivity, thicker lines represent interactions that tend to be at the coordinating and collaborating levels, which require a deeper level of involvement, whereas thinner lines represent interactions at the networking and communicating levels, which require a lighter level of involvement. The number of interactions between partners ranges from 2 to 20.

- **Key terms**
    - **No interaction** means that one organization did not interact with another organization.
    - **Networked** means that organizations networked (e.g., exchanged basic information about organizations or programs) during group meetings, email exchanges, or in conversations about DSEC programs and activities.

- Shared expertise or lessons learned means organizations shared expertise or lessons learned in one-on-one or small-group settings with this partner about program effectiveness, common challenges, promising practices, or engagement with DSEC beneficiaries.

- Coordinated programming means one organization consulted with another organization to implement programming in a coordinated way.

- Collaborated on joint programming means that one organization collaborated with another organization in a sustained way to design, deliver, and/or expand joint programming.

- Network analysis calculations for Option Year 2

  - To calculate the levels and frequencies of interactions between any two partners over Option Year 2, Element 2 used an average of the reported levels and frequencies of interactions across survey administrations.

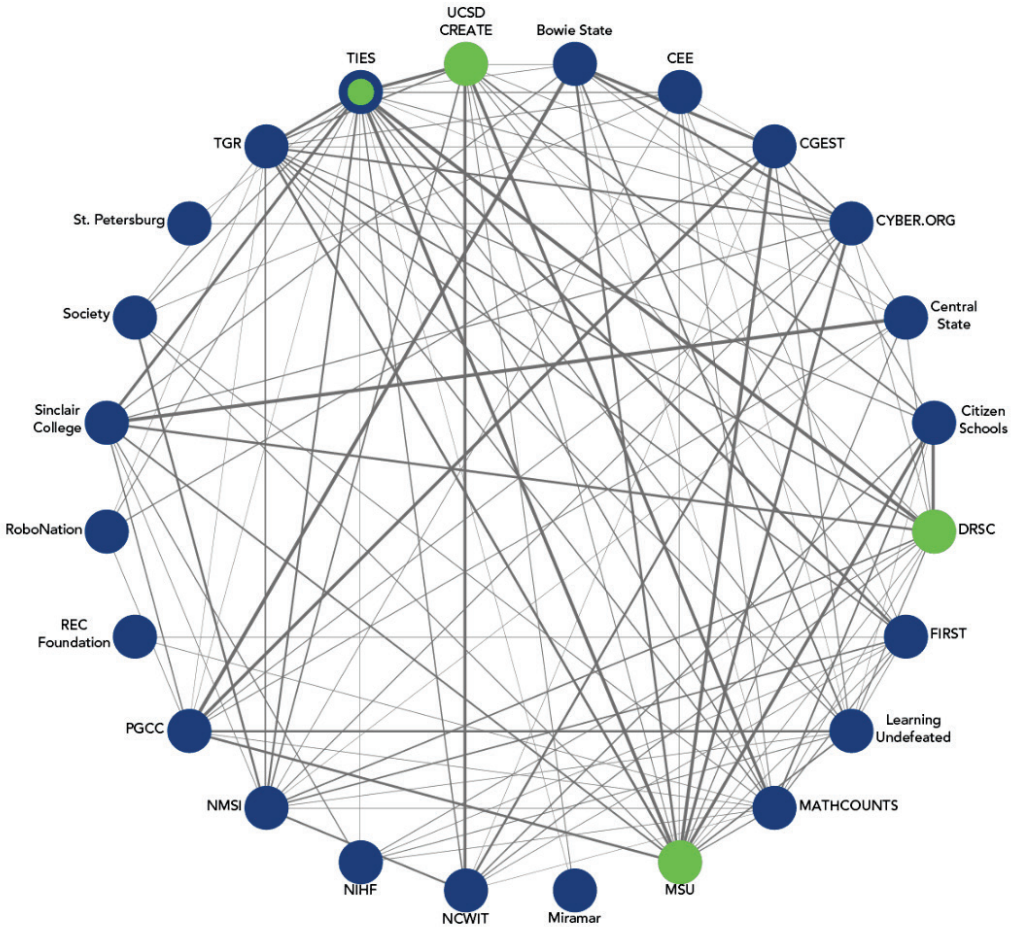

Figure 4. Overall DSEC network connectivity

For the network maps depicting the frequency of interactions focused on the three specific focal populations (military connected, underrepresented, DoD STEM workforce); thicker lines represent interactions that more frequently occurred, whereas thinner lines represent interactions that more rarely occurred.

- Military Connected

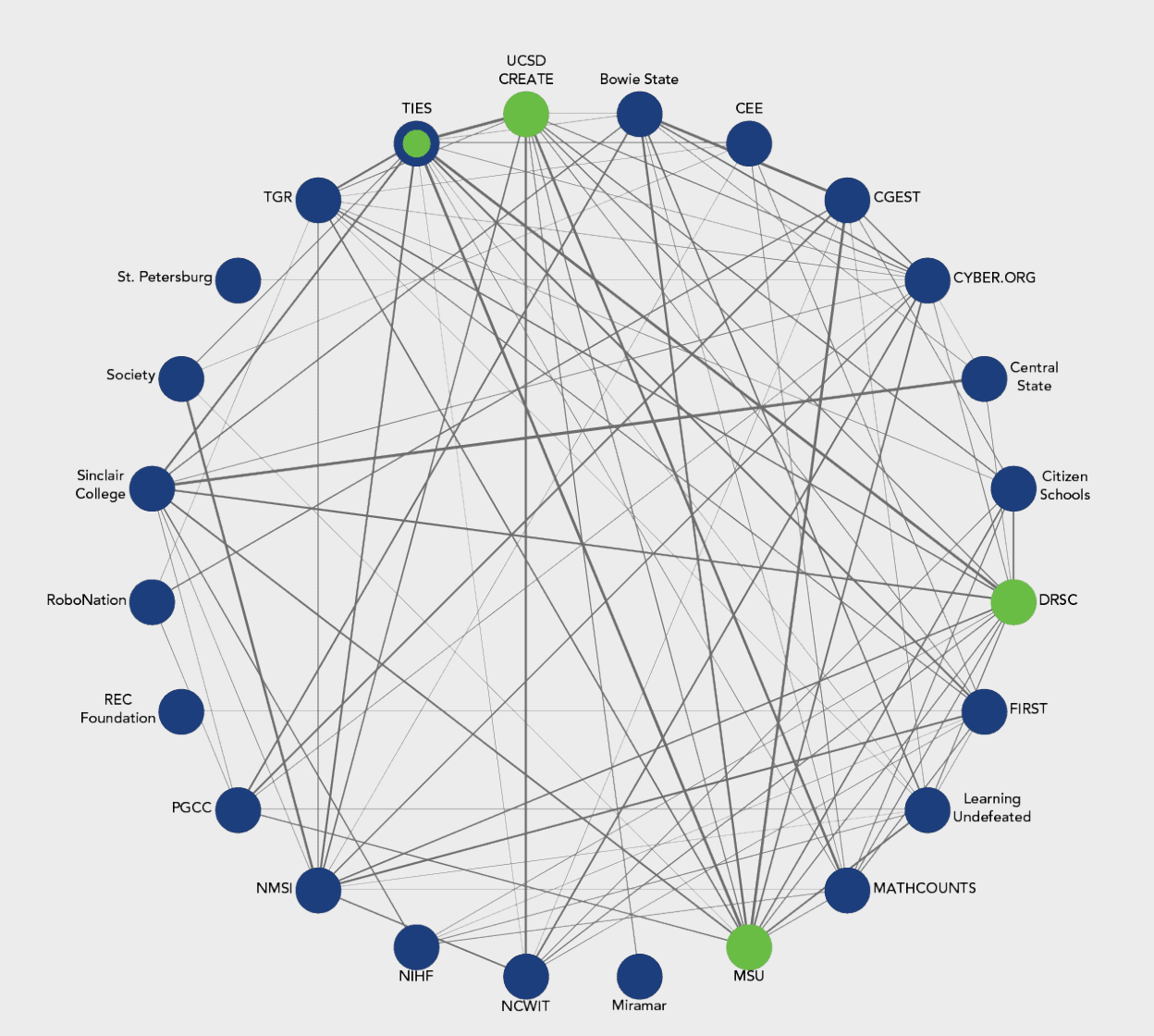

Figure 5. Network connectivity focused on military-connected populations

- Underrepresented

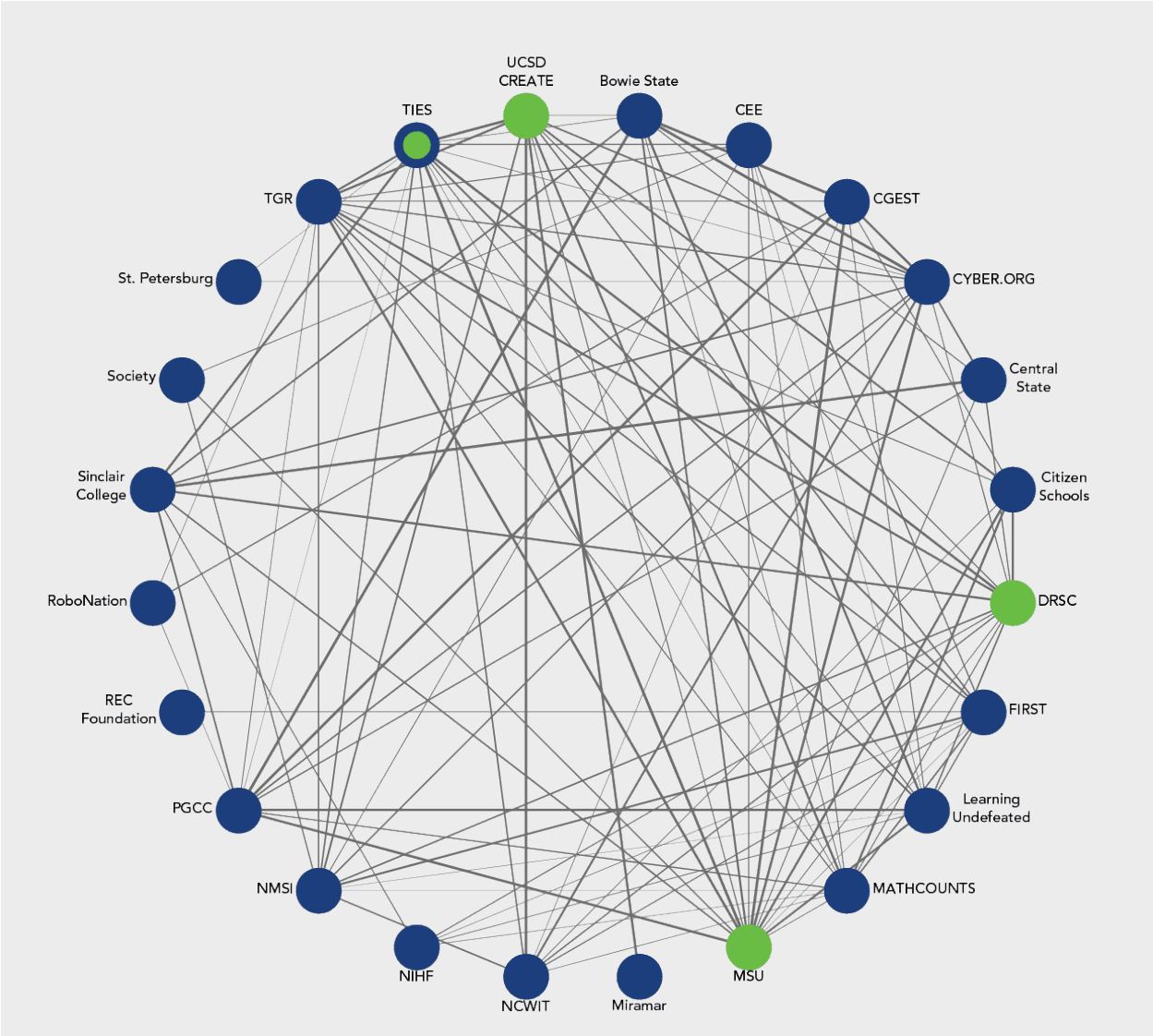

Figure 6. Network connectivity focused on underrepresented populations

- DoD STEM workforce

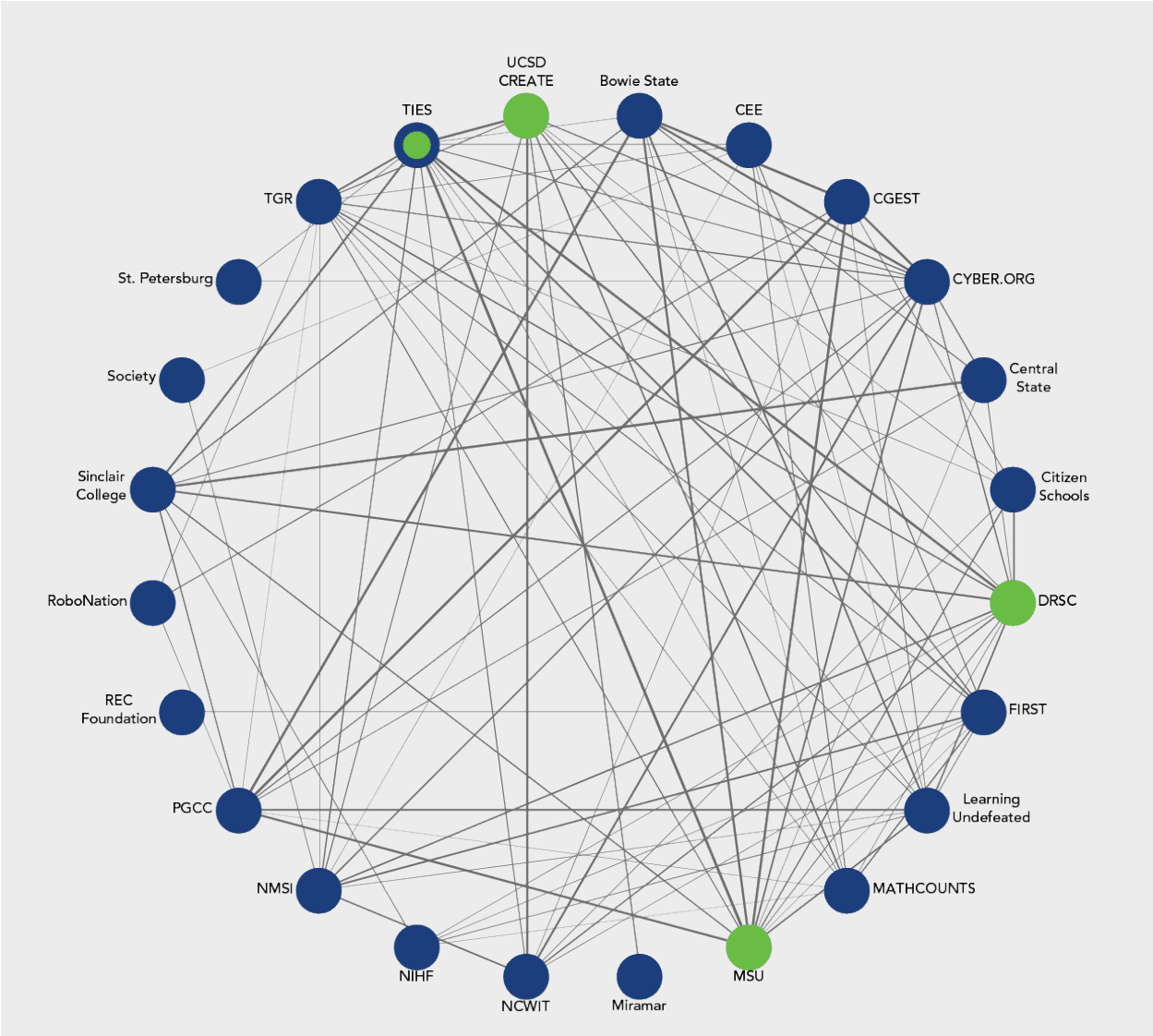

Figure 7. Network connectivity based on DoD STEM workforce

FINDINGS

DSEC STEM Education and Outreach Partners and Hub Leads reported 118 connections from September 2021 to August 2022.

On average, each organization reported connecting to 10 other organizations.

The network has density of 43%, meaning that slightly less than half of all possible connections occur in the network.

Eighty-one percent of the reported interactions between DSEC organizations occurred at the networking and shared expertise or lessons learned levels. Nineteen percent of the reported interactions occurred at the coordinating programming and collaborating on joint programming levels.

Of the 118 reported connections, 109 (92%) included a focus on serving or connecting to at least one of the following focal populations: students who are historically underrepresented in STEM, military-connected students, and the DoD STEM workforce. Of those connections, STEM Education and Outreach Partners and Hub Leads reported most frequently connecting to other DSEC organizations about serving students who are historically underrepresented in STEM.

The overall bar chart depicts the percentages of partner interactions that occurred at each level. The remaining three bar charts depict the percentage of partner interactions focused on each focal population (military-connected students,

- Overall

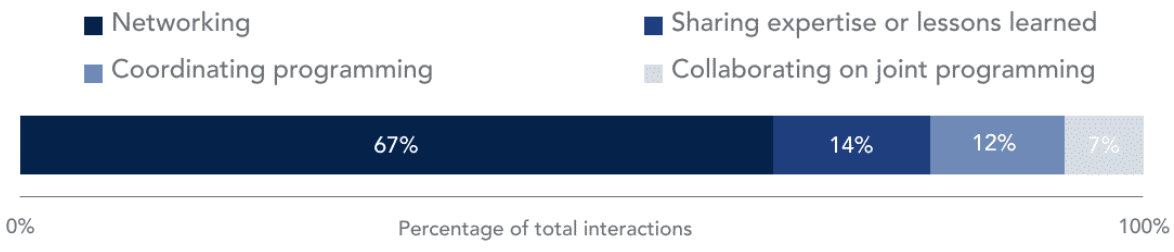

Figure 8. Overall types of connections

- Military connected

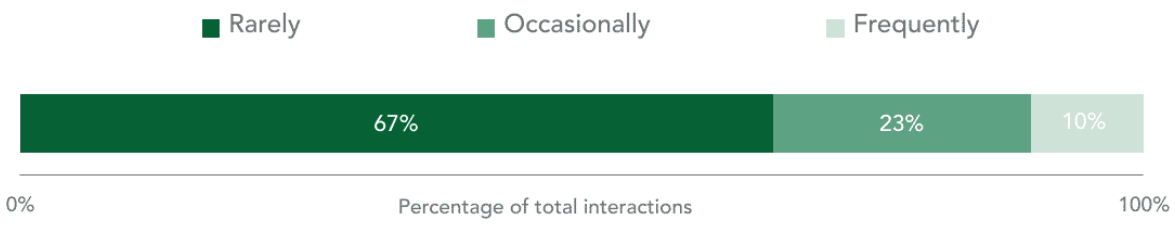

Figure 9. Frequencies of connections focused on military-connected populations

- Underrepresented

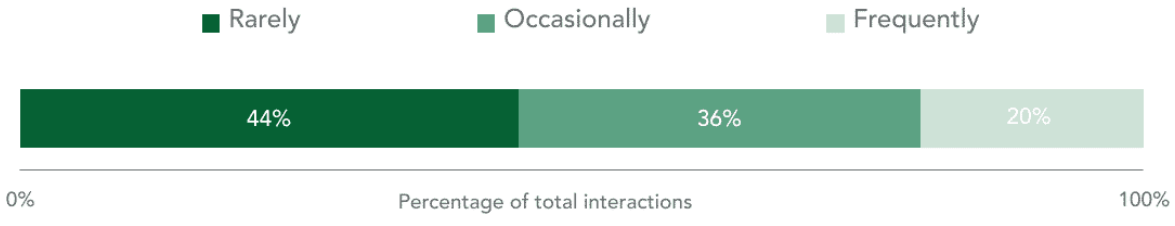

Figure 10. Frequencies of connections focused on underrepresented populations

- DoD STEM workforce

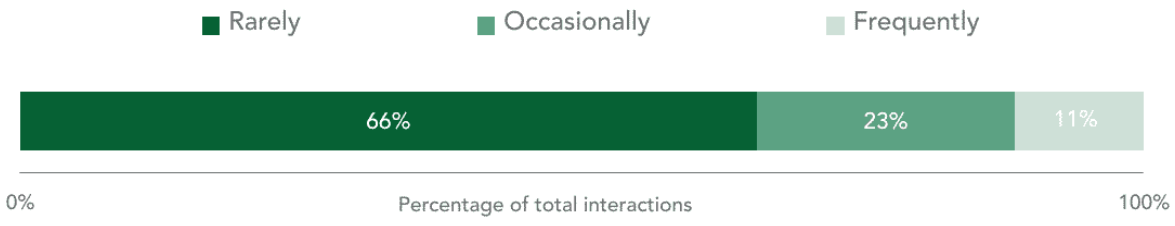

Figure 11. Frequencies of connections focused on the DoD STEM workforce

GEOGRAPHIC REACH (WITH U.S. MAP)

In 2021–22, DSEC programming reached participants in every U.S. state and in the District of Columbia, Guam, U.S. Virgin Islands, and Puerto Rico. Partner activities also reached participants in several international locations. Participants were particularly numerous along the East Coast, Florida, and in central and Southern California. Program concentrations in Washington state, Texas, the Gulf Coast, Colorado, Ohio, and Michigan also were evident. DSEC programming in 2020–21 also reached participants in every U.S. state, but involved more participants, particularly internationally. This difference is likely due to many programs being offered virtually in 2020–21, which allowed for participants located away from program locations to take part.

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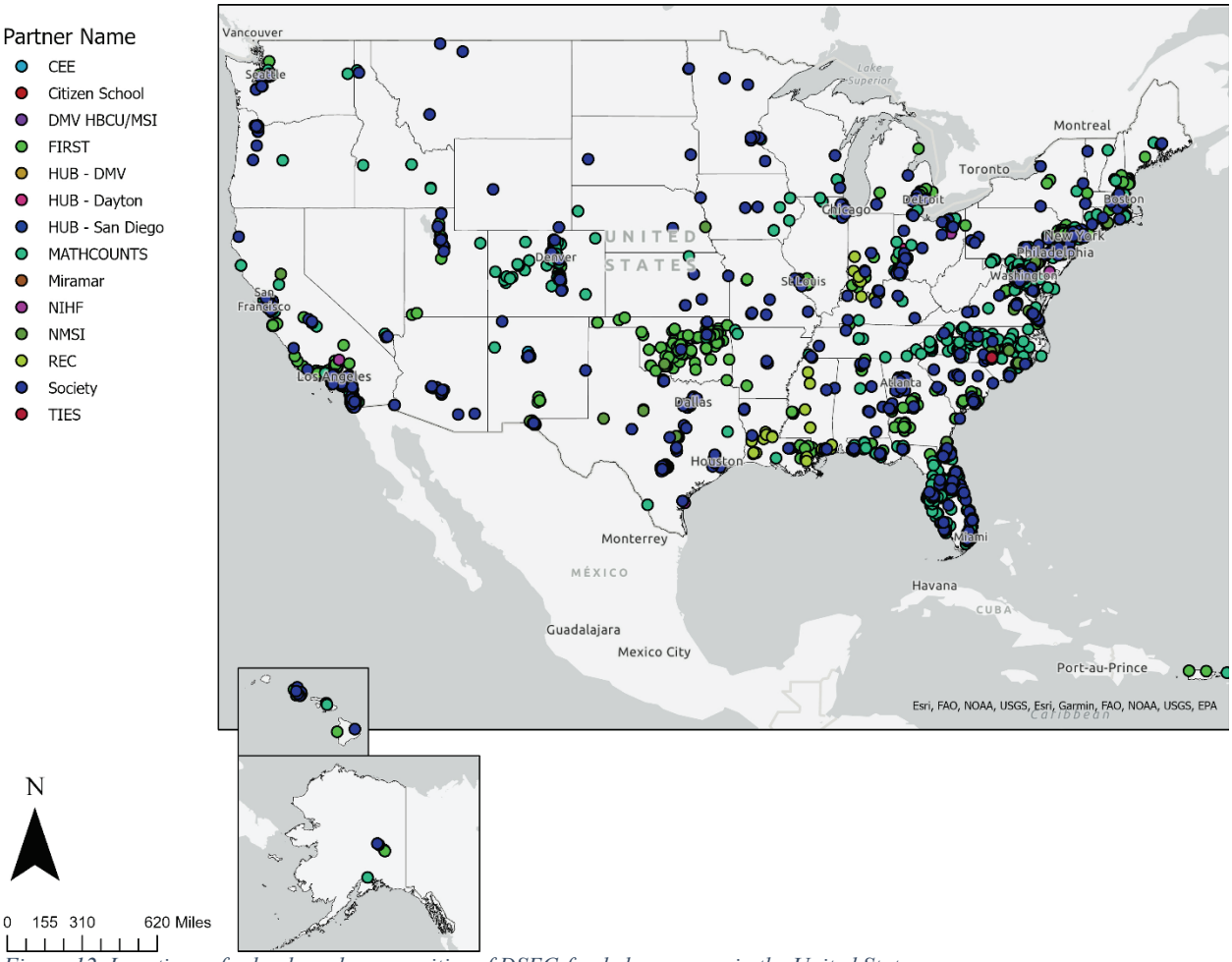

Figure 12. Locations of schools and communities of DSEC-funded programs in the United States

WHO DID DSEC PARTNERS SERVE?

WHAT TYPES OF PROGRAMS WERE DELIVERED?

From September 2021 to August 2022, STEM Education and Outreach Partners implemented programming focused on students and educators through in-person, virtual, or hybrid delivery. Details on these programs can be found in the Partner Snapshot section.

Table 1. The types and amounts of programs done by partner

24	14	10
Student-serving programs	Educator-serving programs	Programs serving both educators and students

WHO WAS INVOLVED IN DSEC ACTIVITIES IN OPTION YEAR 2 (SEPTEMBER 2021–AUGUST 2022)?

For Option Year 2, DSEC asked STEM Education and Outreach Partners to collect demographic data for students served that included gender, race/ethnicity, and whether students are military connected. These data are used to study DSEC's progress for the Serve fundamental (increase opportunities for military connected and underrepresented in STEM). The extent to which STEM Education and Outreach Partners met this request varied. Demographic information is detailed by partner and program in their individual snapshots.

Abbreviations used in the image below and in participation on graphics located throughout this report include:

- AA = African- American
- NA = Native American
- AN = Alaska Native
- NH = Native Hawaiian
- PI = Pacific Islander

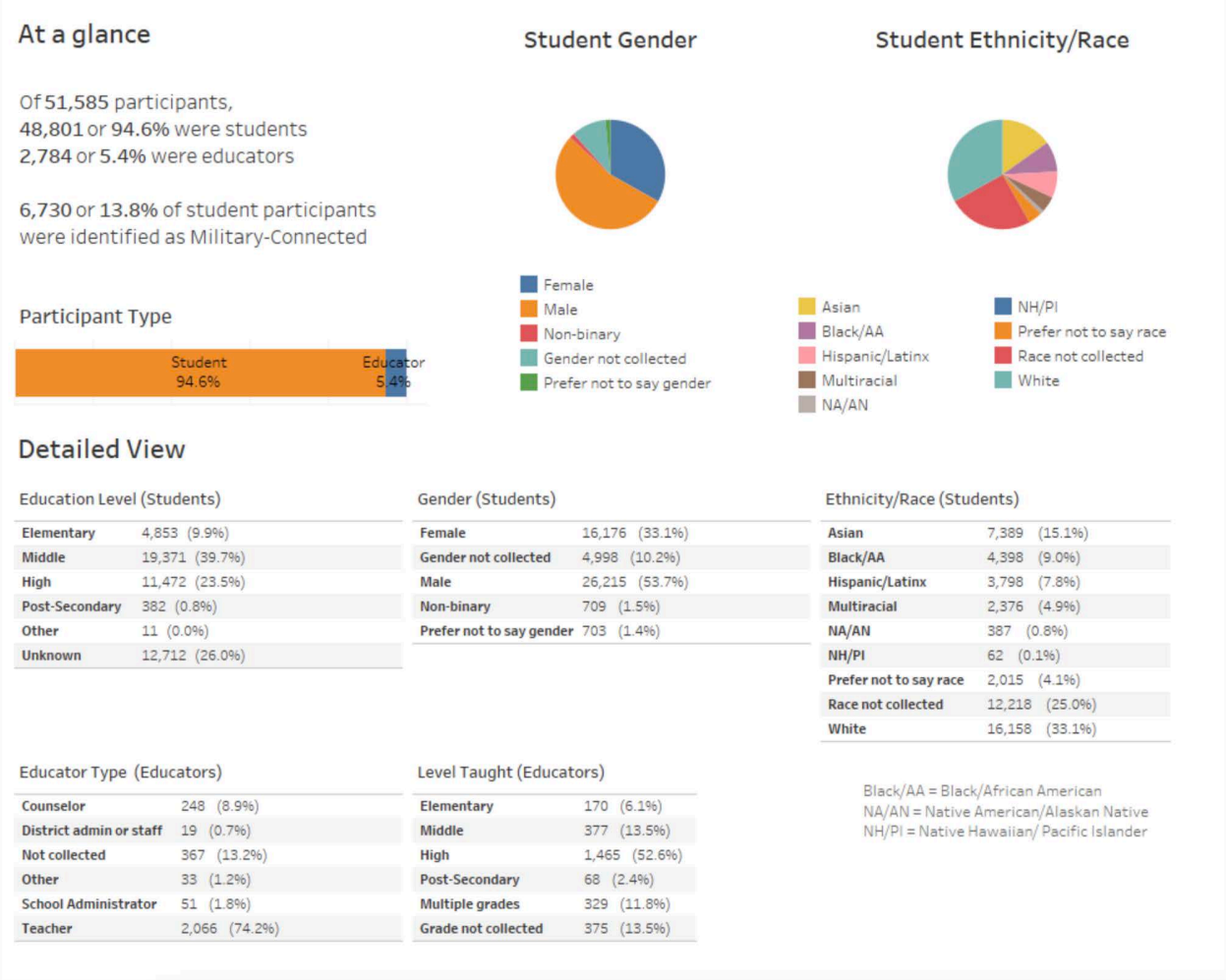

Figure 13. Overall demographic data for partner programs

IMPACT OF COVID-19

The COVID-19 pandemic in the United States began with the first confirmed case in January 2020 and quickly proceeded toward unprecedented disruption to daily life starting in March 2020. At the beginning of the pandemic, existing partners swiftly pivoted away from in-person events. Partner reflections from that time show that many grappled with how to effectively execute high-quality STEM programming in a fully virtual environment. As time passed, however, many partners found opportunities to improve their programming, spurred on by pandemic-related changes. In addition, between the first year of collection and this year, the number of DSEC partners has nearly doubled and has broadened to include postsecondary programs in addition to the original focus on K–12 programming. This has led to more variety in participant education levels and program environments.

In summer 2022, Element 2 administered a survey to DSEC partners, asking them to reflect on the impact of COVID-19 in two ways:

- Summarize any programmatic challenges presented by COVID-19 during Option Year 2 (September 1, 2021, to August 31, 2022).
- Summarize any opportunities or learning that emerged from your work during the COVID-19 pandemic and how you are incorporating this into future DSEC work.

This is the third year that Element 2 collected data from DSEC partners related to COVID-19. During the first year, Element 2 asked partners to generally reflect on their first few months of running their programs during a pandemic. The second and third years' surveys specifically requested DSEC partners to identify challenges and opportunities that emerged during the pandemic. We coded partner responses this year similarly to last year and aggregated them to determine the themes discussed in this section.

In the first months of the pandemic, DSEC partners identified several lessons learned:

- The switch to virtual is not always less expensive.
- Communication is incredibly important.
- Tracking attendance can be more challenging in a virtual environment.
- Building remote relationships is different from those established in person.

- Pivoting to virtual is easier for some programs than others.
- Accessibility varies widely across geography and demographics.
- Budget flexibility is necessary.
- The unpredictable nature of this pandemic will necessitate contingency planning for all programs in the foreseeable future.
- Virtual meetings need to be shorter than face-to-face meetings.
- The principles of effective learning still hold true for children and adults.

The survey data collected show that although many partners have put these lessons to good use, they are ready to move toward a postpandemic strategy. The trajectory forward for many DSEC partners seems to be one of in-person engagement combined with strategic virtual opportunities, a hybrid model that takes what organizations have learned from operating during a pandemic but relies heavily on the core service models in existence before COVID-19.

DSEC DATA DASHBOARDS

This section discusses the set of dashboards, also called a "storyboard," created in Tableau that visualizes DSEC participant demographic data for 2021–22 (Option Year 2). The participant demographic data were gathered from each DSEC partner using the online Amaze platform. Most DSEC partners submitted data into Amaze via a survey after events or programming occurred, whereas others submitted their data separately. The data were then exported, aggregated, cleaned, and visualized in Tableau.

The participant data includes both student and educator participants and focuses on the following types of demographics:

- Student gender
- Student education level
- Educator education level taught
- Student race and ethnicity
- Student military connectedness

A storyboard differs from a dashboard in that it is a collection of dashboards divided into sections. The purpose of these storyboards is for DoD STEM to gain insight into the characteristics of those participating in DSEC-funded partner programs. The interactive charts filter the underlying data with user selections.

The DSEC Participant Demographics OY2 storyboard provides a high-level overview of all participant data, split by demographic categories. The DSEC Partner Overview provides an overall look at demographics.

OPTION YEAR 2 (2021–2022) DSEC STEM EDUCATION AND OUTREACH PARTNERS AT-A-GLANCE

Organization	Participant #s	Participant Type	Gender (Students only)	Grade Levels Served	% Military connected (Student only)	% Underrepresented (Students only)
BSU	8 2	Students Educators	87.5% Male 12.5% Female	Post-Secondary Post-Secondary	0%	12.5% Asian 87.5% Black or African American
CEE	25	Students	56.0% Male, 44.0% Female	9–12 Post-Secondary	4%	64.0% Asian 12.0% Black or African American 4.0% Hispanic or Latino/a/x 4.0% Native Hawaiian or Other Pacific Islander
CGEST	54 21	Students Educators	7.4% Male 90.7% Female 1.9% Prefer Not to Say	6–8 9–12 Post-Secondary	38.9%	3.7% Asian 79.6% Black or African American 11.1% Hispanic or Latino/a/x 1.9% Multiracial

Organization	Participant #s	Participant Type	Gender (Students only)	Grade Levels Served	% Military connected (Student only)	% Underrepresented (Students only)
CITIZEN SCHOOLS	566 9	Students Educators	47.3% Male 48.2% Female 3.4% Non-binary 0.2% Prefer Not to Say	K–5 6–8 9–12 Post-Secondary K–5 6–8 Post-Secondary	0%	1.9% Asian 32.0% Black or African American 23.0% Hispanic or Latino/a/x 15.0% Multiracial 2.1% Native American or Alaska Native 0.7% Native Hawaiian or Other Pacific Islander
CYBER.ORG	55	Students	47.3% Male 50.9% Female 1.8% Non-binary	K–5 6–8 9–12	0%	29.1% Black or African American 23.6% Hispanic or Latino/a/x 7.3% Multiracial
DAYTON REGIONAL STEM CENTER	6 52	Students Educators	Not reported	6–8 9–12 K–5 6–8 9–12	0%	Not reported

Organization	Participant #s	Participant Type	Gender (Students only)	Grade Levels Served	% Military connected (Student only)	% Underrepresented (Students only)
DOD STEM AMBASSADOR	22	Educators		K–5 6–8 9–12 Multiple grades		
*FIRST**	16,648	Students	67.8% Male 31.3% Female 0.7% Non-binary 0.1% Prefer Not to Say	K–5 6–8 9–12	31.7%	17.0% Asian 7.6% Black or African American 12.2% Hispanic or Latino/a/x 2.0% Native American or Alaska Native
LEARNING UNDEFEATED	64	Students	100% Female	9–12 Post-Secondary	7.8%	31.3% Asian 26.6% Black or African American 6.3% Hispanic or Latino/a/x 14.1% Multiracial 1.6% Native American or Alaska Native
MATHCOUNTS	19,987	Students	59.1% Male 38.3% Female 1.3% Non-binary 1.4% Prefer Not to Say	K–5 6–8 9–12	1%	20.9% Asian 3.3% Black or African American 4.5% Hispanic or Latino/a/x 3.9% Multiracial <0.05% Native American or Alaska Native <0.05% Native Hawaiian or Other Pacific Islander

Organization	Participant #s	Participant Type	Gender (Students only)	Grade Levels Served	% Military connected (Student only)	% Underrepresented (Students only)
MIRAMAR COLLEGE	66	Students	30.3% Male 66.7% Female 3.0% Prefer Not to Say	Post-Secondary	4.5%	33.3% Asian 4.5% Black or African American 15.2% Hispanic or Latino/a/x 13.6% Multiracial
MORGAN STATE UNIVERSITY	3,444	Students	36.9% Male 42.9% Female 8.9% Nonbinary 11.3% Prefer Not to Say	K–5 6–8 9–12 Post-Secondary	4.8%	48.3% Black or African American 7.9% Hispanic or Latino/a/x 7.7% Multiracial <0.5% Asian, Native American or Alaska Native
	77	Educators		K–5 6–8 9–12 Post-Secondary Multiple grades		

Organization	Participant #s	Participant Type	Gender (Students only)	Grade Levels Served	% Military connected (Student only)	% Underrepresented (Students only)
NIHF	1,061 114	Students Educators	53.8% Male 45.9% Female 0.3% Prefer Not to Say	K–5 6–8 9–12 Multiple grades	88.4%	5.0% Asian 14.3% Black or African American 15.8% Hispanic or Latino/a/x 7.0% Multiracial 2.4% Native Hawaiian or Other Pacific Islander <0.5% Native American or Alaska Native
NCWIT	50 349	Students Educators	94.0% Female 6.0% Prefer Not to Say	9–12 K–5 6–8 9–12 Post-Secondary Multiple grades	0%	64.0% Asian 4.0% Black or African American 4.0% Hispanic or Latino/a/x 6.0% Multiracial

Organization	Participant #s	Participant Type	Gender (Students only)	Grade Levels Served	% Military connected (Student only)	% Underrepresented (Students only)
NMSI*	2,436 1355	Students Educators	Not reported	Not reported 6–8 9–12 Multiple grades	Not reported	Not reported
PGCC	17 28	Students Educators	23.5% Male 76.5% Female	Post-Secondary Post-Secondary	0%	70.6% Black or African American 11.8% Hispanic or Latino/a/x 11.8% Multiracial
REC FOUNDATION	37	Educators		6–8 9–12 Multiple grades		

Organization	Participant #s	Participant Type	Gender (Students only)	Grade Levels Served	% Military connected (Student only)	% Underrepresented (Students only)
ROBONATION	3390 88	Students Educators	16.0% Male 10.2% Female	K–5 6–8 9–12 Not reported	0.4%	0.8% Asian 6.0% Black or African American 4.8% Hispanic or Latino/a/x 2.2% Multiracial <0.5% Native American or Alaska Native <0.05% Native Hawaiian or Other Pacific Islander
SCC	80 2	Students Educators	12.8% Male 11.5% Female	6–8 9–12 Post-Secondary 6–8 Post-Secondary	0%	19.2% Black or African American

Organization	Participant #s	Participant Type	Gender (Students only)	Grade Levels Served	% Military connected (Student only)	% Underrepresented (Students only)
SOCIETY	331 208	Students Educators	41.1% Male 58.0% Female	6–8 6–8 9–12 Multiple grades	0.3%	53.2% Asian 0.9% Black or African American 5.7% Hispanic or Latino/a/x 4.8% Multiracial 0.6% Native Hawaiian or Other Pacific Islander 0.6% Native American or Alaska Native
ST. PETERSBURG	109 1	Students Educators	23.9% Male 68.8% Female 6.4% Non-binary	Post-Secondary Not reported	1.8%	4.6% Asian 7.3% Black or African American 17.4% Hispanic or Latino/a/x
TGR	100	Educators		K–5 6–8 9–12 Post-Secondary Multiple grades		

Organization	Participant #s	Participant Type	Gender (Students only)	Grade Levels Served	% Military connected (Student only)	% Underrepresented (Students only)
TIES STEM-ON-THE-GO	363	Students	51.5% Male 48.5% Female	K–5	13.8%	38.8% Black or African American 17.4% Hispanic or Latino/a/x 15.4% Multiracial
	35	Educators		K–5 6–8 9–12		
UCSD CREATE	40	Students	52.5% Male 47.5% Female	6–8	42.5%	Not reported
	14	Educators	Not reported	6–8 9–12	Not reported	Not reported

*denotes CMC Member

STEM EDUCATION AND OUTREACH PARTNER ORGANIZATION DESCRIPTIONS

Arizona State University Center for Gender Equity in Science and Technology (CGEST)—supports young women in Grades 9–12 through their CompuGirls Cyber Warriors Program, where they learn to apply culturally responsive computer science learning to modern community challenges inherent in their own communities. Through this program, young women from underanticipated, underrepresented, and/or underserved communities develop and grow their identities as emerging cybersecurity advocates, leaders, and experts.

Bowie State University (BSU)—aims to develop a pathway between K–12, community colleges, and 4-year institutions through their recruitment of students into their CS program. They offer a C++ programming workshop and sessions on discrete math to support students majoring in computer science. They are a part of the DMV HBCU-MI pathway that create an interconnected system between Prince George's County Public Schools, Prince George's Community College, and BSU.

Center for Excellence in Education (CEE)—implements two application-based programs for high school and undergraduate students that provide additional experiences in STEM research during the summer. Undergraduate students have the opportunity to complete internships at DoD laboratories.

Central State University (CSU)—aims to develop a sustainable pipeline of highly skilled scientists and leaders. They conduct joint programming with Sinclair Community College. CSU is part of the Dayton HBCU-MI Pathway that engages students, particularly those who are underserved and/or military connected, in continuing their education in a STEM field, ultimately leading them into the STEM workforce.

Citizen Schools—fosters student interest and achievement in STEM pathways through its STEM Catalyst Partnerships with Dayton Public Schools, which support teachers and volunteers in working with students on standards-aligned STEM projects; Maker Fellows in the Dayton and DMV hub areas, which supports teachers and builds community relations; and its inclusion of Dayton in an expanded Cincinnati-based STEM ecosystem.

CYBER.ORG—focuses on classroom curriculum to help teachers integrate cybersecurity content into their teaching and cybersecurity competitions for students.

Dayton Regional STEM Center (DRSC)—serves as a regional clearinghouse for information regarding STEM activities, awards programming, and research opportunities for students and teachers. Their Air Camp provides K–8 students with an immersive STEM experience related to flight by focusing on STEM careers and applications at a local Air Force base. DRSC's STEM Fellows program brings together K–12 educators to explore the use of high-quality, problem-based learning experiences in the classroom and foster STEM career connections.

DoD STEM Ambassadors—facilitate high-quality STEM learning experiences for students, promote DoD STEM program and opportunities, and leverage the DSEC network to amplify the impact and reach of STEM initiatives across the consortium. Ambassadors present at regional or national conferences, develop blog posts for the DoD STEM website, complete impact projects to address issues in STEM access and equity, and receive professional development on domains prioritized by the federal STEM Strategic Plan.

For Inspiration and Recognition of Science and Technology (*FIRST*)—provides programming for students in Grades Pre-K–12 through *FIRST* LEGO League, *FIRST* Tech Challenge, and *FIRST* Robotics Competition to encourage collaboration and exploration in robotics and increase student coding and programming skills.

Learning Undefeated—engages high school and college students in in-person laboratory and virtual workshop experiences in biotechnology.

MATHCOUNTS—provides extracurricular programming in mathematics for Grades 6–8 students of all skill levels to build confidence in and improve attitudes about math and problem solving. Students join teams to compete in competitive activities such as the MATHCOUNTS Competition Series and Math Video Challenge, or noncompetitive activities, such as the National Math Club.

Miramar College—offers career development services and summer classes to undergraduates that lead to a Certificate of Achievement in Biotechnology and industry-recognized credentials, as well as subsidized internships in life sciences.

Morgan State University (MSU) Center for Excellence in Mathematics and Science Education (CEMSE)—supports STEM education in the Baltimore, Maryland, area with a specific focus on the historically underrepresented minority population.

National Center for Women and Information Technology (NCWIT)—runs peer-led computing programs designed to teach K–12 girls fundamentals in programming and computational thinking called AspireIT. Participants attend sessions led by high school and college women who create these opportunities alongside NCWIT's partner organizations, working to help girls learn in fun, creative, and hands-on environments. NCWIT's Counselors for Computing (C4C) equips counselors with the knowledge, professional development, and resources necessary to become advocates for students as they explore computer science education and classes.

National Inventor Hall of Fame (NIHF)—engages children in Grades K–6 in their Camp Invention program where they explore the relationship between creativity, innovation, STEM, and entrepreneurship.

National Math and Science Initiative (NMSI)—partners with schools and districts nationwide to provide training, supports, and resources for teachers and students. Their College Readiness Program (CRP) supports high school advanced placement coursework, predominantly in STEM content areas. The STEM Star Awards offers monetary incentives to students, especially those traditionally underrepresented in advanced placement courses. Their Laying the Foundation program helps Grades 6–12 teachers build and maintain STEM subject matter expertise and enhance their leadership.

Prince George's Community College (PGCC)—aims to create a seamless K–16 path for students, expose prospective students to PGCC and its transfer partners, and build bridges between PGCC and its transfer partners. They offered its instructors sessions on empathetic reactions and intern panels to help them work with students transitioning from high school to postsecondary work. They also hosted STEMist sessions where high school students learned about STEM careers and career pathways. They are a part of the DMV HBCU-MI pathway that creates an interconnected system between Prince George's County Public Schools, PGCC, and BSU.

REC Foundation—provides elementary, middle, and high school youth with unique opportunities to participate in high-quality and affordable STEM-based robotics programs and competitions. Their Aerial Drone Competition offers students the opportunity to learn to operate drones while working together as a team.

RoboNation—builds a pathway of hands-on robotic programs and competitions for students from elementary school through postgraduate studies. Their SeaPerch program aims to reduce traditional barriers to participation in robotics programs and promote opportunities to engage students and educators in inquiry-based learning with real-world applications.

Sinclair Community College (SCC)—aims to develop programs to provide more awareness of STEM opportunities to underserved and underrepresented middle and high school students. They conduct a biomimicry workshop focused on the design and production of materials, structures, and systems modeled on biological processes and entities. The Summer Bridge program assists students in transitioning to rigorous, postsecondary studies. The STEM enrichment series fosters middle and high school student engagement and interest in STEM careers. They are part of Dayton HBCU-MI Pathway that engages students, particularly those who are underserved and/or military connected, in continuing their education in a STEM field, ultimately leading them into the STEM workforce.

Society for Science (Society)—supports the advancement of STEM through its Broadcom MASTERS Science Fair Awards, DoD STEM Leadership Prize, and Middle School Research Teachers Conferences (MSRTC). MSRTC brings middle school research teachers together to share best practices, troubleshoot challenges, and learn more about student opportunities for science competition.

St. Petersburg College—provides underrepresented populations and military-connected students with professional development, career training, and paid internships and in STEM-related industries such as IT and biotechnology.

TGR Foundation (TGR)—supports teacher development through in-person professional development, such as its TGR STEM Studios, or through its Online Training Academy for educators in Grades 3–12.

Teaching Institutes for Excellence in STEM (TIES) STEM-on-the-Go Van—provides on-site, hands-on learning experiences for elementary through high school students where students engage in grade-appropriate, pre-designed STEM activities facilitated by a lab manager.

University of California, San Diego (UCSD) Center for Research on Educational Equity, Assessment, and Teaching Excellence (CREATE)—supports local K–12 outreach, offers college preparation for students who often are underrepresented in higher education, serves as a professional development provider, and acts as coordinator to facilitate connections. Their Barrio Logan Science & Art Expo provides local partners the opportunity to offer STEM opportunities that highlight science, art, and culture from around the world. The Summer Math Institute for Teachers provided professional develop opportunities that prepare middle and high school teachers to teach math at the Summer Math Academy for Students. The Summer Math Academy for Students gives middle school students a unique opportunity to learn discrete math skills and how they link to computer science foundations.