



## NASA Glenn Research Center – Office of STEM Engagement Ohio College & University High School Outreach

Spring 2021 Solicitation

Solicitation posted:	December 10, 2020
Solicitation URL:	<a href="https://paragon-tec.com/funding-opportunities/">https://paragon-tec.com/funding-opportunities/</a>
Proposal form URL:	<a href="https://forms.gle/FWeGBvESVLQaHBFS6">https://forms.gle/FWeGBvESVLQaHBFS6</a>
<b>Proposal receipt deadline:</b>	<b>January 15, 2021, 8:00 PM Eastern Time</b>
Notification of awards:	January 29, 2021
Virtual workshop dates:	February 24-25, 2021
Implementation dates:	February 26, 2021 - August 31, 2021
Final report deadline:	August 31, 2021

### PROJECT OVERVIEW

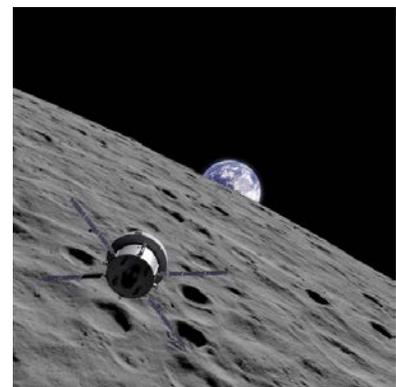
#### OPPORTUNITY DESCRIPTION

In a quest to discover and expand knowledge for the benefit of humanity, NASA continues to push the boundaries on a new era of exploration. NASA plans to send humans back to the Moon and onto Mars. Astronauts once again launch from American soil to the International Space Station to conduct scientific research in orbit. Satellites help scientists learn more about our planet Earth, its weather and the natural world. Space probes study the solar system and beyond and air travel is being revolutionized as improvements are made to all aspects of flight.

This funding opportunity is offered by Paragon TEC, a NASA support services contractor, in collaboration with the NASA Glenn Research Center. Proposals are being requested from Ohio Colleges and Universities with existing high school programs at the time of this solicitation opportunity. The purpose of the program is to offer science, technology, engineering, and mathematics (STEM) learning experiences that connect NASA scientists, engineers, and mission content with eligible programs.

This solicitation is requesting proposals to:

- Develop a plan to implement STEM content in existing programs supporting students in grades 9-12
- Conduct chosen NASA activities between February 26, 2021 and August 31, 2021
- Sustain efforts to integrate NASA content into programs in the future



*Figure 1: Artist Rendition of Orion above the surface of the Moon as the Earth rises in the distance.*

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This opportunity will provide institutions with:

- Funding (up to \$10,000.00) for materials and supplies needed to implement Next Generation STEM (NGS) and Global Learning and Observations to benefit the Environment (GLOBE) content with students
- NASA activity content documents and resources
- Help desk support to assist educators as needed in facilitating the content
- Opportunities for live, web-based connections with NASA scientists and engineers

Awardees will be granted select access to NASA's unique resources and subject matter experts as part of mentorship, and/or public-facing activities. Additionally, awardees will receive training and support related to: relevant STEM content, NGS as well as GLOBE products and opportunities. The content received via this opportunity will allow students to work on real-world problems in a collaborative, team-based environment. Students apply lessons learned to solve problems that STEM professionals may face, while gaining a deeper knowledge of how NASA is a part of their everyday lives.

This competitive opportunity is open only to eligible Ohio Colleges and Universities with existing high school programs at the time of this solicitation offer. Funds (up to \$10,000.00 per awardee) will assist and support eligible awardees in achieving their, as well as, OSTEM program goals and enhance the skills and expertise of their students, staff and program directors. Funding from this opportunity may not be utilized to supplement funding for a program, grant, or opportunity currently funded by NASA.

Funding will be awarded through a competitive application process in which up to 10 awards may each receive up to \$10,000.00. Based on available funding, Paragon TEC, Inc., the support services contractor for this opportunity, will issue awards on behalf of NASA. NASA may elect to make full or partial awards based on proposals received.

## BACKGROUND

### **NASA GLENN'S OFFICE OF STEM ENGAGEMENT**

NASA Glenn's Office of STEM Engagement delivers tools for young Americans and educators to learn and succeed. The office seeks to create unique opportunities for students and the public to contribute to NASA's work in exploration and discovery; build a diverse future STEM workforce by engaging students in authentic learning experiences with NASA people, content, and facilities; and strengthen public understanding by enabling powerful connections to NASA's mission and work. To achieve these goals, NASA's Office of STEM Engagement strives to increase K-12 involvement in NASA projects, enhance higher education, support underrepresented communities, strengthen online education, and boost NASA's contribution to informal education. The intended outcome is a generation prepared to code, calculate, design, and discover its way to a new era of American innovation. For more information about STEM engagement at NASA Glenn Research Center, visit <https://www.nasa.gov/centers/glenn/stem>.

### **OBJECTIVES AND STEM ENGAGEMENT STRATEGIES:**

This activity aligns to the agency's goals and objectives for STEM engagement as listed below:

Goal 2.0: Build a diverse future STEM workforce by engaging students in authentic learning experiences with NASA's people, content and facilities.

2.1 Develop and deploy a continuum of STEM experiences through authentic learning and research opportunities with NASA's people and work to cultivate student interest, including students from underrepresented and underserved communities, in pursuing STEM careers and foster interest in aerospace fields.

Goal 3.0: Attract diverse groups of students to STEM through learning opportunities that spark interest and provide connections to NASA's mission and work.

3.1: Develop and deploy targeted opportunities and readily available NASA STEM engagement resources and content, to attract students to STEM.

### **NEXT GEN STEM**

NASA's Office of STEM Engagement executed a series of efforts to develop STEM products and opportunities that provide a platform for students to contribute to NASA's endeavors in exploration and discovery. These mission-driven activities include over 20 evidence-based products and opportunities to engage students in authentic STEM experiences. NASA is working to provide mission driven opportunities that enhance STEM literacy and help build a vibrant and diverse next generation STEM workforce.

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**NASA OFFICE OF STEM ENGAGEMENT CONTENT SUMMARY**

NASA's Office of STEM Engagement developed STEM products and opportunities aligned with national standards and NASA goals and objectives. These products and opportunities provide a platform for students to experience NASA's endeavors in exploration and discovery, while fostering their innovation. The following table provides an overview of three content areas to be utilized in this solicitation: Commercial Crew Program (CCP), Moon to Mars (M2M), and Global Learning and Observations to Benefit the Environment (GLOBE).

**NASA CONTENT SUMMARY**

Content Area	Synopsis
<p><b>Commercial Crew Program (CCP)</b></p> <p>NASA's Commercial Crew Program is working with Boeing and SpaceX to design, develop, and test systems to send astronauts to the International Space Station. NGS CCP has a toolkit of resources for K-12 educators that includes engineering challenges, coding, digital badging, virtual reality, and more.</p>	<p>In this content area, two activities are available:</p> <ul style="list-style-type: none"> <li>• <a href="#"><b>Crew Orbital Docking (CODing) Simulation</b></a> [suggested time 1-2 hours]: Students will use Scratch, Snap!, or another programming language to create an interactive simulation of a spacecraft docking to the International Space Station.</li> <li>• <a href="#"><b>Eggstronaut Parachute Challenge</b></a> [suggested time 3-5 hours]: Students will design and build parachutes to slow the descent of an egg and minimize the force of impact when landing.</li> </ul>
<p><b>Moon to Mars (M2M)</b></p> <p>Next Gen STEM has activities focused on NASA's Exploration Campaign for Moon to Mars to send humans farther into space and bring back to Earth new knowledge and opportunities. NGS M2M focuses on NASA's integrated transportation systems and platforms, namely the Orion capsule, the Space Launch System (SLS) rocket, and the Gateway Lunar Outpost.</p>	<p>Challenge will take place in Spring/Summer 2021 tentatively starting May 2021. <b>Organizations who choose this content area must adhere to all challenge rules and guidelines.</b></p> <ul style="list-style-type: none"> <li>• <a href="#"><b>App Development Challenge (ADC)</b></a> [suggested time 30-40+ hours]: NASA's App Development Challenge (ADC) is a coding challenge where NASA presents technical problems to students seeking student contributions to future exploration missions. By responding to the App Development Challenge, students take a part directly in the <a href="#"><b>Artemis Generation</b></a> endeavors to land American astronauts, including the first woman and the next man, on the Moon by 2024.</li> </ul>
<p><b>Global Learning and Observations to Benefit the Environment (GLOBE)</b></p> <p>The GLOBE Program is an international science and education program that provides students and the</p>	<p><b>In this content area, both activities must be completed together.</b></p> <ul style="list-style-type: none"> <li>• <a href="#"><b>GLOBE Observer App: Land Cover</b></a> [suggested time 1-2 hours]: By photographing and classifying the land cover over an area the size of a soccerfield, students will be</li> </ul>

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Content Area	Synopsis
public worldwide with the opportunity to participate in data collection and the scientific process, and contribute meaningfully to our understanding of the Earth system and global environment.	assisting those scientists working to enhance global maps of land cover use with a finer spatial resolution than is possible when using satellites alone. <ul style="list-style-type: none"><li>• <a href="#">My NASA Data: Creation of Urban Heat Islands Story Map</a> [suggested time 2-3 hours]: Using various visualizations (i.e., images, charts, and graphs), students will explore the <i>urban heat island effect</i> using land surface temperature and vegetation data.</li></ul>

NASA has selected content from each of these areas as part of this opportunity. Eligible institutions may select activities from one or more of these content areas. Each of these activities provides students with content that allows them to work on real-world problems in a collaborative, team-based environment. While gaining a deeper knowledge of how NASA is a part of their everyday lives, students will apply lessons learned to solve problems that STEM professionals may face. The following design principles, guided development of these and other NASA STEM opportunities:

- Provide a platform for students to contribute to NASA's endeavors in exploration and discovery;
- Develop mission-driven authentic STEM experiences;
- Align with national STEM education standards;
- Use evidence-based practices; and
- Scale through partnerships and networks.

Applicants are encouraged to visit each link to NASA's mission-focused activities to learn more about available experiential learning opportunities and available lesson plans. Applicants are also encouraged to integrate content from more than one mission-focused activity.

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**ELEMENTS OF A QUALITY STEM PROGRAM**

Leading research indicates that quality STEM programs should include learner-centered, participatory activities that provide opportunities for participants to engage in STEM practices, explore their interests, and identify with STEM professionals. Activities should reflect the nature of STEM program learning environments by providing opportunities for choice, autonomy, ownership, active involvement, wonder, and discovery. Activities should be age appropriate, varied, interesting, enjoyable, challenging, connected to real work, and flexible (Fredricks, 2011; Graves, 2016; Kesidou & Koppal, 2004; PEAR, 2016; Stocklmayer, Rennie, & Gilbert, 2010). The NASA NGS content for this opportunity was developed to align to these best practices and support organizations that are equipped to provide high-quality STEM programming. Additional information on current research related to quality STEM learning can be found at the National Research Council's, [Identifying Supporting Productive STEM Programs in Out-of-School Settings](#).

**NASA RESOURCES**

- Next Gen STEM Main <https://www.nasa.gov/stem/nextgenstem/index.html>
  - Commercial Crew [https://www.nasa.gov/stem/nextgenstem/commercial\\_crew/index.html](https://www.nasa.gov/stem/nextgenstem/commercial_crew/index.html)
  - Moon to Mars [https://www.nasa.gov/stem/nextgenstem/moon\\_to\\_mars/index.html](https://www.nasa.gov/stem/nextgenstem/moon_to_mars/index.html)
- The GLOBE Program <https://www.globe.gov>
- NASA for Educators <https://www.nasa.gov/audience/foreducators/index.html>
- NASA - Search Educational Resources <https://www.nasa.gov/education/resources>

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## ***BENEFITS FOR PARTICIPATING ORGANIZATIONS***

### **VIRTUAL FACILITATOR WORKSHOP**

Facilitators or staff trainers will be provided a required multi-day virtual facilitator workshop by Education Specialists and hosted by NASA Glenn Research Center. The workshop will consist of multiple virtual webinar segments, occurring February 24-25, 2021.

- Organizations will propose one or more facilitators to attend the virtual workshop. Proposing organizations should consider reasonable facilitator-to-student ratios when proposing the number of facilitators to be trained.
- Awardees may also have access to web-based training sessions during implementation. Programs must have the hardware capability to connect virtually.

Awarded organizations will confirm their workshop attendance upon notification of award.

- Some content may be provided for facilitators to review in advance of workshop attendance, in the form of webinar sessions, instructional videos, or document reviews outlining characteristics of programming or demonstrating specific technology platforms to be used during the workshop.
- Sessions during the virtual workshop will focus on the required NASA content. Participants will have the opportunity to work through the content to gain knowledge on execution of activities, STEM learning background information, and delivery techniques.

### **FUNDING**

Awarded institutions will receive funding to supplement costs of materials and supplies to implement NASA STEM content. Organizations can have an unlimited number of students and facilitators participate in NASA programming; however, total funding provided through this opportunity for student materials and equipment will not exceed \$10,000.00. Upon successful completion of the facilitator workshop, the initial 75% of funding will be provided. The remaining 25% of materials support will be provided upon successful submission of final reporting requirements due by August 31, 2021.

### **TECHNICAL ASSISTANCE AND SUPPORT**

Paragon TEC will provide technical support to awardees based on their unique needs, including:

- **Help desk support** – Awardees will receive support as needed throughout implementation via email and/or phone conversations with NASA education specialists.
- **Collaborative content development** – Facilitators may need to customize the NASA STEM content to meet their students where they are, NASA education specialists can provide advice about such modifications. This will cultivate student interest and engagement in STEM and prevent frustrations the facilitators or students might experience.
- **Collaboration opportunities with NASA scientists and engineers** – As a collaborating institution with NASA, NASA scientists and engineers can talk directly with students via phone or a web-based platform to discuss the scientific and engineering concepts related to the NASA STEM content and their STEM careers. Each awarded

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site will be expected to participate in one virtual subject matter expert event during implementation, contingent on the availability of NASA's subject matter experts.

## **ELIGIBILITY REQUIREMENTS**

*This solicitation seeks:*

- Organizations located in Ohio with existing high school programs.
- Organizations that will reach students in 9<sup>th</sup> to 12<sup>th</sup> grade. Greater consideration is given to organizations who are able to reach underrepresented and underserved students. For purposes of this solicitation, groups underrepresented in STEM fields include Hispanics and Latinos, African Americans, American Indians, Alaska Natives, Native Hawaiians and Pacific Islanders, the economically disadvantaged, people with disabilities, and women and girls.
- Organizations that will facilitate the entire chosen NASA content during the timeframe of February 26, 2021 through August 31, 2021.
- Organizations that can recruit and retain the proposed number of students through the full NASA activity implementation. Organizations with greater student reach are highly desirable.
- Organizations who are committed to providing their staff with professional development opportunities, including the virtual facilitator workshop.

*The proposed program must:*

- Serve students in grades K-12.
- Provide all proposed students with the chosen NASA content and needed equipment to implement across the digital divide.
- Be conducted during the implementation period of February 26, 2021 through August 31, 2021.

*Selected organizations must agree to the following:*

- One or more designated facilitators must participate in the virtual training session hosted by NASA Glenn's Office of STEM Engagement's Education Specialists February 24-25, 2021.
- Organizations must complete their chosen NASA content with the number of students written in their proposal.
- Organizations must provide a final report and any potential NASA content adaptations created as a result of the solicitation.

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*Evaluation Requirements:*

All awarded organizations must provide a final data report. Details and reporting template will be provided to awarded organizations. The final data report must include the following:

- A brief narrative of the implementation of the activities with the students
- Student and facilitator participation data (anonymized)
  - Number of students (by each grade level)
  - Number of educators/facilitators (certified teachers, pre-service teachers, informal educators)
  - Demographic data (gender, ethnicity, and race)
- Model of implementation
  - When did the program take place (after school every day, half-days on Saturday, etc.)?
  - How were NASA content activities used?
    - Any NASA content adaptations created for implementation
  - When did virtual connections with NASA scientists and engineers occur?
- Signed budget summary
- Stories, images and media release forms of all participants whose likenesses are featured
- Any partnerships and/or collaboration data pertaining to the NASA content implementation

Selected sites may be asked to participate in one or more of the following evaluation activities to help improve NASA's STEM programming opportunities. By applying, your organization agrees to participate in the following:

- Complete facilitator surveys
- Participate in focus groups between NASA evaluators and site facilitators
- Have students complete participation surveys

## ***SUBMITTING YOUR PROPOSAL***

All proposals are to be submitted through the online proposal form, which is located at [link](#). Proposals must be submitted by 8:00 PM Eastern on January 15, 2021. Only proposals submitted online will be accepted.

Proposals must be completed in full at the time of submission, so it is encouraged to prepare responses prior to beginning the online proposal form. A list of the proposal form questions for reference is available [here](#).

A budget document must be submitted as part of your proposal, indicating both funds requested from NASA and a description of any funds or supplies to be leveraged from other sources. An editable budget template is available [here](#). The Facilitator Travel category does not apply to this opportunity and should be left blank.

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## PROPOSAL REVIEW PROCESS

Proposals are reviewed by a panel of experts. Full or partial awards may be granted. Award funds are distributed after participation in the virtual facilitator workshop.

Proposals will be evaluated to determine likelihood of project success using the following criteria:

- Number of proposed student participants
- Total hours dedicated to NASA STEM content during the session for a typical student
- Plans to recruit and retain underrepresented and underserved student participation in the program
- Reasonability of funding requested based on expected numbers of participants and leveraging of additional resources beyond this solicitation
- Plans to sustain efforts beyond the award period and scaling to more participants in the future

Proposing organizations will be notified of their award status by January 29, 2021.

## AWARD ADMINISTRATION INFORMATION

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## POINT OF CONTACT

If you have questions about the project or the online proposal form, contact:  
NASA Glenn Research Center Office of STEM Engagement  
[GRC-Ed-Opportunities@mail.nasa.gov](mailto:GRC-Ed-Opportunities@mail.nasa.gov)