Overview: VIRTEX (VIRtual Trips to EXtreme Environments) is an informal education program supported by NASA Next Gen STEM, a project of NASA’s Office of STEM Engagement (additional information at www.lpi.usra.edu/education/VIRTEX). VIRTEX is a three-year program that began in Summer 2023. Over the lifetime of the project, VIRTEX aims to engage teams of middle school-aged (10-15 years old) learners at approximately 100 Boys & Girls Clubs in historically minoritized communities throughout the nation, ultimately reaching more than 1000 individuals. The program will connect middle school-aged learners around the country with NASA-inspired STEM activities, career development resources, and their very own “NASA Mentor.” Through VIRTEX, young learners will build an increased interest in STEM career paths and will develop their personal STEM identities as they learn about exciting NASA research, engage in collaborative, hands-on activities, develop new skills, and get to know their NASA Mentor through virtual interactions.

VIRTEX is led by the Lunar and Planetary Institute; partners include the Texas Alliance of Boys & Girls Clubs, NASA Johnson Space Center’s Astromaterials Research and Exploration Science (ARES) Division, the University of Alaska’s Geophysical Institute which operates Poker Flat Research Range on behalf of NASA Wallops, the Antarctic Search for Meteorites program (ANSMET), NASA’s Astrobiology Program, the Haughton Mars Project (HMP), BlacknAstron, GeoLatinas, and Blue Marble Space Institute of Science. VIRTEX will be evaluated by Dr. Sanlyn Buxner, Planetary Science Institute.

NASA Mentors: VIRTEX will recruit approximately 50 STEM professionals to act as “NASA Mentors” over the lifetime of the program. Scientists, engineers, technicians, etc., who (a) have received NASA funding (currently or in the past) and (b) conduct, or plan to conduct, research in an “extreme environment” are eligible and encouraged to apply. “Extreme environments” are broadly interpreted, with examples like remote field locations or unique laboratory settings, from aircraft, mountain tops, underwater test sites, and more. After being accepted as a VIRTEX NASA Mentor, scientists will be added to an online database accessible only to VIRTEX administrators and participating Boys & Girls Clubs. Mentors will receive invitations to match with one or more Clubs. If there is mutual availability and interest, the Mentor can choose to accept the invitation, at which point they will begin working with the Club to schedule their virtual interactions. Mentors will not be expected to prepare presentations, lessons, or activities, and no in-person interactions are required. STEM professionals, especially those with diverse identities, are invited to participate in the program. Prior to being paired with a student group, Mentors will receive training about best practices in providing virtual mentorship.

Mentors will connect with their paired Club(s) through synchronous and asynchronous virtual interactions, including three video conference sessions in which students will interview their Mentor to learn about their educational and professional pathway, their research, and their identity as a scientist. One video conference session is expected to take place in the Mentor’s “extreme environment” as a type of guided, virtual tour. This interaction will help to inspire the learning cohort and illuminate the wide diversity of research settings and STEM pursuits. Mentors will answer questions, share their insights and experiences, and act as a STEM role model, positively impacting students’ self-confidence and interest in pursuing STEM careers.

In preparation for and support of the interactions with their NASA Mentor, learning cohorts of 10–20 students will engage in STEM and career activities throughout the VIRTEX program. Clubs will receive training in how to access and implement activity materials. Over the course of about a two-month period, participating Boys & Girls Clubs will be expected to implement 4–8 VIRTEX activity modules geared toward building skills, inspiring curiosity, and expanding learners’ awareness of STEM career pathways and what it means to be a scientist. Following interactions with their Mentors, students will create video essays to share with their communities, highlighting what they have learned and how it informs their future career paths.

Motivation: Studies show that most students have a limited understanding of STEM career pathways and frequently lack access to stimulating STEM experiences and culturally relevant role models [1, 2]. Further, students from low socioeconomic households are less likely than peers from higher income households to benefit from out-of-school learning experiences, which can spark or strengthen a young person’s curiosity and confidence about pursuing STEM [3, 4]. To help address these gaps and disparities, VIRTEX aims to bring the excitement of NASA research to diverse communities throughout the country by partnering with Boys & Girls Clubs, organizations which provide free, voluntary programs for youth through thousands of local chapters.
VIRTEX will help students develop skills to formulate questions, problem-solve, collaborate as a team, and communicate their ideas. Embedded in the programming will be activities and discussions that raise learners’ awareness of science as human endeavor, as something that is pursued by unique individuals from all cultures and backgrounds who possess a wide variety of talents, skills, and identities. As a learning cohort progresses through the program, they will learn how to ask questions to gain a better understanding of their Mentor’s skills, research interests, and career pathway. Students will hear about the challenges that their Mentors have faced and how they overcame them. These discussions will help to reinforce the students’ understanding of how science is conducted, normalize challenges and struggles, and strengthen students’ own STEM identities.

**Progress:** In the Fall of 2023, a Co-Design Workshop was organized by VIRTEX team members to collaborate with representatives from Boys & Girls Clubs. A major goal of the workshop was to develop an informed understanding of the mission, resources, and needs of these stakeholders to ensure that VIRTEX program elements are designed with intentionality and alignment. Informal education practitioners from thirteen different Boys & Girls Clubs participated in the two-day workshop, which included presentations, activity demonstrations, and discussions (Figure 1).

**Outcomes:** VIRTEX programming will promote youth and scientist engagement and support beyond the duration of the project:

- More than 1,000 young learners in acquiring knowledge of NASA research, developing new skills, strengthening their personal STEM identities, and increasing their interest in STEM careers.
- More than 50 NASA-funded scientists, engineers, and technicians in acting as NASA Mentors and growing as role models, gaining skills and confidence that can facilitate future mentoring activities.
- The development of relevant, free, and widely accessible activities and resources for use by other informal education practitioners or NASA Centers.

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Pilot testing for the VIRTEX program will begin in the Spring of 2024, with a limited number of Clubs and Mentors participating in testing program materials, trainings, and implementation plans. The full VIRTEX program is expected to launch in the Summer of 2024.