



A program of the
National Center for Earth and Space Science Education (NCESSE)
and the Arthur C. Clarke Institute for Space Education

Student Spaceflight Experiment Program (<http://ssep.ncesse.org>)

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Arthur C. Clarke Institute for Space Education (<http://clarkeinstitute.org>),
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*Created to address U.S. Strategic Need in Workforce Development for the 21st Century:
a high caliber STEM education program tuned to Next Generation Science Standards; designed as a
pedagogical model for inspiring and engaging the next generation of American scientists and
engineers; utilization of the International Space Station for STEM education; a bold commercial space
venture*

The Student Spaceflight Experiments Program (SSEP) was launched in June 2010 by the National Center for Earth and Space Science Education (NCESSE). Designed as a model U.S. national Science, Technology, Engineering, and Mathematics (STEM) education initiative, the program gives students across a participating community the ability to design and propose real microgravity experiments to fly in low Earth orbit (experiments conducted in a “weightless” environment). SSEP was first carried out aboard the final two flights of the U.S. Space Shuttle Program in 2011 (STS-134 Endeavour, STS-135 Atlantis). In 2012 SSEP transitioned to operations on the International Space Station (ISS) – America’s newest National Laboratory.

- SSEP is suitable for students in pre-college grades 5-12, 2-year community colleges, and 4-year colleges and universities. For pre-college grades 5-12, each community typically engages 300+ students (at least 100) in microgravity experiment design and proposal writing. For an undergraduate community, it is expected that at least 20 students will be engaged.
- Each community participating in SSEP is provided a flight slot to fly one student team designed microgravity experiment to ISS where it is operated by the astronauts.
- Mirroring how professional research is done, each community conducts a **Flight Experiment Design Competition**, where student teams (typically 50-80 teams in a pre-college community) each submit a formal proposal for a microgravity experiment. All proposals go through a formal review to select the flight experiment for the community. The design competition – from program start, to experiment design, to submission of proposals by student teams – runs 9 weeks.
- True STEM Education Initiative: real experiment design across all science disciplines (physical, chemical, and biological); seamless fusion with technology, engineering, and mathematics; required interdisciplinary skills: technical writing, oral communication, and art and design.
- Systemic Initiative: applicable across an entire school district, addressing state and local strategic needs in STEM education, Next Generation Science Standards, and applicable across grades 5-16.

*SSSEP is the best real life application program
that my students have ever experienced*

*- Alison Thammovongsa, 7th grade science
teacher, Peoria Unified School District*

- Community Engagement Model for STEM Education: SSEP is designed to engage students across grades K-16, teachers, families, civic and business organizations, and research institutions.
- Track Record: 23 SSEP flight opportunities have been undertaken since program inception in June 2010 with **257 participating communities** in the U.S. (reflecting 42 States and the District of Columbia), Canada (5 Provinces), Brazil, Portugal, and Ukraine.

Data available through the first 22 opportunities: **169,300 grade 5-16 students** were fully immersed in microgravity

experiment design and proposal writing; and **32,604 flight experiment proposals** were received from student teams. To date, **421 experiments have flown** on the final two Space Shuttle flights and to ISS on commercial vehicles, with **25** more flying in Spring/Summer 2026.

This might be the best experience I have ever had. The opportunity to work with others that enjoy science as much as I do was great. It opened my eyes to how the scientific method is used in real life. This has shown me that if you work as a team and bounce ideas off each other you can accomplish anything.

- Alex A., Grade 8, Mendenhall MS, Guilford

- Authentic Immersion in Scientific Research: SSEP precisely models the breadth and depth of real research by the professional community, including definition of a research program by a research team with PIs, Co-Is and Collaborators; writing proposals against a real proposal guideline with a formal evaluation rubric; a real 2-step proposal review process; formal NASA flight safety review for selected experiments; and an annual research conference at NASA's Kennedy Space Center.
- Deep Investment in Partnership: over 1,600 Local Partners, including: school districts, private schools, 34 NASA Space Grant lead colleges and universities, businesses, foundations, private philanthropists, and local research institutions providing science advisors.
- High Profile National Partners: Smithsonian National Air and Space Museum, Nanoracks, International Space Station (ISS) National Laboratory
- High Profile Program: garnering significant media coverage at local, regional, and national levels, over 1,500 articles to date; transport to the International Space Station aboard next generation commercial carriers: SpaceX Dragon, from Kennedy Space Center, FL, and Northrop Grumman Cygnus, from the Mid-Atlantic Regional Spaceport, VA; student delegations at launches; experiments aboard U.S. National Lab on the International Space Station and overseen by the astronauts.
- Breaking New Ground in Commercial Space: SSEP is the first pre-college STEM education program that is both a U.S. national initiative and implemented as an on-orbit commercial space venture.
- Expansion internationally in 2012, with 16 communities that have participated in Canada (Manitoba, Ontario, Alberta, Nova Scotia, and British Columbia), and national programs in Brazil, Portugal, and Ukraine.

The Student Spaceflight Experiments Program is a program of the [National Center for Earth and Space Science Education \(NCESSE\)](#) in the U.S. and the [Arthur C. Clarke Institute for Space Education](#) internationally. It is enabled through a strategic collaboration with [Rhodium Scientific](#), America's first commercial space biotech company, working with NASA through a CASIS Agreement to utilize its facilities aboard the International Space Station. [The International Space Station \(ISS\) National Laboratory](#) is a National Partner on the Student Spaceflight Experiments Program.