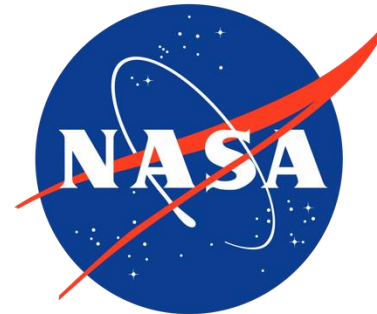


A Collaboration to Broaden Access to Space

Session goal: High-level overview of the different funding opportunities (education & tech development) available to Faculty & Students

- Be quick – 📷 Take pictures of websites & QR codes as the pace will be brisk
- Tomorrow's session – Students who have gone through some of the programs will present their project/experiences tomorrow **Thu, August 8, 2024 9:45-10:45AM MT**



U.S. National
Science
Foundation



University SmallSat Development Roadmap

SmallSat Education Opportunities

Flight Opportunity (FO) TechRise

- Grades 6-12
- 2U payload on suborbital vehicle (sounding rocket, high-altitude balloon, rocket powered lander, or rocket vehicle)

\$ Hardware Development,
Suborbital Test & Training

Mission Concept Program

- University
- Summer Program
- Intro to Mission Design/Concept

\$ Education / Training

University Nanosatellite Program (UNP) Cycle

- University
- Solicitation available Every 3 Years

\$ Hardware Development & Launch

\$ varies

S3VI

*Best Practices
Guidebook*

**Space Grant
Consortium**



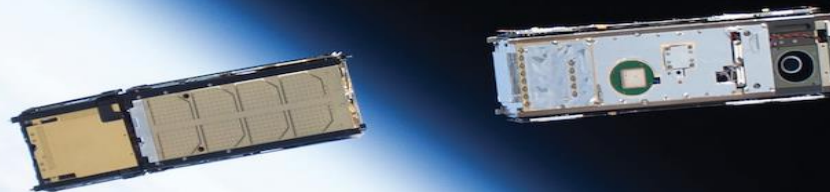
SmallSat Science & Technology Development and Flight Test Opportunities

- SST University SmallSat Technology Partnerships (SST-USTP)
- SBIR / STTR Phase 1 and 2 with companies (SST)
- SMD Science & Technology Missions
- NSF
- PI Launchpad

\$ Hardware Development

- FO TechLeap Challenge
- FO TechFlights Solicitation (REDDI)
- Space Grant opportunities
 - RockSat**
 - HASP**
- EPSCoR

\$ Hardware Development and
\$ Suborbital Test



Ride to Space

- CubeSat Launch Initiative (CSLI)
- AFRL Space Technology Program (STP)
- Flights of Opportunity (Hosted Orbital)
- SST Mission of Opportunity (Free Fliers)

\$ Launch



National Space Grant College and Fellowship Program

Jose Nunez
TSC Ballroom
Booth 17 KSC/CSLI

Promoting the understanding of and participation of Universities in NASA's aeronautics and space projects by supporting and enhancing science and engineering education, research and public outreach efforts.

- Includes over 1250 affiliates and partners from universities, colleges, industry, museums, science centers, and state and local agencies.
- Every State and U.S. Territory has a Space Grant Consortium, each with unique programs tailored to that State/Territory
 - Includes: Undergraduate & Graduate Fellowships; Faculty Research; Senior Design Projects; NASA Internships; Hands-on experiences including launch vehicle and payload development, engineering challenges, space flight operations, & remote sensing; Ballooning Programs; Small Sat Initiatives.
- Major solicitations are published through NSPIRES (<https://nspires.nasaprs.com/external/>)
- Funding varies depending on the specific project
- **Website:** <https://www.nasa.gov/learning-resources/national-space-grant-college-and-fellowship-project/>





NASA Established Program to Stimulate Competitive Research (EPSCoR)

Jose Nunez
TSC Ballroom
Booth 17 KSC/CSLI

EPSCoR establishes partnerships with government, higher education and industry that are designed to effect lasting improvements in a state or region's research infrastructure, research and development capacity, and its national research and development competitiveness. Spans six federal agencies.

- 28 eligible jurisdictions (States or regions)
- Provides awards, designed to establish partnerships between government, higher education, and industry
- NASA EPSCoR Research Components:
 - Research Solicitation
 - Research Infrastructure Development (RID)
 - International Space Station (ISS) Flight Opportunity
 - Suborbital Flight Opportunity (SFO)
 - Rapid Response Research (R3)
 - Award amount: \$125k
 - Solicitation Opens: Nov/Dec 2024



Website: <https://www.nasa.gov/learning-resources/established-program-to-stimulate-competitive-research/>

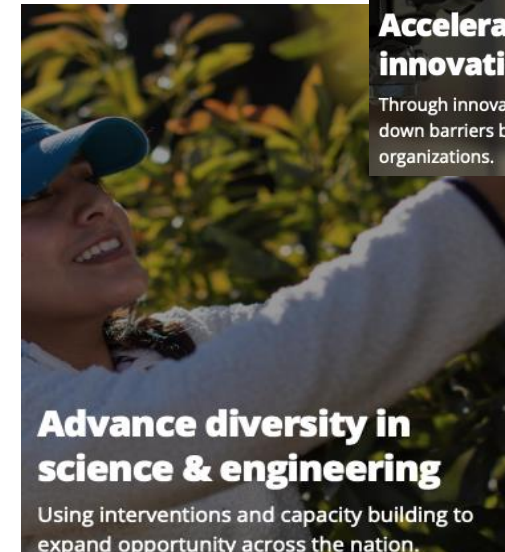
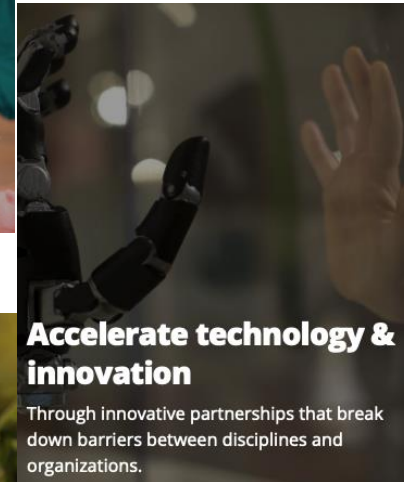
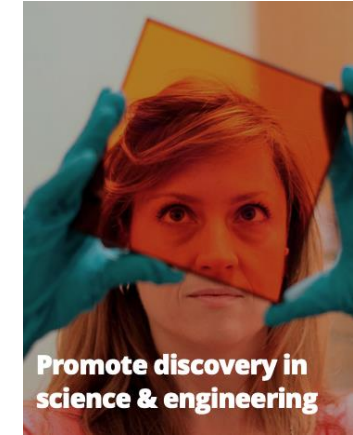


U.S. National Science Foundation (NSF)

Jose Nunez
TSC Ballroom
Booth 17 KSC/CSLI

NSF offers principal investigators (PIs) resources for Research Grants, Facilities and Equipment, Collaborative Opportunities, Educational and Outreach Programs, Career Development, Data and Resources, and Administrative Support.

- Eligibility criteria varies depending on the program or solicitation.
- Getting involved:
 - PIs are encouraged to contact NSF program officers if they are thinking of proposing small sat missions or concepts to NSF programs.
 - Search for a program officer(s) managing the program most closely associated with the PI's research topic (<https://new.nsf.gov/science-matters/nsf-101-5-tips-how-work-nsf-program-officer>)
 - Utilize the the NSF Program Suitability & Proposal Concept Tool (ProSPCT) (<https://suitability.nsf.gov/s/>)
- NSF Example Funded Missions:
CANVAS, IMPRESS, SWARM-EX, TRYAD, VISORS
- **Website:** www.nsf.gov





Small Spacecraft Systems Virtual Institute (S3VI)

Bruce Yost (NASA)
TSC Ballroom
Booth 9-10 STMD

S3VI facilitates collaboration, information sharing, and innovation among NASA, academia, industry, and other stakeholders to advance space and solar system exploration.

Sharing Knowledge

- SmallSat LEARN Forum
- Community of Practice
- Access to Space Announcements
- S3VI Quarterly Newsletter
- CubeSat 201

Connecting People and Ideas

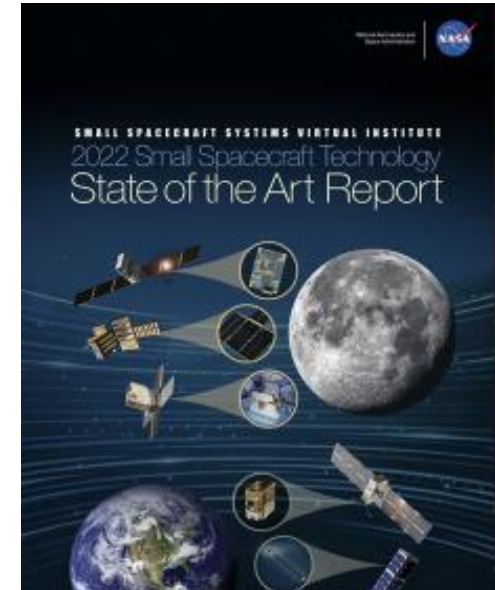
- Industry Days Webinar Series
- SmallSat Technology Partnerships – Tech Expo
- Cross-Agency Collaboration

Building Tools

- Small Spacecraft Reliability Initiative Knowledge Base Tool
- Small Spacecraft Information Search
- State of the Art Report
- Space Mission Design Tools Collection
- Anomaly Alert Reporting System

*Identifying Emerging
Technology Opportunities*

*Promoting Innovative
Concepts*



Website: www.nasa.gov/smallsat-institute/



Space Technology Research Grants Program (STRGP)

Bruce Yost (NASA)
TSC Ballroom
Booth 9-10 STMD

STRGP accelerates the development of low TRL space technologies to support future space science and exploration needs of NASA, other government agencies, and the commercial space sector.

Space Tech Graduate Research (NSTGRO)

- Fellowship opportunity focused on graduate student research and development of advanced and innovative space technologies critical for our Nation to meet its goals to explore and understand the Earth, our solar system, and the universe.
- Open to US citizens/nationals/permanent resident alien students seeking advanced degrees related to space technology
- Award up to \$84K annually for up to 4 years
- ~50 – 60 awards annually

Early Career Faculty (ECF)

- Supporting outstanding faculty researchers early in their careers as they conduct space technology research of high priority to NASA's Mission Directorates.
- Open to untenured Assistant Professor on the tenure track at the sponsoring U.S. accredited university
- TRL 1 or 2
- Award up to \$600K total over 3 years (max)
- ~5 – 10 awards annually

Early Stage Innovations (ESI)

- Development of innovative, early-stage space technology research of high priority to NASA's Mission Directorates
- Open to accredited U.S. universities
- TRL 1 or 2, Topic Specific
- Award up to \$750K over 3 yrs max
- ~5 awards, annually

Lunar Surface Technology Research (LuSTR)

- Development of early- to mid-TRL lunar surface technologies of high priority to NASA's Mission Directorates
- Open to accredited U.S. universities
- TRL 2-4
- Award up to \$2M over 2 years (max)
- ~4 awards, annually

Space Technology Research Institutes (STRI)

- Research and exploitation of cutting-edge advances in technology with the potential for revolutionary impact on future aerospace capabilities.
- Open to accredited U.S. universities
- TRL 2
- Award up to \$15M over 5 years (max)
- ~2 awards, every 2 years

Website: www.nasa.gov/space-technology-research-grants/



Mission Concept (MC) Program

Lee Jasper (SDL/AFRL)
info@universitynanosat.org

Helping Schools & Students Get Ready for Space Opportunities

- Joint Air Force / NASA “Bootcamp” for Small Sats
- Eligibility: All U.S. Universities & Colleges
- Solicitation opens every January for the subsequent Summer
- # of Awards: 7-8 Universities
 - Approximately three (3) students from each school selected will be paid as an intern
 - Timeline: May thru July
 - Minimum of \$40k to selected universities
 - Travel/fees to events, housing and rental car during internship in Albuquerque, PI time, etc.
- Website: <https://universitynanosat.org/solicitation/>



AFRL Image






University NanoSatellite Program (UNP)

Lee Jasper (SDL/AFRL)
info@universitynanosat.org

Mission Statement: To support university students and programs to design, build, launch and operate small satellites to provide education centered on systems engineering principles and practices.

- Multi-year program for universities to design, build, and fly a small satellite of relevance to the DoD
- Eligibility: All U.S. Universities & Colleges
- Solicitation September for January 2025 start
- # of Awards: ~10 Universities
 - Student-led teams design and build mission with guidance and reviews from industry and government professionals
 - Timeline: Phase A, Jan 2025 – Jan 2027
 - ~\$220k to selected universities
 - Travel/fees to events, hardware, PI time, student time, etc.
- Website: <https://universitynanosat.org/solicitation/>



Education

- Systems engineering training
- Workforce development
- Foundation for all UNP decisions



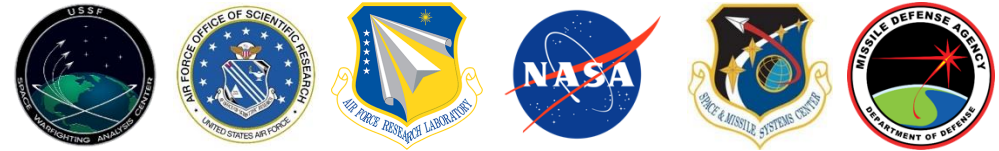
University Development

- Develop space hardware laboratories
- Support university PIs



Technology

- Innovative, low-cost technology development
- Motivation for government and industry sponsors
- DoD relevant





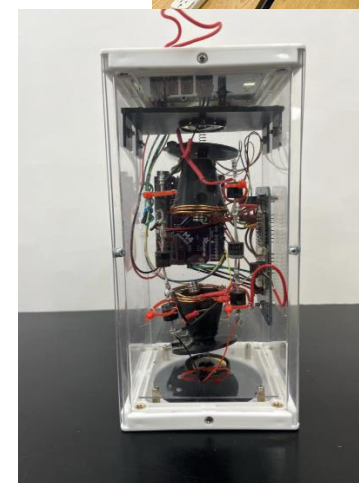
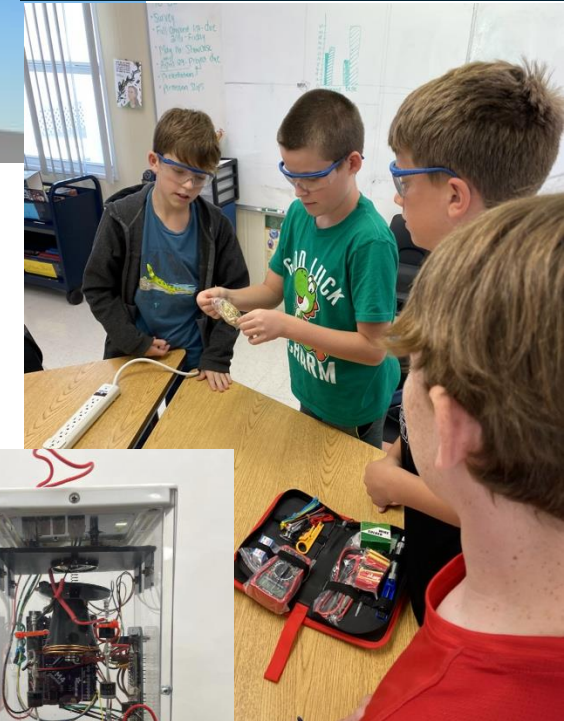
Anh N. Nguyen (NASA)
TSC Ballroom
Booth 9-10 STMD

Provide hands-on payload build and flight test experience to engage students in STEM

- Open to teams of 4 or more students **grades 6-12** from public, private, and charter school students in all U.S. states and territories
- Flying TechRise 3 Summer of 2024
- TechRise 4 open for submissions Aug. 1, 2024, with flights scheduled for summer 2025
- Approx. 60 winning teams each year
- **Winning Teams receive:**
 - \$1,500 cash prize
 - 2U flight experiment box
 - Experiment supplies (soldering iron, basic electronics materials, multimeter)
 - Weekly mentorship
 - **Commercial suborbital flight test**
- **Website:** <https://www.futureengineers.org/nasatechrise>

1 School Year Challenge Cycle

- Aug – Nov (4 mo): Proposal Period
- Nov – Jan (3 mo): Judging
- Jan – May (4 mo): Build
- Jun – Aug: Flight Test





NASA
TechLeap
PRIZE

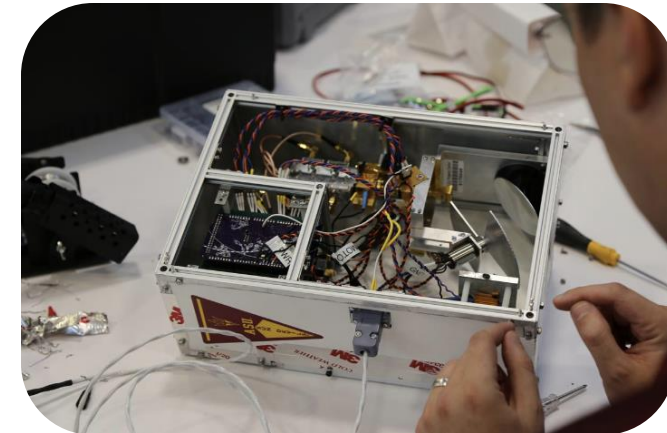
Anh N. Nguyen (NASA)
TSC Ballroom
Booth 9-10 STMD

Rapidly identify and develop technologies of significant interest to the agency through a series of challenges

- Open to U.S. citizens and permanent residents including students and faculty at **U.S. universities.**
- Individuals & teams permitted (organizations must be incorporated & operating in U.S.); lead must be U.S. person at least 18 years of age
- Previous challenges have included: Autonomous Observation Challenge No. 1 (2021), Nighttime Precision Landing Challenge No 1 (2022), Universal Payload Interface Challenge (2023)
- Typically 3 winning teams, annually
- **Winning teams have the opportunity to progress through challenge milestones, including :**
 - \$200K for Initial design and build
 - \$200K during Payload Build Round 1
 - \$100K during Payload Build Round 2
 - **Commercial suborbital flight test at no cost**
 - Up to \$150K Performance Incentive
- **Website:** <https://www.nasatechleap.org/>

Schedule

Challenge timelines target submission open to flight test in less than 12 months





Anh N. Nguyen (NASA)
TSC Ballroom
Booth 9-10 STMD

Advance technologies that align with U.S. space exploration priorities and support the expanding space economy through development and test of space technologies that address agency and mission goals in relevant environments

- Open to U.S.-based researchers from industry, **academia**, and private research institutes.
- Payloads must be TRL4+.
- Typically 7-10 suborbital awards and 1-2 orbital awards, annually
- Winning teams receive awards of up to \$1M (for all topics).
- **Funding covers:**
 - Purchase of flight tests on commercial suborbital vehicles or orbital platforms hosting payloads
 - Design, development, and preparation of technology payloads for flight
 - Travel, educational opportunities, and other indirect costs
- **Website:** www.nasa.gov/stmd-flight-opportunities/access-flight-tests/nasa-techflights-solicitation-information/

Watch the Flight Opportunities newsletter and website for more information, including funding opportunity schedule, topic details, and award information.





University SmallSat Technology Partnerships

Samson Phan (NASA)
TSC Ballroom
Booth 9-10 STMD

Development of university-based technologies with the potential to advance the small spacecraft industry by facilitating collaborations between accredited U.S. colleges and universities and NASA Centers across the country

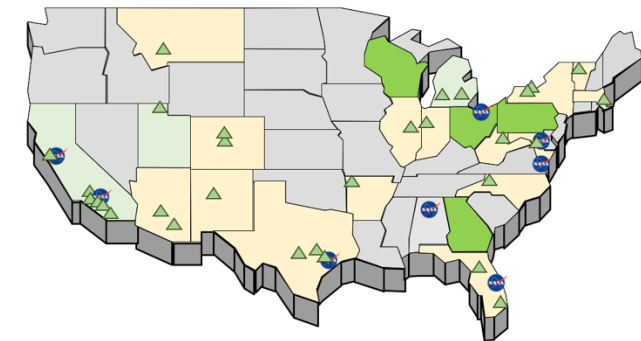
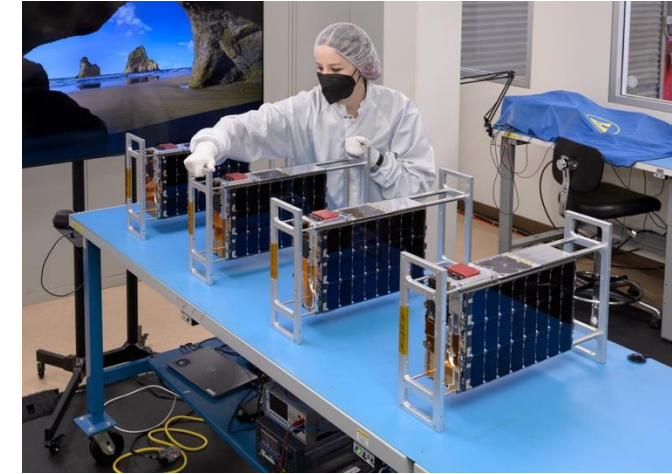
- Open to **U.S. accredited universities**
- 6 Solicitations between 2013 and 2023 through SpaceTech-REDDI
- Typically 8 – 10 winning teams each solicitation

Winning teams receive:

- 2-year cooperative agreement
- \$225K year 1
- \$225K year 2
- 0.5 FTE NASA Civil Servant or JPL Employee
- Up to \$30K of procurement funding for NASA partner over 2 years
- Follow-on flight demonstration through NASA's Space Operations Mission Directorate's CubeSat Launch Initiative and STMD's Flight Opportunities program.
- Website: www.nasa.gov/smallspacecraft/sst-partnerships/

Schedule

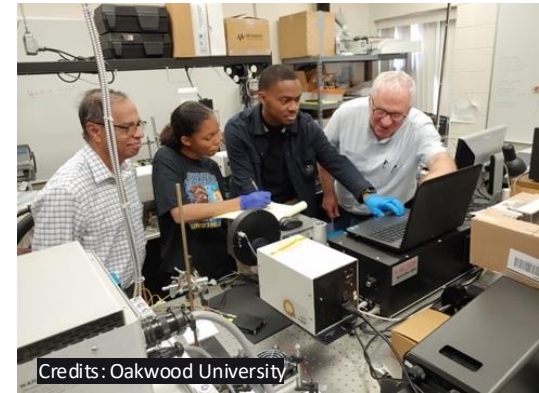
- <1 mo: Preliminary Proposals Period
- 2 mo: Full Proposal Period
- 1 mo: Selection Period





Samson Phan (NASA)
TSC Ballroom
Booth 9-10 STMD

The NASA Small Business Technology Transfer (STTR) program funds collaborative research partnerships between small businesses and research institutions to develop innovative technologies that meet NASA's mission needs.



- Open to U.S. Universities and **Small Businesses** (< 500 employees)
- **Yearly** Solicitations through SAM.gov
- SST participates in all SBIR opportunities

Winning teams receive:

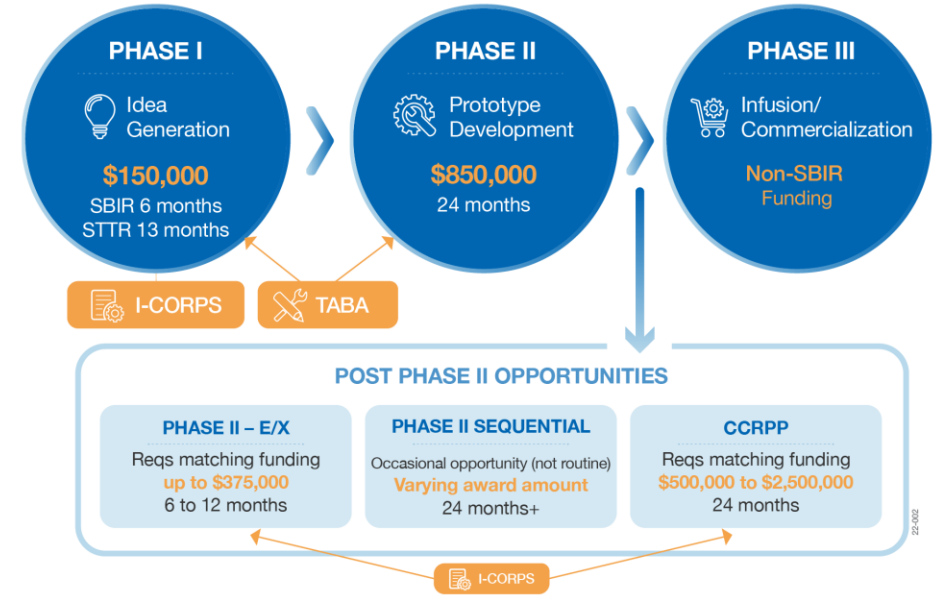
- Funding to advance technology
- Technical and business assistance opportunities
- Connections with NASA personnel

Schedule

- 2 mo: Open solicitation period
- 2 mo: Proposal evaluation
- 1 mo: Selection Period

Multiple post Phase II opportunities to increase TRL, including testing, flight opportunities, and continued development.

• **Website:** www.nasa.gov/sbir_sttr/





NASA's CubeSat Launch Initiative (CSLI)

Liam Cheney (LSP)
TSC Ballroom
Booth 17 KSC/CSLI

Provide launch opportunities for U.S. CubeSat developers, to enable research in science, exploration, technology development, and education.

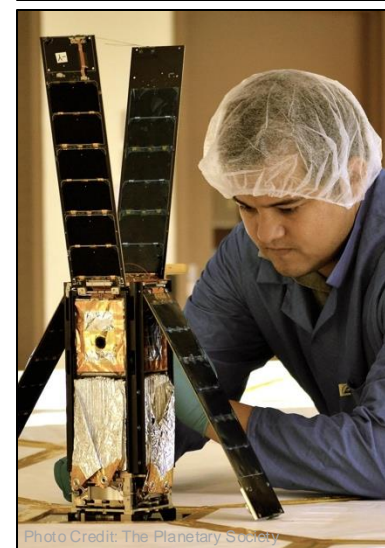
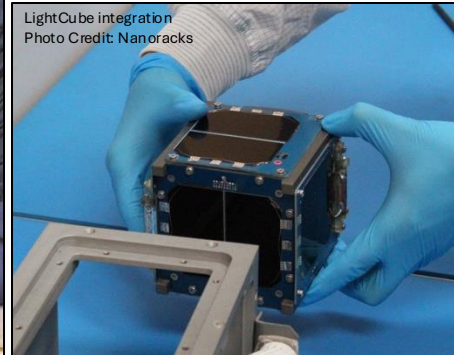
- Open to educational originations (universities, colleges, high schools, etc.), nonprofit organizations, NASA Centers, and JPL
- New selections are made annually through an Announcement of Partnership Opportunity (AoPO) that is usually released in early August
- Nearly 300 CubeSat Projects have been selected from 100+ organizations from 40+ states, Washington DC, and Puerto Rico

Award Details

- Up to 6U in size to one of three orbit range options (exceptions may be proposed)
- Does not include payload development

Key Dates

- Early August: Announcement of Opportunity (AoPO) released
- November: Proposals due
- ~March: Selections expected



Website: www.nasa.gov/kennedy/launch-services-program/cubesat-launch-initiative/



NASA Research Opportunities in Space and Earth Science (ROSES)

Tom Johnson
TSC Ballroom
Booth 5

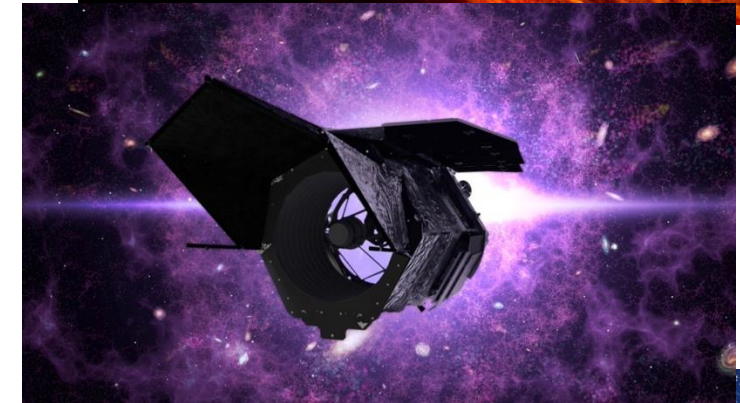
SMD's omnibus solicitation, made up >100 opportunities/program elements, mostly for federal assistance awards (e.g., grants) each with their own topics, due dates etc.

- Unless otherwise restricted by a particular program element, open to organizations of every type, domestic and foreign, Government and private, for-profit, and not-for-profit, may submit proposals without restriction on teaming arrangements*
- Released Annually on Feb14
- Awards up to \$10M+, over 1-5+ years (depends on program element)

Topics include

- Astrophysics
- Planetary Science
- Heliophysics
- Earth Science
- Biophysics

*See solicitation for further details



NASA Heliophysics & Astrophysics Opportunities

Heliophysics Flight Opportunities for Research and Technology (H-FORT)

- Development of technologies that will enable investigation of heliophysics science questions
- TRL 1 – 9 (suggest 3+), up to \$10M up to 5 years
- Released annually, 1-2 awarded missions per year.
- [Currently OPEN until 9/20/2024]
- 29 missions awarded and 18 launched since 2013

Astrophysics Research and Analysis (APRA)

- Technology development or science research relating to Astrophysics
- TRL 1 – 9, up to \$10M up to 5 years
- Released annually, 1 awarded mission per year
- [Currently OPEN until 1/30/2025]
- 8 missions awarded and 2 launched since 2015

Pioneers

- Intended for compelling astrophysics science at a lower cost using smaller hardware than missions in the Explorers Program
- TRL 6 by PDR, up to \$20M (excluding launch costs) for up to 5 years
- 6 missions awarded currently under development since 2019
- [Currently OPEN until 3/13/2025]





NASA's PI Launchpad

Erika Hamden
hamden@arizona.edu

A workshop to educate NEW PIs on the basics of developing teams and science ideas for Space Missions.

- Open to anyone who 1) has not yet been the PI of a large space mission proposal, or held a titled role in such a proposal. 2) has previously submitted any type of observing or funding proposal. 3) is interested in being a PI and has a mission concept to develop. Targeted towards postdocs and later, but some grad students have attended. Can be from a university, company, or government lab. Non-US persons can apply if they are employed at a US institution. 5 question application required, submitted via NSPIRES as an NOI.
- Typically, 40 attendees per year workshop held every other year.
- Attendees have all flights, hotels, and food covered. No additional awards are made.

Notional Schedule:

- Applications open typically in January
- Workshop held in July
- 4 days long
- Held every 2 years

Topics include:

- Science Objective and STM development
- Networking with Industry partners
- Discussion of requirements and other details
- Science Storytelling

Website: <https://science.nasa.gov/researchers/pi-launchpad/>





TechPort

The TechPort Funding Opportunities page provides a consolidated list of NASA opportunities for NASA, academia, industry, and individuals to seek NASA funding for aerospace technology development.

You may filter for opportunities by your role or organization type, amount of funding needed, and technology maturity.

<https://techport.nasa.gov/opportunities>



Jose Nunez

jose.l.nunez@nasa.gov

NASA KSC – University Partnerships / Small Sat
Capabilities Manager

Presented: Roadmap, Space Grant, EPSCoR, NSF

**Taggart Student Center Ballroom, Booth 17
KSC/CSLI**



Liam Cheney

liam.j.cheney@nasa.gov

NASA KSC – Launch Services Program

Mission Manager, NASA Launch Services Program

Presented: CSLI

**Taggart Student Center Ballroom, Booth 17
KSC/CSLI**



Lee Jasper

lee.jasper@sdl.usu.edu

Space Dynamics Laboratory

UNP Lead

Presented: UNP, Mission Concept



Florence Tan

florence.w.tan@nasa.gov

NASA HQ - Small Spacecraft Coordination Group
Chair

Presented: PI Launchpad



Anh N. Nguyen

anh.n.nguyen@nasa.gov

NASA HQ – STMD SST & FO Program Portfolio
Integrator

Presented: TechRise, TechFlights, TechLeap

Taggart Student Center Ballroom, Booth 9-10 STMD



Samson Phan

samson.phan@nasa.gov

NASA ARC – STMD SST USTP & SmallSat SBIR Portfolio
Project Manager

Presented: USTP and SBIRs

Taggart Student Center Ballroom, Booth 9-10 STMD



Bruce Yost

bruce.d.yost@nasa.gov

NASA ARC – STMD S3VI, S3VI Director

Presented: S3VI, STRG

Taggart Student Center Ballroom, Booth 9-10 STMD



Tom Johnson

Thomas.E.Johnson@nasa.gov

NASA GSFC – Portfolio Project Manager

Presented: NASA Heliophysics & Astrophysics

Taggart Student Center Ballroom, Booth 5