

# Northrop Grumman STEM Education Strategy

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**BUILDING**  
PARTNERSHIPS  
for  
**STRONGER**  
COMMUNITIES



# Northrop Grumman STEM Education Strategy

## Executive Summary

Northrop Grumman and the Northrop Grumman Foundation are committed to expanding and enhancing the pipeline of diverse, talented science, technology, engineering, and mathematics (STEM) students globally. This is achieved through charitable contributions, mentors, and intern opportunities, as well as programs that connect our employees to students in the classroom and our technology capabilities. We believe that through contributions to STEM literacy, we can be a catalyst to inspire students to envision STEM careers as a future, help develop the next generation of STEM leaders, and contribute to the global-need for STEM literate citizens. Since teachers are influential in STEM education, our focused efforts to support teacher professional development supports them in their efforts to spark student's interest of STEM careers and connections between STEM careers and the classroom.

Northrop Grumman and the Northrop Grumman Foundation's education strategy focuses on **engineering and technology-based programs and initiatives that excite, engage, and educate students and serve as professional development resources for teachers, with a primary focus on middle school (grades five through eight).**

Our strategy is grounded in the following core beliefs:

- The future STEM workforce needs to be far more diverse and our programs should focus on **closing the STEM opportunity gap for those who are underrepresented in STEM careers, which includes girls and students of color.**
- **Hands-on engineering opportunities in formal and informal settings** produce students who are passionate about building, problem solving, and discovering: essential traits in our future workforce.
- **Early access to engineering and technology programs** provides opportunities for students to collaborate on complex problems and provide an insight into what a STEM career can look and feel like.
- STEM content is complex and teachers need additional **professional development and support to effectively teach STEM-based content, especially engineering.**

By strategically focusing in these areas, we can support

Relevant STEM **educational** experiences for students

Students' understanding of how **classroom learning** connects to **STEM careers**

Global **gender parity** in STEM careers

A robust and diverse **pipeline** of tomorrow's workforce

In a perfect world, a student in a Northrop Grumman community would experience Northrop Grumman STEM influences throughout his or her education career. From WolfTrap experiences in Pre-K/Kindergarten through classroom visits and tours in elementary school to VEX robotics, CyberPatriot, E-Week, and Space Camp in middle school, along with VEX, CyberPatriot, High School Mentoring and High School internships. All leading to excitement, interest and pursuit of a STEM career either in community college/vocational or college/University, which would then provide additional opportunities for exposure through college/career fairs, college internships, apprenticeships and more. Resulting in a student who has been consistently engaged, nurtured and trained with Northrop Grumman in his/her entire academic and career pathway resulting in a highly qualified STEM candidate connected to Northrop Grumman.

# Northrop Grumman STEM Education Strategy

## The Business Case

As Northrop Grumman approaches almost a century of outstanding performance, innovation and discovery, we maintain our commitment to excellence in STEM. This commitment will help to build a capable workforce for the security and benefit of our world, ensure the availability of top talent for our staffing requirements now and into the future, and develop generations of scientists, engineers and technicians.

Our strategy applies an enterprise-wide approach to education. Taking a pipeline approach, building from one level of education to the next, leading to the development of the best and brightest talent. It aligns Northrop Grumman's total education program with the company's strategic plan and provides an integrated structure. Our STEM strategy encompasses all company education efforts and guides our relationships with external education partners including government education organizations, professional and student associations, colleges and universities, K-12 institutions, customers, industry partners, and engagement with the communities where our employees live and work.

## Goals and Objectives

The goal of Northrop Grumman's STEM education strategy is to stimulate students' and teachers' interests, capabilities and strengthened confidence in STEM, as well as and increase the number of diverse students interested in and pursuing STEM fields. Through this sustained commitment, we contribute to the long-term interests of our country, our customers and our company.



As a company, we have committed to the following goals:

- In alignment with UN Sustainable Development Goal #4, our goal is to provide workforce-relevant professional development programming to middle school educators to increase their math and science knowledge and their confidence and competence in teaching STEM subjects, thereby helping increase math and science proficiency in 350,000 students by 2030.
- In support of the national focus on apprenticeships and workforce development, our goal is to provide 100 registered apprenticeships within Northrop Grumman by summer 2019.

- We remain committed to partnering with universities and colleges to promote research and innovation, as well as supporting the current and future engineering pipelines to develop students to serve as tomorrow's leaders.

## Strategic Elements - Partnerships and Education Portfolio

The company's investment in education partnerships and programs is directly related to furthering STEM education and educational opportunities for students so they can fill future workforce needs for talented and diverse STEM professionals.

Studies show a global decline in students, to include women and minorities, prepared for STEM careers (Catalyst, 2018). This is further complicated by the trend that indicates minorities will make up about half of the U.S. population and a corresponding percentage of the U.S. work force in the next 40 years (Vespa & Armstrong, 2018). Without efforts to address this concern, Northrop Grumman will be faced with significant recruiting challenges. Our diversity and inclusion commitment is an important element of our education efforts and is integral to the entire STEM education strategy.

### Key STEM Education Partnerships & Programs

Our partnerships focus is on engineering and technology-based initiatives that excite, engage and educate students, with an emphasis on middle school and university level programs. Defending cyber networks, engineering autonomous vehicles and exploring space are just a few examples of the skills students develop as they experience the excitement of STEM through programs we support. Programs such as the Northrop Grumman Foundation Teachers Academy provide professional development opportunities for STEM teachers, who ultimately can inspire and educate the future talent base.

Engagement Level	Education Level	Desired Outcome
Employ	Higher Education	Contribute to the development of a future workforce in disciplines needed to achieve Northrop Grumman strategic goals through a variety of education investments
Educate	Elementary/Secondary/Higher Education	Encourage student interest in STEM disciplines through, education, content and relevant industry connection opportunities for students and teachers
Engage	Informal Education and Elementary/Secondary Education	Develop linkages between formal and informal education to promote STEM and awareness of Northrop Grumman products and associated technologies
Excite	Informal Education	



- Classroom Visits (I) (E) (M) (H)
- Code.Org (T) (M)
- Community College Partnerships (P)
- CyberPatriot (S) (E) (M) (H)
- DiscoverE & Engineers Week (I) (S) (T) (E) (M) (H)
- EarthEcho Expeditions (T) (M)
- High School Internship (S) (H)
- High School Mentoring (S) (H)
- Into the Unknown (I) (E) (M) (H)
- MATHCOUNTS (S) (M)
- Mentoring/Tutoring (I) (E) (M) (H)
- NSBE SEEK (S) (M)
- Northrop Grumman Foundation Teachers Academy (T) (M)
- Real World Science (T) (E) (M) (H)
- Science Festivals/Fairs (I) (E) (M) (H)
- Site Tours (I) (M) (H)
- Space Camp & Space Academy (S) (T) (M)
- Teach for America (T) (E) (M) (H)
- Trade Schools (P)
- University Partnerships (U)
- VEX Robotics (S) (T) (M)
- VIVA Technology (S) (T) (M)
- WolfTrap STEM Learning Through the Arts (S) (T) (E)

#### Key:

##### Focus

- (I) Informal Education
- (S) K-12 Student Focused
- (T) K-12 Educator Focused

##### Grade Level

- (E) Elementary School
- (M) Middle School\*
- (H) High School
- (P) PostSecondary

\*The Northrop Grumman Foundation focuses heavily on middle school

## ***Excite, Engage, Educate – The K-12 Approach***

The Corporate Citizenship organization is responsible for developing and supporting K-12 education programming that prepares students through informal education programs, engages students in STEM technologies and careers, offers professional development opportunities to teachers, and enhances the overall educational experiences for students and teachers. These programs have a direct linkage to company goals for talent and technology development.

Corporate Citizenship's K-12 education mission is to:

- Support K-12 education, primarily STEM programs that align with strategy and focus on technology and engineering, to help ensure a future workforce
- Foster relationships with our customers and support their goals through education outreach activities in communities where we live and work

To accomplish Corporate Citizenship's mission, it is essential to have an established, strategic college readiness and access program. Recognizing that an individual's education must begin early and continue throughout high school, our programming will consist of the following elements:

- Global middle school programming for students coupled with regional partners that support student understanding of STEM, relevancy to coursework, and career awareness
- High School mentoring and intern programming that assists students with career awareness and development goals
- Professional development programming for teachers, with a particular focus on workforce relevant skills to support STEM career pathways
- Informal education programming that reaches the community, and connects us with customer-supported initiatives

## ***Educate and Employ – Trade Schools, Community Colleges and University Partnerships***

Developing partnerships with key trade schools, community college, and universities has a direct effect on the development of the future work force. These relationships influence the curriculum, provide opportunities for exceptional talent and drive the development of research and technology.

### Human Resources and University Relations and Recruiting

The Human Resources (HR) organization, in partnership Corporate Citizenship, establishes strategic partnerships to position Northrop Grumman as the "best work force and best workplace." In order to address the pipeline support from an earlier age, HR, University Relations and Recruiting (UR&R) and Corporate Citizenship will continue strengthen their partnerships and bridging of exceptional high school students in Corporate Citizenship programs to UR&R initiatives.

UR&R, under HR, leverages efforts by Diversity & Inclusion (D&I) and Corporate Citizenship to address the decreased enrollment in STEM fields by investing in opportunities that encourage and nurture students interested in STEM as they advance and complete their education, leading to rewarding careers.

UR&R also focuses on relationships and programs aligned with critical skills and long term business needs at key universities, including Historically Black Colleges and Universities and Hispanic Serving Institutions. Each key university has an executive champion, campus lead and an assigned team that develops, promotes and implements customized education

strategies for the school. Partnerships are also created with two-year technical and community colleges to provide academic and industry-related skills including apprenticeship training as well as to promote STEM transfers to key universities.

### Importance of Trade Schools

Partnerships with strategic trade schools are important to the nature of our business in that they develop and provide instruction and training to develop quality workers in key trade fields.

### Community College Partnerships

Community Colleges provide the educational foundation for many students pursuing in-demand disciplines prior to furthering their education at 4-year colleges and universities. Furthermore, community colleges provide industry relevant trade and 2-year programs that provide the education necessary for success in many of our company's workforce needs.

### Apprenticeships

Northrop Grumman is currently working to develop new apprenticeship programs for a variety of subject areas and locations across the country to build our future workforce. To launch these apprenticeship programs, we're partnering with community colleges to design curriculum, build on the job training, and create new ways to expand the talent pipeline for in-demand skillsets in STEM and advanced manufacturing. Apprenticeships are a great way to "grow your own" employees to address these critical skills gaps. We have some apprenticeship programs that have been around for years and now we're looking at expanding those apprenticeships to additional skills we need in our workforce.

### Aid to Higher Education Philanthropy

The focus of Aid to Higher Education funding includes:

- Building, strengthening and sustaining relationships at universities
- Supporting diversity, engineering, business and technical programs at key universities
- Contributing to the development of student organizations, i.e. SWE, NSBE, SHPE, Institute of Electrical and Electronics Engineers (IEEE)

### *On-Campus Presence*

Northrop Grumman's on-campus presence includes programs and activities such as career fairs, mock interviews, resume workshops, business etiquette seminars, classroom presentations, information sessions, and networking receptions. Campus teams comprised of executive champions, managers, recruiters, alumni, and company employee volunteers are trained in support of enterprise UR&R efforts.

### *Internship and Co-op Programs*

Working with key universities and faculty, our internship and co-op programs invest in talent as follows:

- Learn about the company and our technical capabilities
- Acquire skills and experience through direct assignments and mentorship aligned with students' majors
- Expose intern and co-op students to challenging work that contributes to successful intern conversions
- Expedite assimilation through training and experience
- Leverage intern and co-op students to brand Northrop Grumman and share their positive experiences
- Provide increased relationships with key universities and their faculties

### National and Regional Diversity Engineering Associations

Northrop Grumman supports diversity through its membership in national and regional engineering diversity associations. The mission of these associations is to educate, motivate and enable students to pursue STEM careers. Diversity enriches

our programs, allows us to meet our business objectives and positions our company for success. D&I invests and/or sponsors specific industry-related conferences and symposiums that UR&R also attends to support networking, reinforcing the company brand and accessing to top talent, such as Great Minds in STEM (HENAAC), or the Society of Women Engineers (SWE).

Our partnerships allow us to collaborate with educators and employers to increase STEM interest, they include:

American Indian Science and Engineering Society (AISES)	Great Minds in STEM	National Society of Black Engineers (NSBE)	Society of Women Engineers (SWE)
Black Engineer of The Year Awards (BEYA)	National Association of Multicultural Engineering Program Advocates, Inc.(NAMEPA)	Society of Hispanic Professional Engineers (SHPE)	Student Veterans of America

Our membership assists these organizations in expanding the engineering and business pipelines through pre-college outreach, assisting undergraduate and graduate students in excelling academically, and helping to cultivate future leaders.

Benefits of membership include:

- Accessing and recruiting top talent at national and regional conferences and career fairs
- Providing scholarship awards to students
- Participating in mentoring programs
- Hosting and participating in leadership development events
- Showcasing Northrop Grumman executives and technologies
- Posting jobs and searching for candidates through related databases
- Contributing to employee outreach of pre-college students pursuing studies in a STEM field

### Leveraging Employees and Employee Alumni

We employ a diverse workforce located across the world who have educational experiences across a plethora of academic intuitions. We believe that by leveraging their community engagement, academic pathways and connections to their Alma Mater’s we can maximize our academic and company outreach by:

- Employees can be educated on what we look for when we recruit interns/full-time
  - Timeline of recruitment, so that they are sending us referrals in the early Fall rather than the Spring
  - Hands-on, project based, full system lifecycle extracurricular or projects
  - The types of disciplines that we are seeing a growing need for across all industries
  - The presentation/teamwork/communication skills that we look for
  - The GPA cutoff that we have below which we require a waiver
- Employees can be our advocates
- Employees will always give us referrals, but this could continue to grow the quality of our referrals and help with the timing of referrals
- If there are higher quality referrals, we could have higher acceptance rates and lower attrition rates

As an added benefit beyond employee volunteerism in our STEM outreach, the company offers Community Service Grants on behalf of employees who volunteer with a qualifying school or 501(c)(3) non-profit throughout the year.

## **Strengthening STEM Coordination and Strategy**

While Northrop Grumman initiatives are strategically focused and impactful, they cannot, alone, reform the entire education system. Engagement with policy makers, as well as industry groups with like goals and objectives, and supporting education research all will help to advance and strengthen STEM education.

Government Relations and Business Development are responsible for developing strategic relationships, partnerships and memberships with policy makers, elected officials, trade associations, coalitions, academia, public and private research institutions to help monitor and shape the decision-making processes. Their primary focus is on national and/or international level activities to create advocates and help develop and shape policy positions. Opportunities for shaping education policy also exist at the state and local government levels. These partnerships are strategic in nature and are in support of our global security, work force development, company competitiveness, innovation, and inspiration efforts.

Business Development organizations sponsor programs related to STEM education. These informal education initiatives and programs complement and support Northrop Grumman program objectives in association with customer objectives. Business Development works closely with other Northrop Grumman organizations to ensure an integrated approach in support of Northrop Grumman's education strategy.

By coordinating and leveraging across Northrop Grumman, we can shape policies to improve STEM education, help address our long-term workforce needs, and deepen key relationships with our state, federal, and international partners.

## **Customer Partnerships**

STEM skills and STEM literacy are important to our customers. Many customers have established extensive education initiatives and encourage the development of program-specific education programs and, sometimes, partner or collaborate with the customer on initiatives.

Working in conjunction with Business Development, Corporate Citizenship implements and engages in education opportunities that support our customers' education goals and objectives while reinforcing Northrop Grumman's STEM commitment. This programming includes education exhibits, particularly customer supported conferences, and the development of program-specific educational collateral materials.

## **Charitable Giving**

The company, through its charitable giving program, supports a variety of community-based programs, non-profits, and education institutions and programs. Given the importance of education and the need to develop the pipeline of talent, the Northrop Grumman Foundation's focus is on education, and 50% of the company's charitable giving budget is directed towards STEM education.

## ***The Role of the Northrop Grumman Foundation***

The Northrop Grumman Foundation, a charitable giving arm of Northrop Grumman Corporation, is dedicated to increasing STEM educational opportunities for students so they can fill future workforce needs for talented and diverse professionals. Our partnerships focus on engineering and technology-based initiatives that excite, engage and educate students, with an emphasis on middle school and university level programs. Defending cyber networks, engineering autonomous vehicles and exploring space are just a few examples of the skills students develop as they experience the excitement of STEM through programs supported by the Northrop Grumman Foundation and Northrop Grumman. Programs such as the Northrop Grumman Foundation Teachers Academy provide professional development opportunities for STEM teachers, who ultimately can inspire and educate the future talent base.

Additionally, the Foundation supports Northrop Grumman's employees' passion for education and sharing STEM through our matching gifts for education.

For additional information on Northrop Grumman's education programs, please visit [www.northropgrumman.com](http://www.northropgrumman.com), keyword search: Corporate Responsibility

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