



DoD STEM Overview

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What Encompasses DoD STEM?



DoD STEM is inclusive of Department-wide efforts that address near- to mid-term (postsecondary) STEM workforce needs, and long-term (K-16 education & outreach) STEM talent development through a variety of educational and work-experiential opportunities across the K-20 continuum.



INSPIRING THE FUTURE

Shaping the Future Workforce to Ensure the Department's Technological Superiority

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DoD STEM Strategy (2021-2025)



VISION: A diverse and sustainable science, technology, engineering, and mathematics (STEM) talent pool ready to serve our Nation and extend the Department of Defense's (DoD's) competitive edge.

MISSION: Inspire, cultivate, and develop exceptional STEM talent through a continuum of opportunities to enrich our current and future DoD workforce poised to tackle evolving defense technological challenges.

- **Inspire** community engagement in DoD STEM education programs and activities to provide meaningful STEM learning opportunities for students and educators.
- **Attract** the Nation's and DoD's current and future STEM workforce through multiple pathways to educational and career opportunities.
- **Increase** participation of underserved and underrepresented groups in STEM education and workforce development programs, activities, and outreach.
- **Advance** the efficiency and effectiveness of STEM education and workforce development programs, activities, and outreach through evaluation and assessment.



DoD STEM Authorities



- **America Competes Reauthorization Act 2010**

- America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science
- Coordination of Federal STEM Education Activities

- **10 U.S.C. Sec. 2192**

- Improvement of education in technical fields: general authority regarding education in science, mathematics, and engineering
- Sec 2192(a) Science, Mathematics and Research Transformation (SMART)
- Sec 2192(b) Program on enhancement of preparation of dependents of members of armed forces for careers in science, technology, engineering, and mathematics.

- **10 U.S.C. Sec. 2193**

- Improvement of education in technical fields: grants for higher education in science and mathematics

- **10 U.S.C. Sec 2194 – Educational Partnerships**

- **10 U.S.C. Sec 2195 – Department of Defense cooperative education programs**

- **10 U.S.C. Sec 2196 – Manufacturing Engineering Education Program**



DoD STEM Education, Outreach, and Development Efforts



- **K-12**

- Student enrichment activities (year-round and summer STEM camps)
- Student Research/Project-based Competitions
- Paid apprenticeships/internships
- Teacher professional development & externships

- **Post-secondary**

- Paid Work Experiential Programs (Internships/Fellowships/Apprenticeships)
- Student Competitions
- Manufacturing Engineering Education Program (MEEP)
- Scholarships (SMART)
- DoD Scientists/Engineer in the Classroom or Faculty Exchange
- Fellowships (NDSEG)

DoD Components Engaged in STEM Activities

- U.S. Army – Office of the Deputy Assistant Secretary of the Army for Research & Technology
- Naval STEM (U.S. Navy & Marine Corps) – Office of Naval Research
- U.S. Air Force – Office of the Secretary of the Air Force in Acquisition, Technology, and Logistics & Air Force Research Laboratory
- Missile Defense Agency (MDA)
- Defense Threat Reduction Agency (DTRA)
- National Security Agency (NSA)
- DoD Educational Activity (DoDEA)
- Office of Civil and Military Affairs
- OSD ManTech, HBCU/MI, Biotechnology

Leveraging the DoD's over 60K Scientists and Engineers, 63 Labs/Centers in the Defense Laboratory Enterprise with 200 Locations across the U.S., to engage in STEM activities and help develop the Nation's STEM talent now and into the future



DoD Instruction (DoDI) 1025.11



- Establishes policy, assign responsibilities, and prescribes procedures for DoD STEM education programs and activities
- Identify actions that the DoD may take to improve education and outreach in STEM fields and disciplines necessary to meet the national defense needs in accordance with the Federal STEM Education Strategic Plan
- Establish, conduct, evaluate, and report programs and activities to carry out STEM education and outreach on behalf of the DoD.
- Strengthen the DoD's efforts to recruit and sustain careers in STEM consistent with diversity program goals and objectives aligned with P.L. 111-358, the Federal STEM Education Strategic Plan, and the Department of Defense Diversity and Inclusion Strategic Plan.
- Encourage industry, academia, and non-profit organizations to participate in DoD STEM education programs and activities, in accordance with P.L. 111-358.
- Collaborate with other federal agencies to coordinate STEM education programs and activities across the Federal Government.



DoD STEM Portfolio



- STEM Coordinating Requirement for the Department, Policy and Oversight
 - STEM Advisory Council
 - DoD Instruction 1025.11
- Represent the Department in Federal Coordination in STEM (FC-STEM) and Interagency Working Groups
- National Defense Education Program (NDEP)

FY18: 103M

FY19: 136M

FY20: \$144M

FY21: \$137M

- SMART Scholarship Program
- STEM Education & Outreach
 - Defense STEM Education Consortium (DSEC)
 - Other NDEP efforts through Funding Opportunity Announcements
- Manufacturing Engineering Education Program (MEEP)
- Evaluation Assessment Capability (EAC)
 - Capturing the Department's collective impact in STEM activities



SMART Scholarship Program



SMART enhances the Department's workforce with innovative scientists, engineers, and researchers across the United States.

- **3,367** Scholarships awarded since 2006
- **91%** success rate of service commitment completion
- **190** DoD sponsoring laboratories & agencies across 40 states
- **411** Universities represented by SMART scholars
- **21** STEM Disciplines

SMART
SCIENCE, MATHEMATICS,
AND RESEARCH FOR
TRANSFORMATION
PART OF THE NATIONAL
DEFENSE EDUCATION PROGRAM
smartscholarship.org

 “ I’ve been able to apply my technical expertise to a variety of areas that aid the Navy’s Mission. ”

The SMART Scholarship opened up many doors for professional growth and the ability to better serve our country. ”

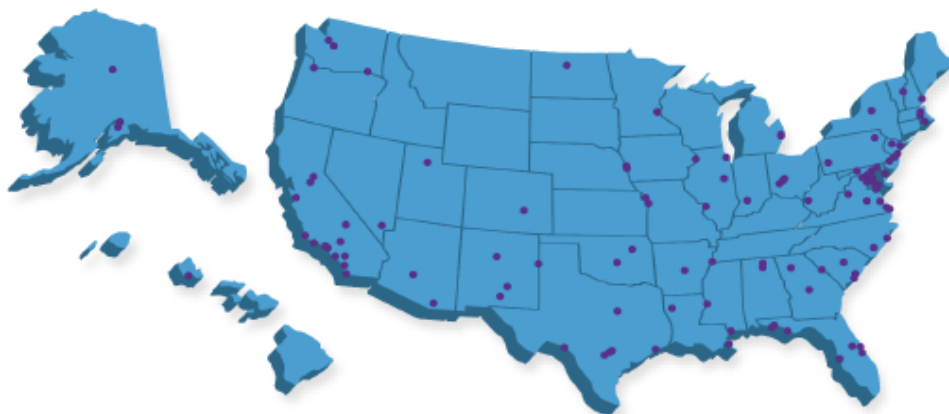
Jennifer Aneke, SMART Scholar

What do SMART Scholars Receive?

- Full Tuition
- Annual stipend between \$25,000-\$38,000 per year, depending on degree level
- Summer Internships
- Book Allowance & Health Insurance
- Experienced mentor
- Guaranteed employment at a DoD facility upon degree completion



SMART Sponsoring Facilities



DoD SMART Scholarship Facilities

190 Labs and Agencies
Across 40 States and All Services

Laboratory Sites

59

Intelligence
Community Sites

12

Medical Facilities

04

Army Corps of
Engineer Sites

33

Test & Evaluation
Center Sites

49

Other Mission
Support Sites

33



Ongoing Diversity Efforts in SMART



- FY2021 NDAA Section 242 and Section 250
- Focused efforts to increase the proportion of HBCU/MI scholars in the application, semi-finalist, and finalist stages as compared to 2018-2020.
 - Through strategic outreach via webinars, targeted social media engagement with scholars, sponsoring facilities and DoD Labs
 - Initiated quarterly webinar series, “Fostering a Community of Diversity” to increase awareness of program and research opportunities within the Department.
- Targeted outreach at Affinity Group Conferences (Great Minds in STEM, Society of Women Engineers, National Society of Black Engineers, etc.)
- Leverage existing DoD HBCU/MI Programs
- Leverage partnerships with MSIs, faculty and professional organizations.



STEM Education & Outreach



Defense STEM Education Consortium (DSEC)

- **Consortium model approach** to NDEP's K-16 STEM education and outreach initiatives
- **Leveraging partnerships** to amplify awareness and broaden impact
- **National reach and regional focused execution** (DSEC HUBs)
- Coordinated functions, planning, and supports
- **Coherent and interconnected K-16 STEM education & outreach portfolio**
- Incorporates annual '**Innovation Bloc**' funding to address identified gaps



Launched
March 1, 2019



Includes
18 organizations



Structured as a
Cooperative Agreement



Initially scoped as up to
\$75M investment over 5 years



Supports
DoD STEM Strategic Plan
And aligns with
Federal STEM plan



DSEC Fundamentals



FEDERAL STEM GOALS

BUILD
Strong Foundations for
STEM Literacy

INCREASE
Diversity, Equity, and
Inclusion in STEM

PREPARE
the STEM Workforce for
the Future

FEDERAL STEM PATHWAYS

DEVELOP
and Enrich Strategic
Partnerships

ENGAGE
Students Where
Disciplines Converge

BUILD
Computational
Literacy

OPERATE
with Transparency
and Accountability

DoD STEM GOALS

COMMUNICATE
Value of STEM
Engagement

PROMOTE
Participation by
Underserved

INSPIRE
Community
Engagement in STEM

CULTIVATE
Future STEM
Talent

ENHANCE
Efficiency and
Effectiveness

DSEC FUNDAMENTALS


ENGAGE Students
& Educators in
Meaningful STEM
Experiences


CONNECT to the
DoD STEM
Workforce


SERVE Students
Who Are Military-
Connected &
Underrepresented
in STEM


LEVERAGE the
Network as a
Force Multiplier


EVOLVE the
Approach Based
on Data

DSEC is designed to align with federal and DoD STEM strategic goals.

Federal STEM Vision:

All Americans will have lifelong access to high-quality STEM education, and the United States will be the global leader in STEM literacy, innovation, and employment.

Leveraging the breadth and diversity of the Consortium to amplify impact through Collaboration



DSEC Partnership Network

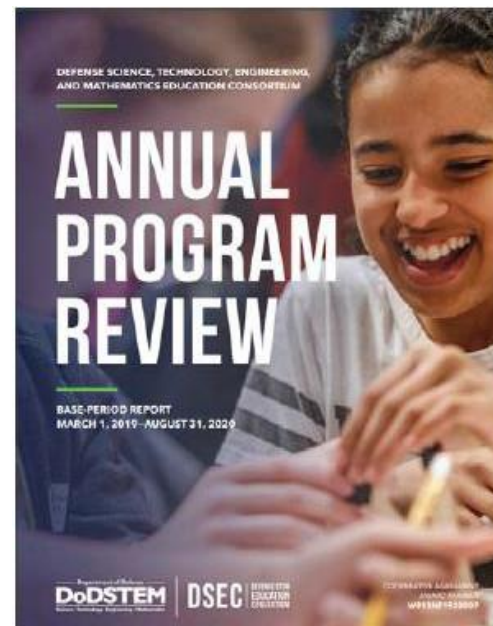
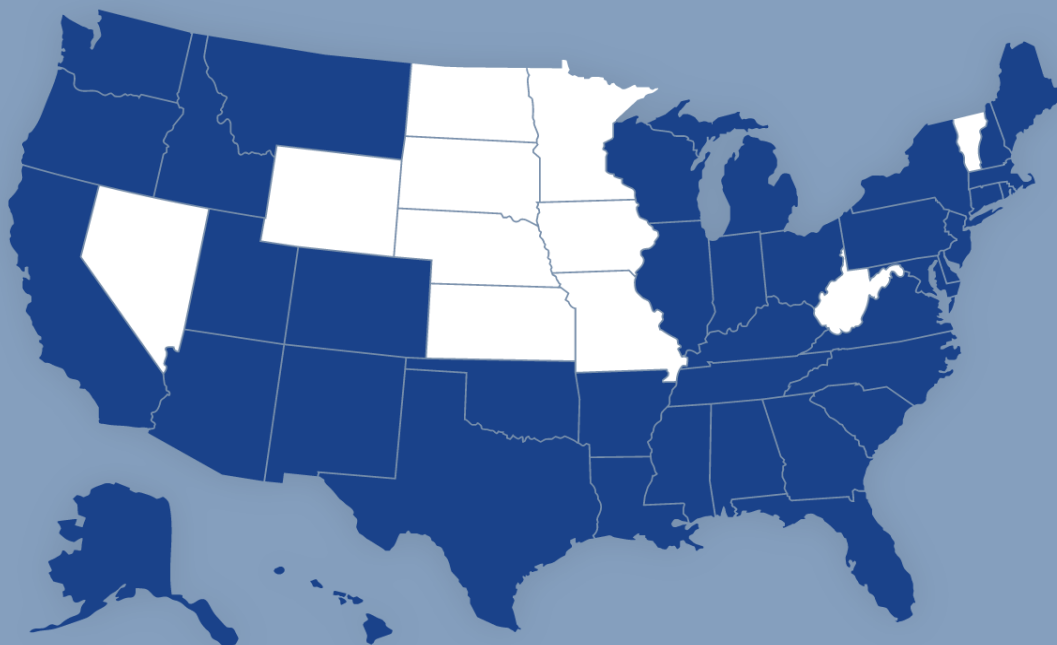


Engaging students and educators at multiple entry points across the K-16 continuum



Base Year Outcomes (2019-2020)

DSEC Partners Engaged in 39 States + District of Columbia



50%

OF DSEC PROGRAMMING

was intentionally aligned to focus on student populations who are military-connected or underrepresented in STEM.



51,728 STUDENTS SERVED



3,657 TEACHERS SERVED



155 OTHER PARTICIPANTS



2020-21 NDEP Funding Opportunity Announcement



- 2020-2021 National Defense Education Program (NDEP) Funding Opportunity Announcement (FOA) HQ0034-21-S-F001 closed on 25 January 2021 for white paper applications on Grants.gov.
 - <https://www.grants.gov/web/grants/view-opportunity.html?oppld=330319>
- PURPOSE:
 - The Department of Defense (DoD) seeks innovative applications on mechanisms to implement education, outreach, and/or workforce initiative programs in the areas of Science, Technology, Engineering, and Mathematics (STEM) and Biotechnology.
 - Activities will support the DoD STEM strategic plan and align to the 2018 Federal STEM strategic plan. Additional efforts will create a separate pilot program in Enhanced Civics education.
 - Note: Respondents are not required to address all three focus areas, but should direct their responses to one of the areas, STEM, Biotech, or Enhanced Civics Education.
 - Additional resources:
 - DoD STEM Education and Workforce Development Workshop <https://dodstem.us/blog-posts/2020/dod-stem-education-and-workforce-development-virtual-workshop>
 - Current NDEP Awardees: <https://dodstem.us/blog-posts/2020/national-defense-education-program-stem-awardees>
- The Department intends to award multiple grants, subject to the availability of funds.



Manufacturing Engineering Education Program (MEEP)



PURPOSE

Congressionally added in 2017-2020, this program **established new or enhances existing programs** (or collections of programs) to better position the current and **next-generation manufacturing workforce** to produce military systems and components that assure technological superiority for the DoD.

APPROACH

Through Funding Opportunity Announcements (FOA), awarded **13** distinguished educational and industry partners with close to **\$50M**, over a three-year period to establish or expand educational opportunities for Americans to acquire manufacturing skills critical to sustaining the defense innovation base.

MEEP Awardees

Battelle Education; Clemson University; Massachusetts Institute of Technology; National Center for Defense Manufacturing & Machining; Institute for Advanced Composites Manufacturing Innovation; Lightweight Innovations for Tomorrow; Loraine County Community College; Monroe Community College; NextFlex; Society of Manufacturing Engineers; University of Texas, Rio Grande Valley; Virginia Polytechnic Institute; and State University.



Evaluation & Assessment Capability



EAC objectives:

1. Develop and implement a **coordinated framework** for evaluating DoD-wide STEM investments consistent with agency strategic and performance plans
2. **Evaluate the impact** of DoD STEM programs
3. Enable a **culture of evidence-based planning, policy, and decision making** that articulates **program goals** and **evaluation metrics**
4. Increase **access to program-level data** to **support decision making**



DoD STEM: Underserved Population Definition



- Military connected students which include dependents of members of the Active Duty Armed Forces, National Guard and Reserves
- Students from low income families
- Racial and ethnic minorities that are historically underrepresented in STEM (i.e., Alaskan Natives, Native Americans, Black or African Americans, Latinx/Hispanic Americans, and Native Hawaiians and other Pacific Islanders)
- Individuals with disabilities
- Individuals with English as a second language or English Language Learners
- First generation college-bound students
- Students in rural, frontier, or other federally targeted schools
- Females in STEM fields where they remain underrepresented (physical science, computer science, mathematics, and engineering)



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