



Kentucky Space Grant Consortium 2016-2017 Request for Proposals

Announcement: RFP-17-001

Release Date: August 24, 2016

Proposals Due: 5:00 pm EDT, Thursday, October 13, 2016

Proposal files submitted online at nasa.engr.uky.edu

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Proposal forms, FAQ, and additional information available:

nasa.engr.uky.edu/space-grant and
nasa.engr.uky.edu/requests-for-proposals

Kentucky Space Grant Consortium 2016-2017 Request for Proposals

NASA Kentucky Space Grant Consortium Overview

The NASA Kentucky Space Grant Consortium is a NASA Higher Education program supporting student fellowships/scholarships, research initiation, and workforce development in STEM areas of interest to NASA and Kentucky. Space Grant promotes networking and cooperation among education, industry, and local, state, and federal government. Recruitment and training of US Citizens, especially women, underrepresented minorities and persons with disabilities, for careers in aerospace science and technology is a national priority. NASA Kentucky Space Grant Consortium Programs support Kentucky faculty, students, and outreach through Graduate Fellowship (GF), Undergraduate Fellowship (UF), Team Fellowship (TF), Research Initiation (RIA), Mini-Grant (MG), and Enhanced Mini-Grant (EMG) awards.

NASA Kentucky invites proposal submissions from Kentucky Space Grant Consortium affiliates for the following Space Grant programs addressing the national interests of NASA and state needs of Kentucky:

Deadline: Proposal files submitted online at nasa.engr.uky.edu by **5:00 pm EDT, Thursday, October 13, 2016.**

Period of Performance: NASA Kentucky will support awards up to one year in the period January 1, 2017 to December 31, 2017.

Numbers of Awards: Numbers of awards in each category are determined by sizes of the individual awards and available program funding levels.

Eligibility for Space Grant Awards [GF, UF, TF, RIA, MG, EMG]: Proposals will be accepted from NASA Kentucky Space Grant Consortium Affiliate Institutions. A list of Affiliate Institutions may be found at nasa.engr.uky.edu/space-grant. Per NASA training grant guidelines, US citizenship is required for students and faculty receiving direct support or reporting effort as cost-share. *Reporting on current and prior awards must be up to date to be eligible for funding under this announcement.*

Reporting Requirements: Principal Investigators (PIs) are required to report research productivity and students supported using the KY EPSCoR Reporting System (KERS): 1) during the award period, 2) within 30 days of the end of the award (final technical report and complete KERS reporting), and 3) annual updates for 5 years post-award (Kentucky EPSCoR requirement). Quarterly updates to project reporting are suggested. Reporting must be current to meet program report cycles due annually in spring for NASA and summer for state funding.

General Guidelines: Proposals that omit required materials or that exceed page limits may be rejected without review. Proposals from PIs who are delinquent in meeting reporting requirements on current or prior NASA Kentucky awards may be rejected without review. Failure to complete proposed work on prior NASA Kentucky projects will be taken into consideration in selecting proposals. By submitting to this RFP, the proposer acknowledges that NASA Kentucky reserves the right to request backup financial information at any time during the course of an awarded project.

- *Equipment* may not be purchased or used as cost-share in any NASA Kentucky award under this RFP.
- *Travel* funds are restricted to domestic travel only.
- *Cost-share* must be from non-Federal sources.

Cost-Share: The NASA Office of Education requires cost-share of all state Space Grant consortia, therefore most NASA Kentucky Space Grant Consortium programs require cost-share. Cost-share must be from non-Federal sources. Students and faculty receiving direct support or reporting effort as cost-share must be US citizens.

F&A Rates: Space Grant is a workforce development program and it is important to propose projects that are well-aligned with the intent of the program, ie. projects that will emphasize Science Technology Engineering and Math (STEM) and recruit and train US citizens for careers in aerospace science and technology. In line with this program, proposing universities and colleges should use an “other” or training grant F&A rate (if one exists) versus a research F&A rate. No F&A is permitted on fellowships (GF, UF, TF) as directed by the NASA Office of Education:

“It is a policy of the Space Grant program that neither management fees nor indirect costs shall be charged to NASA stipends, internships, fellowships, or scholarships (NIFS).”

FAQ and additional information: nasa.engr.uky.edu/space-grant

Submission Instructions

Proposal forms are available at nasa.engr.uky.edu/requests-for-proposals/forms. All proposals must be submitted via the NASA KY website as PDF files. Please title the proposal documents according to the specified file naming convention, in which **PI** is last name of proposer and **PGM** is the program abbreviation (see Table 1).

- SIGNED COVER PAGE:** Scan the signed original and save as PDF
(File name format: PI_PGM_Cover_2017.pdf)
- BUDGET FORM:** Include justification detailing requested support and cost-share
(File name format: PI_PGM_Budget_2017.pdf)
- PROJECT DESCRIPTION:** (File name format: PI_PGM_Project_2017.pdf)
 - o 12 point font, 1 inch margins, single spaced
 - o 5 page limit - See specific program guidelines for required content
 - o Additional pages - See specific program guidelines for lists of documents
- STUDENT INFORMATION FORM (SIF):** Include with GF and UF projects
(File name format: SLN_PGM_SIF_2017, where **SLN** is the student’s last name.)

Upload at nasa.engr.uky.edu by **5:00 pm EDT, Thursday October 13, 2016**. Submissions after 5 pm may be rejected without review.

Paired Submissions

PIs may associate two related proposals for a combined award amount not to exceed \$60,000. For example, PIs may submit a paired GF and TF for a combined amount of \$55,000. Each proposal should be submitted individually following guidelines for each program, but indicate in the project description if it is related to another submission. Paired proposals may share proposal elements, such as letters of support, where relevant. Proposals must be aligned with one of the three NASA KY Strategic themes (see pg. 5) for consideration as a paired submission. This opportunity is meant to encourage PIs to submit larger proposals, not to restrict the number of proposals that a PI may submit. See also Table 1 below.

Table 1. Summary of NASA Kentucky Space Grant Consortium Programs

Funding Source	Award Program ⁶	Program Acronym	Program Description	US Citizen Required ¹	Max Award ⁶	Indirect Costs Allowed	Required Cost-Share (\$CS:\$Award)	Level of NASA Collaboration
Space Grant	Graduate Fellowships	GF	Salary or stipend, tuition, materials and travel for MS and PhD students to conduct NASA-aligned research	Yes	\$45,000	No	1:1 including 12.5% faculty FTE ⁵	NASA letter of support ²
Space Grant	Undergraduate Fellowships	UF	Salary or stipend, materials and travel for undergrad students to conduct NASA- aligned research	Yes	\$6,000	No	None required	Use of NASA resources ³
Space Grant	Team Fellowships	TF	Materials and travel for student teams participating in NASA-related competitions	Yes	\$10,000	No	0.5:1	Alignment with NASA objectives ⁴
Space Grant	Research Initiation Awards	RIA	Faculty directed research to explore NASA collaborations and NASA-aligned research topics	Yes	\$15,000	Yes	1:1	NASA letter of support ²
Space Grant	Mini-Grants	MG	Pre-college and science center outreach activities, targeted recruiting and teacher PD	Yes	\$5,000	Yes	None required	Alignment with NASA objectives ⁴
Space Grant	Enhanced Mini-Grants	EMG	Priority given to projects aligned with NASA Kentucky Strategic Themes or NASA Emphases	Yes	\$15,000	Yes	1:1	Alignment with NASA objectives ⁴

¹US Citizenship required for students and faculty receiving direct support or reporting effort as cost-share.

²Letter of support required that commits NASA partnership or collaboration to the project. Letters of support *do not* include letters of affirmation (i.e., letters that only endorse the value or merit of a proposal). Letters of support may be from NASA or affiliated organizations including NASA Institutes/Laboratories such as JPL, Space Telescope Science Institute, National Space Biomedical Institute, CASIS, and others. (See [NASA KY FAQ](#) for more information about NASA letters of support.)

³NASA resources include facilities and collaborators or other resources such as datasets, modeling, source code, curricula, images, etc. developed and made available to the public or researchers by NASA. Links to NASA research results including NASA PubSpace and NASA Data Portal are available at: <http://www.nasa.gov/open/researchaccess>.

⁴See following sections for description of NASA Education and Research objectives.

⁵Level of faculty full-time equivalent (FTE) may be limited by institutional or unit policies or practices.

⁶Paired proposals may share proposal elements and request a combined total award amount no larger than \$60,000, equal to the sum of the max award amounts for each program. See note on paired submissions above (pg. 2).

Affiliate Participation

Academic affiliates in the NASA Kentucky Space Grant Consortium are eligible for all programs. Non-profit and Industry affiliates can participate in partnership with Academic affiliates or can propose directly involving students of various educational levels via mini-grant, enhanced mini-grant, team fellowship, and undergraduate fellowship programs. Mini-grants can be proposed to develop new exhibits, program content or events with student intern involvement to prepare materials and planning. Mini-grants can be envisioned for groups of students as participants, keeping in mind NASA's emphasis on middle-school teacher training as a preferred way to enable student participation.

Review Process

Proposals will be rated, ranked, and funded up to the budgeted amount available for each program. NASA KY Space Grant Affiliate Representatives and external content specialists will review the proposals and rate the technical content as Definitely Fund, Fund if Possible, or Do Not Fund (Review Criteria). Proposals will also be reviewed for budget compliance and programmatic alignment by NASA Kentucky staff. As a panel, the reviewers will recommend proposals for funding to the NASA Kentucky Director. Past reporting and accomplishments will be considered in evaluation of proposals. To avoid conflicts of interest, alternate reviewers may be recruited by the NASA Kentucky Director.

Space Grant Proposal Review Process

Proposals will be reviewed and rated based on the following criteria:

- SCIENCE: Scientific merit and implementation; NASA mission and research relevance (30%)
- TECHNICAL: Technical merit and feasibility, including cost risk (30%)
- PROGRAMMATIC: Management and evaluation; successful and timely completion of prior proposed NASA Kentucky projects and reporting; alignment with Kentucky Space Grant Consortium Strategic Themes and NASA Education Areas of Emphasis (30%)
- BUDGET: Reasonableness of budget narrative (10%)

NASA Alignment and Collaboration

Proposals should align with the goals and objectives of the NASA Kentucky Space Grant Program, NASA Education Office and the agency's missions and research, as well as the interests of the state of Kentucky. NASA Kentucky Space Grant programs encourage increasing levels of involvement with NASA, from base alignment with NASA objectives for TF and MG programs; use of NASA resources for the UF program; progressing to a letter of support from a NASA collaborator for GF and RIA. See Table 1 as well as program descriptions and the following for more information on NASA and programmatic alignment.

NASA Kentucky Space Grant Consortium Program Objectives and Strategic Themes

Kentucky has undergone an extensive effort to evaluate and produce a science and technology strategic plan, the 2012 Kentucky Science and Innovation Strategy. In the strategy, five high-value areas are identified with strong potential to build innovation capacity in the Commonwealth: 1. Agriculture and Bioscience, 2. Energy and Environmental Technologies, 3. Human Health and Personalized Medicine, 4. Information Technology and New Media, and 5. Material Science and Advanced Manufacturing. The strategy also acknowledges that relevant high-value R&D often spans multiple areas, as is the case for aerospace research. The strategy further defines actions to catalyze investment in high-value areas and to build industry/academic partnerships for STEM workforce development, which overlap both NASA Kentucky Space Grant and EPSCoR priorities.

In January 2015, a Consortium strategic planning session was conducted for the NASA Kentucky Space Grant program and identified three themes for 2016-2018:

TOTAL SOLAR ECLIPSE 2017: August 21, 2017 will present a unique opportunity for science, public education, and inspiration. People from Oregon to South Carolina will be able to witness a total solar eclipse, something not seen in the eastern United States since 1970 and not since 1869 in Kentucky. Eclipse totality will traverse a swath of western Kentucky, with an area just west of Hopkinsville seeing the point of greatest eclipse nationwide. Cities and NASA Kentucky Space Grant affiliate institutions near the eclipse path have begun planning ways to help residents and numerous visitors, expected from all over the world, to enjoy and learn from the event. Affiliates outside the total eclipse area are also planning to participate in eclipse educational events and projects. This theme also includes long-range preparation for a second total solar eclipse in Kentucky in 2024.

BIG DATA: Addressing cross-cutting technology issues of "Big Data" is imperative to the future of many research fields as investigators find themselves challenged with analyzing and managing exponentially growing datasets. Kentucky space science researchers are pursuing exo-solar discovery, space-based astronomy, and ground-based astronomy that increasingly involve manipulating very large datasets. Other Kentucky researchers have research directions in earth science, atmospheric science, and meteorology that also produce large amounts of data, capture inputs from distributed sensor networks, and/or analyze satellite data over time.

APPLIED AEROSPACE: "Applied Aerospace" enables NASA Kentucky to emphasize notable trends among the state's aerospace industry, including Kentucky's role as a national manufacturing leader for aircraft products exports, and to support prominent technical and research expertise among faculty and entrepreneurs in engineering, biomedicine, space science, nanotech, physics, energy, and more. This theme advances Kentucky's many aerospace-related research and training specialties and captures growing student interest in NASA's progress to innovate the nation's aviation system, build the deep space SLS rocket, and commercialize space flight and satellite missions to low-Earth orbit and beyond. Students at Consortium institutions have the opportunity to perform aerospace research in areas such as thermal protection systems for spacecraft, ISS experimentation, space science, small satellites, UAV research, long-duration space travel, aviation studies and research, advanced manufacturing, robotics, and nano-technology, as well as to complete NASA internships.

National NASA Space Grant Program Goal and Objectives

The national goal of Space Grant is to contribute to the nation's science enterprise by funding education, research, and informal education projects through a national network of university-based Space Grant consortia:

- Establish and maintain a national network of universities with interests and capabilities in aeronautics, space and related fields.
- Encourage cooperative programs among universities, aerospace industry, and Federal, state and local governments.
- Encourage interdisciplinary training, research and public service programs related to aerospace.
- Recruit and train U.S. citizens, especially women, underrepresented minorities, and persons with disabilities, for careers in aerospace science and technology.
- Promote a strong science, technology, engineering, and mathematics education base from elementary through secondary levels while preparing teachers in these grade levels to become more effective at improving student academic outcomes.

NASA Education Strategic Goals and Objectives (from 2014 NASA Strategic Plan)

*NASA Strategic Objective 2.4¹: Advance the Nation's STEM education and workforce pipeline by working collaboratively with other agencies to engage students, teachers, and faculty in NASA's missions and unique assets. This Strategic Objective clearly points to the NASA Office of Education as a vital entity in the accomplishment of the NASA Vision: *We reach for new heights and reveal the unknown for the benefit of humankind.**

NASA Office of Education has established next steps for Strategic Objective 2.4 with near-term milestones that set the foundation for achievement of this objective. These milestones include, but are not limited to:

- Create a portfolio of projects consistent with the Federal 5-Year STEM Education Strategic Plan issued by the Office of Science and Technology Policy Committee on STEM Education;
- Ensure that NASA Education efforts are anchored to evidence-based strategies in their design and implementation; and,
- Enhance reporting capabilities for NASA Education's data collection applications.

NASA Education Lines of Business²

Primary priorities for Space Grant:

1. NASA internships, fellowships, and scholarships (NIFS) –

- NASA Internships, Fellowships, and Scholarships (NIFS) leverage NASA's unique missions and programs to enhance and increase the capability, diversity, and size of the Nation's future STEM workforce. NASA continues to invest in the nation's STEM learners by providing opportunities that will launch a new era of learning, innovation, and achievement.

NASA Internships are competitive awards to support educational work opportunities that provide unique NASA-related experiences for educators and high school, undergraduate, and graduate students. These opportunities engage students with real-world experiences while contributing to the operation of a NASA facility or the advancement of NASA's missions.

NASA Fellowships are designed to support independently conceived or designed research, or senior design projects by highly qualified faculty, undergraduate, and graduate students, in disciplines needed to help advance NASA's missions, thus affording them the opportunity to directly contribute to advancements in STEM-related areas of study. Fellowship opportunities are focused on innovation and generate measurable research results that contribute to NASA's current and future science and technology goals.

NASA Scholarships provide financial support to undergraduate and graduate students for studies in STEM disciplines to inspire and support the next generation of STEM professionals.

2. Institutional Engagement (IE) –

- Institutional Engagement (IE) increases STEM capabilities at formal and informal educational institutions and organizations by incorporating content based on NASA's missions.

¹ https://www.nasa.gov/sites/default/files/files/FY2014_NASA_SP_508c.pdf

² http://www.nasa.gov/sites/default/files/atoms/files/nasa_education_implementation_plan_2015-2017.pdf

NASA Institutional Engagement builds the capacity of formal and informal education institutions to participate in NASA's mission. IE improves their capabilities to gain support from external sources; fosters interactions between NASA Centers/JPL, academic institutions, and industry; and expands the diversity and geographic representation of institutions nationwide. The institutions and organizations that fit in the IE model cover a diverse spectrum, from academic institutions of higher learning to museums with a STEM focus to national organizations dedicated to improving and enhancing STEM education. Consequently, both formal and informal education entities are significant stakeholders in and collaborators with NASA Education.

NASA Institutional Engagement supports colleges and universities by helping them gain access to cutting-edge engineering and science facilities and personnel. IE also enables informal institutions, such as museums, planetaria, and science centers, to engage their visitors through exhibits and displays that showcase NASA's dynamic content.

NASA Institutional Engagement supports the advancement and development of STEM personnel, programs, and infrastructure to enable formal and informal institutions to conduct NASA-related research and/or deliver NASA-related STEM content. The opportunities IE provides capitalize on the strengths and resources of the agency, including its scientists, engineers, other technical staff, and world-class facilities.

Secondary priorities for Space Grant:

3. STEM engagement (SE) –

- STEM Engagement (SE) activities are designed to provide opportunities for participatory and experiential learning activities that connect learners to NASA-unique resources. STEM Engagement activities are based on best practices in motivation, engagement, and learning in formal and informal settings such as Public Education Activities, Experiential Learning Opportunities, and STEM Challenges.

4. Educator Professional Development (EPD) –

- Educator Professional Development (EPD) uses NASA's missions, education resources, and unique facilities to provide high-quality STEM content and hands-on learning experiences to in-service, pre-service and informal educators. EPD provides educators with the knowledge, skills, and ability to deliver unique STEM content to learners who will ensure the economic growth and competitiveness of our nation.

NASA Education Priorities – Current Areas of Emphasis

NASA has articulated the following emphases for its education programs:

- **E1.** NASA internships, fellowships, and scholarships (NIFS)
- **E2.** Authentic, hands-on student experiences in science and engineering disciplines- the incorporation of active participation by students in hands-on learning or practice with experiences rooted in NASA-related, STEM-focused questions and issues; the incorporation of real-life problem-solving and needs as the context for activities.
- **E3.** Engage middle school teachers in hands-on curriculum enhancement capabilities through exposure to NASA scientific and technical expertise. Capabilities for teachers to provide authentic, hands-on middle school student experiences in science and engineering disciplines.
- **E4.** Summer opportunities for secondary students on college campuses with the objective of increased enrollment in STEM disciplines or interest in STEM careers.

- **E5.** Community Colleges - develop new relationships as well as sustain and strengthen existing institutional relationships with community colleges.
- **E6.** Aeronautics research - research in traditional aeronautics disciplines; research in areas that are appropriate to NASA's unique capabilities; directly address the fundamental research needs of the Next Generation Air Transportation System (NextGen).
- **E7.** Environmental Science and Global Climate Change - research activities to better understand Earth's environments.
- **E8.** Enhance capacity of institutions to support innovative research infrastructure activities to enable early-career faculty to focus their research toward NASA priorities.
- **E9.** Diversity of institutions, faculty, and students (gender, underrepresented, and underserved).

NASA Research and Technology Development Priorities

The NASA Office of Education identifies research and technology priorities based on alignment with NASA's Mission Directorates. The Aeronautics Research Mission Directorate (ARMD), Human Exploration and Operations Mission Directorate (HEOMD), Science Mission Directorate (SMD), and the Space Technology Mission Directorate (STMD) identify their priorities on the NASA website <http://www.nasa.gov/about/directorates/index.html>. For information on all of NASA's missions, please visit <http://www.nasa.gov/missions/index.html>.

NASA Mission Directorate (MD) Descriptions

Aeronautics Research Mission Directorate (ARMD) conducts vital research to make air travel more efficient, safe, sustainable, and to uncover leading-edge solutions for the Next Generation Air Transportation System (NextGen) in the United States. ARMD's fundamental research in traditional aeronautical disciplines and emerging disciplines helps address substantial noise, emissions, efficiency, performance, and safety challenges that must be met in order to design vehicles that can operate in the NextGen. NASA aeronautics has made decades of contributions to aviation. Nearly every aircraft today has a NASA-supported technology on board that helps the vehicle fly more safely and efficiently. Aeronautics research continues to play a vital supporting role to air travel and commerce by enabling game-changing technologies and innovation that allows the U.S. aviation industry to continue to grow and maintain global competitiveness. (www.aeronautics.nasa.gov)

Human Exploration and Operations Mission Directorate (HEOMD) provides the Agency with leadership and management of NASA space operations related to human exploration in and beyond low-Earth orbit. HEO also oversees low-level requirements development, policy, and programmatic oversight. The International Space Station represents the NASA exploration activities in low-Earth orbit. Exploration activities beyond low-Earth orbit include the management of Commercial Space Transportation, Exploration Systems Development, Human Space Flight Capabilities, Advanced Exploration Systems, and Space Life Sciences Research & Applications. The directorate is similarly responsible for Agency leadership and management of NASA space operations related to Launch Services, Space Transportation, and Space Communications in support of both human and robotic exploration programs. (www.nasa.gov/directorates/heo/home/index.html)

Science Mission Directorate (SMD) leads the Agency in four areas of research: Earth Science, Heliophysics, Planetary Science, and Astrophysics. SMD works closely with the broader scientific community, considers national initiatives, and uses the results of National Research Council studies to define a set of "Big Questions" in each of these four research areas. These questions, in turn, fuel mission priorities and the SMD research agenda. The SMD also sponsors research that both enables, and is enabled by, NASA's exploration activities. SMD has a portfolio of Education and Public Outreach projects that are connected to its research efforts. (nasascience.nasa.gov)

Space Technology Mission Directorate (STMD) is responsible for developing the crosscutting, pioneering, new technologies and capabilities needed by the agency to achieve its current and future missions. STMD rapidly develops, demonstrates, and infuses revolutionary, high-payoff technologies through transparent, collaborative partnerships, expanding the boundaries of the aerospace enterprise. STMD employs a merit-based competition model with a portfolio approach, spanning a range of discipline areas and technology readiness levels. By investing in bold, broadly applicable, disruptive technology that industry cannot tackle today, STMD seeks to mature the technology required for NASA's future missions in science and exploration while proving the capabilities and lowering the cost for other government agencies and commercial space activities. Research and technology development take place within NASA Centers, in academia and industry, and leverage partnerships with other government agencies and international partners. (www.nasa.gov/directorates/spacetech/home/index.html)

NASA Internships

In addition to programs available through this RFP, NASA Kentucky also supports Kentucky undergraduate students through NASA internships. Students are encouraged to visit the NASA OSSI site, build a student profile, and apply to internship, fellowship, and scholarship programs available directly from NASA. OSSI is a NASA-wide system for the recruitment, application, selection and career development of undergraduate and graduate students. Selection for OSSI opportunities available is made by NASA.

<https://intern.nasa.gov/ossi/web/public/main/>



Graduate Fellowships - \$45,000

Description: Higher education is the top priority of NASA's Space Grant Program. NASA seeks to promote science, technology, engineering and mathematics (STEM) education; encourage interdisciplinary training, research and public service programs related to aerospace; and recruit and train US citizens for careers in aerospace science and technology. NASA Kentucky **Graduate Fellowships** recognize and support students addressing the challenges of aerospace research related to NASA's strategic goals. Research advisors at Affiliate Institutions may apply for a one-year fellowship for a specific graduate student. Research projects must emphasize connections to NASA, address specific goals for the fellowship year, and contribute to program metrics including publications, presentations, and student advancement in disciplines of interest to NASA.

Eligibility: Proposals will be accepted from Principal Investigators at NASA Kentucky Space Grant Consortium Affiliate Institutions on behalf of Master's or Doctoral students in NASA-aligned disciplines. Women and minorities are strongly encouraged to apply. US citizenship is required.

Requirements: The proposed research topic must utilize NASA resources and be aligned with NASA priorities addressed by one or more of the Mission Directorates. NASA letter of support required. Connections with Kentucky companies and/or NASA Kentucky strategic themes will be viewed favorably. (See also Table 1)

Proposal Content: See General Proposal Guidelines for formatting and file naming instructions.

1) Project Description: PI_GF_Project_2017.pdf

- No more than 5 pages including tables and figures describing: abstract (200-300 words), project summary, alignment with NASA Mission Directorate(s), specific goals for the funded period, anticipated outcomes, and progress toward degree.
- Additional pages - included in PI_GF_Project_2017.pdf after 5 page project description:
 - Bibliography/References as needed
 - Unofficial transcript
 - Student's resume
 - Letter of recommendation from a faculty member other than the research advisor
 - Research Advisor's 2 page CV
 - Letter of support from a NASA collaborator (See [NASA KY FAQ](#) for more information)

2) Student Information Form: SLN_GF_SIF_2017.pdf, where SLN is the student's last name - Completed by the student applicant and uploaded with proposal files.

Budget Guidelines: Maximum award level is \$45,000 per student per year. Allowable costs include student stipend or salary consistent with recipient institution policies and practices, fringe benefits, tuition and fees, materials and supplies, and student domestic travel. Required cost-share of at least 1:1 (\$CS:\$Award) must be provided by the proposing institution including a minimum of 12.5% FTE faculty time for the research advisor required as cost-share. Include description of faculty time cost-share detailed in the budget justification. The level of faculty FTE for advising graduate students may be limited by institutional or unit policies or practices. Indirect costs are not allowed, but unrecovered indirect costs on sub-recipient direct cost-share may be used as cost-share.

Longitudinal Tracking of Students: All students receiving compensation must be reported in KERS. Any student receiving \$5,000 or more in NASA funding or working 160 hours or more on NASA-supported projects or a combination of both will be longitudinally tracked by NASA for five years using information provided on the NASA KY Student Information Form (SIF). Longitudinally tracked students will need to keep their information current through follow-up correspondence for the 5-year period.



Undergraduate Fellowships - \$6,000

Description: Higher education is the top priority of NASA's Space Grant Program. NASA seeks to promote science, technology, engineering and mathematics (STEM) education; encourage interdisciplinary training, research and public service programs related to aerospace; and recruit and train US citizens for careers in aerospace science and technology. NASA Kentucky **Undergraduate Fellowships** recognize and support students addressing the challenges of aerospace research related to NASA's strategic goals. In cooperation with their research advisors, undergraduate students at Affiliate Institutions may apply for one-year scholarships to conduct 1-on-1 mentored research. Research projects must emphasize connections to NASA, address specific goals for the scholarship year and contribute to program metrics including publications, presentations and student advancement in disciplines of interest to NASA.

Eligibility: Proposals will be accepted from Principal Investigators at NASA Kentucky Space Grant Consortium Affiliate Institutions on behalf of undergraduate students in NASA-aligned disciplines. Women and minorities are strongly encouraged to apply. US citizenship is required.

Requirements: The proposed research topic must utilize NASA resources and be aligned with NASA priorities addressed by one or more of the Mission Directorates. Connections with Kentucky companies and/or NASA Kentucky strategic themes will be viewed favorably. (See also Table 1)

Proposal Content: See General Proposal Guidelines for formatting and file naming instructions.

1) Project Description: PI_UF_Project_2017.pdf

- No more than 5 pages including tables and figures describing: abstract (200-300 words), project summary, alignment with NASA Mission Directorate(s), specific goals for the funded period, anticipated outcomes and progress toward degree.
- Additional pages - included in PI_UF_Project_2017.pdf after 5 page project description
 - Bibliography/References as needed
 - Unofficial transcript
 - Letter of recommendation from a faculty member other than the research advisor
 - Research Advisor's 2 page CV
 - If applicable, letter of support from collaborator (NASA or non-NASA)
 - Description of NASA resources to be used

2) Student Information Form: SLN_UF_SIF_2017.pdf, where SLN is the student's last name - Completed by the student applicant and uploaded with proposal files.

Budget Guidelines: Maximum award level is \$6,000 per student per year. Allowable costs include student stipend or salary, fringe benefits, tuition and fees, materials and supplies up to \$500, and student domestic travel up to \$1,000. Indirect costs are not allowed. Cost-share not required.

Longitudinal Tracking of Students: All students receiving compensation must be reported in KERS. Any student receiving \$5,000 or more in NASA funding or working 160 hours or more on NASA-supported projects or a combination of both will be longitudinally tracked by NASA for five years using information provided on the NASA KY Student Information Form (SIF). Longitudinally tracked students will need to keep their information current through follow-up correspondence for the 5-year period.



Team Fellowships - \$10,000

Description: Higher education is the top priority of NASA's Space Grant Program. NASA seeks to promote science, technology, engineering and mathematics (STEM) education; encourage interdisciplinary training, research and public service programs related to aerospace; and recruit and train US citizens for careers in aerospace science and technology. NASA Kentucky **Team Fellowship awards** provide support for higher education student groups participating in design competitions sponsored by NASA or related engineering and science organizations. Example competitions include but are not limited to: NASA Robotic Mining Competition, NASA University Student Launch, AIAA Design/Build/Fly, and AUVSI. An expanded list of examples with links is available at nasa.engr.uky.edu/space-grant.

Eligibility: Proposals will be accepted from Principal Investigators at NASA Kentucky Space Grant Consortium Affiliate Institutions on behalf of teams of students in NASA-aligned disciplines. Women and minorities are strongly encouraged to apply. US citizenship is required.

Requirements: The proposed competition must be aligned with NASA priorities addressed by one or more of the Mission Directorates. Connections with Kentucky companies and/or NASA Kentucky strategic themes will be viewed favorably. (See also Table 1)

Proposal Content: See General Proposal Guidelines for formatting and file naming instructions.

1) Project Description: PI_TF_Project_2017.pdf

- No more than 5 pages including tables and figures describing: abstract (200-300 words), project summary, alignment with NASA Mission Directorate(s), specific goals for the funded period, anticipated outcomes, prior experience with team competitions and schedule of competition deadlines.
- Additional pages - included in PI_TF_Project_2017.pdf after 5 page project description
 - Bibliography/References as needed
 - Faculty Advisor's 2 page CV
 - If applicable, letter of support from collaborator

Budget Guidelines: Maximum award level is \$10,000 per team per year. Allowable costs include registration fees, materials and supplies, shipping costs to/from competition site, and faculty advisor and student team member domestic travel. Required cost-share of at least 0.5:1 (\$CS:\$Award) must be provided by the proposing institution. Indirect costs are not allowed, but unrecovered indirect costs on sub-recipient direct cost-share may be used as cost-share.

Longitudinal Tracking of Students: All students receiving compensation must be reported in KERS. Any student receiving \$5,000 or more in NASA funding or working 160 hours or more on NASA-supported projects or a combination of both will be longitudinally tracked by NASA for five years using information provided on the NASA KY Student Information Form (SIF). Longitudinally tracked students will need to keep their information current through follow-up correspondence for the 5-year period.

Research Initiation Awards - \$15,000

Description: Alignment with NASA interests and meaningful collaborations with NASA scientists are essential to the development of competitive proposals for federal funding opportunities. **Research Initiation Awards (RIA)** are a flexible funding program for faculty to become familiar with NASA research programs and Mission Directorates, establish and cultivate relationships with NASA scientists, and visit NASA facilities. RIA funding is the first step in the faculty pathway to build capacity to conduct NASA-aligned research. Next steps in the pathway include NASA KY EPSCoR Research Infrastructure Development Grants (RIDG), student support for research through Graduate and Undergraduate Fellowships, and NASA ROSES and other NASA research solicitations. RIA proposals may include travel, experiments to obtain preliminary results, data analysis or manuscript preparation. Any combination of faculty salary, student support, travel, materials and supplies, and corresponding indirect costs may be requested up to the \$15,000 maximum award amount. Preference will be given to early-career faculty and faculty changing research directions.

Eligibility: Proposals will be accepted from Principal Investigators at NASA Kentucky Space Grant Consortium Affiliate Institutions to develop NASA-aligned research activities. Women and minorities are strongly encouraged to apply. US citizenship is required.

Requirements: The proposed research topic must utilize NASA resources and be aligned with NASA priorities addressed by one or more of the Mission Directorates. NASA letter of support required. Principal Investigators are expected to submit at least one proposal for follow-on funding based on the RIA activities. (See also Table 1)

Proposal Content: See General Proposal Guidelines for formatting and file naming instructions.

1) Project Description: PI_RIA_Project_2017.pdf

- No more than 5 pages including tables and figures describing: abstract (200-300 words), project summary, alignment with NASA Mission Directorate(s), specific goals for the funded period, anticipated outcomes and plans for follow on funding.
- Additional pages - included in PI_RIA_Project_2017.pdf after the 5 page project description
 - Bibliography/References as needed
 - Principal Investigator's 2 page CV
 - Letter of support from a NASA collaborator expressing mutual interest in the research topic and agreement to meet with the Principal Investigator in person at a research facility or a specific conference. (See [NASA KY FAQ](#) for more information)

Budget Guidelines: Maximum award level is \$15,000 per faculty member per year. Allowable costs include faculty salary, student stipend or salary, fringe benefits, tuition, materials and supplies, and domestic travel. Required cost-share of at least 1:1 (\$CS:\$Award) must be provided by the proposing institution. Indirect costs are allowed and unrecovered indirect costs may be used as cost-share. Space Grant is a workforce development program. In line with this program, proposing institutions should use the "other" or training grant F&A rate (if one exists) versus the research F&A rate and indicate in the budget justification.

Longitudinal Tracking of Students: All students receiving compensation must be reported in KERS. Any student receiving \$5,000 or more in NASA funding or working 160 hours or more on NASA-supported projects or a combination of both will be longitudinally tracked by NASA for five years using information provided on the NASA KY Student Information Form (SIF). Longitudinally tracked students will need to keep their information current through follow-up correspondence for the 5-year period.

Mini-Grants - \$5,000

Description: Pre-college activities supported by the NASA Space Grant Program help to fill the pipeline with well-prepared, inspired and engaged students motivated to pursue higher education. NASA seeks to promote science, technology, engineering and mathematics (STEM) education; encourage interdisciplinary training, research and public service programs related to aerospace; and recruit and train US citizens for careers in aerospace science and technology. NASA Kentucky **Mini-Grants** provide support for outreach programs at scientific sites (museums, observatories, planetariums, etc.), hosting pre-college students on campus, and group travel to NASA-related events. Examples of mini-grant programs include but are not limited to: outreach programs at planetariums and observatories; pre-college student fieldtrips or workshops designed to recruit STEM students to the affiliate institution in disciplines of interest to NASA; professional development workshops for K-12 STEM teachers; and small group travel to Affiliate Institutions combined with travel to a NASA-related event such as Space Camp, AirVenture, rocketry competition or scientific site.

Eligibility: Proposals will be accepted from Principal Investigators at NASA Kentucky Space Grant Consortium Affiliate Institutions collaborating with scientific sites (museums, observatories, planetariums, etc.) or institution recruiters. Women and minorities are strongly encouraged to apply. US citizenship is required.

Requirements: The proposed activity must be aligned with NASA priorities addressed by one or more of the Mission Directorates. Small group travel awards must support at least six students on the proposed trip. Connections with Kentucky companies and/or NASA Kentucky strategic themes will be viewed favorably. (See also Table 1)

Proposal Content: See General Proposal Guidelines for formatting and file naming instructions.

1) Project Description: PI_MG_Project_2017.pdf

- No more than 5 pages including tables and figures describing: abstract (200-300 words), project summary, alignment with NASA Mission Directorate(s), specific goals for the funded period, anticipated outcomes and event dates.
- Additional pages - included in PI_MG_Project_2017.pdf after 5 page project description
 - Bibliography/References as needed
 - Principal Investigator's 2 page CV
 - Letter of support from institution partner, scientific site and/or NASA collaborator

Budget Guidelines: Maximum award level is \$5,000 per year. Allowable costs include registration and entry fees, materials and supplies, salary and fringe benefits for college student assistants, transportation (buses), and domestic travel expenses for faculty advisor, chaperone and students. Indirect costs are allowed. Cost-share not required, but match and in-kind cost-share of allowable costs is viewed favorably.

Longitudinal Tracking of Students: All students receiving compensation must be reported in KERS. Any student receiving \$5,000 or more in NASA funding or working 160 hours or more on NASA-supported projects or a combination of both will be longitudinally tracked by NASA for five years using information provided on the NASA KY Student Information Form (SIF). Longitudinally tracked students will need to keep their information current through follow-up correspondence for the 5-year period.

Enhanced Mini-Grants - \$15,000

Description: Pre-college activities supported by the NASA Space Grant Program help to fill the STEM pipeline with well-prepared, inspired and engaged students motivated to pursue higher education. NASA seeks to promote science, technology, engineering and mathematics (STEM) education; encourage interdisciplinary training, research and public service programs related to aerospace; and recruit and train US citizens for careers in aerospace science and technology. NASA Kentucky **Enhanced Mini-Grants** provide support for outreach programs at scientific sites (museums, observatories, planetariums, etc.), hosting pre-college students on campus, and group travel to NASA-related events. Examples of projects suited for enhanced mini-grants include but are not limited to: pre-service middle-school teacher training, museum-based projects for students and the general public, or pre-college STEM competitions.

Eligibility: Proposals will be accepted from Principal Investigators at NASA Kentucky Space Grant Consortium Affiliate Institutions collaborating with scientific sites (museums, observatories, planetariums, etc.) or affiliate institution recruiters. Women and minorities are strongly encouraged to apply. US citizenship is required.

Requirements: The proposed activity must be aligned with NASA priorities addressed by one or more of the Mission Directorates. Group travel awards must support an appropriate number of students on the proposed trip. Connections with Kentucky companies and/or NASA Kentucky strategic themes will be viewed favorably. (See also Table 1)

Proposal Content: See General Proposal Guidelines for formatting and file naming instructions.

1) Project Description: PI_EMG_Project_2017.pdf

- No more than 5 pages including tables and figures describing: abstract (200-300 words), project summary, alignment with NASA Mission Directorate(s), specific goals for the funded period, anticipated outcomes and event dates.
- Additional pages - included in PI_EMG_Project_2017.pdf after 5 page project description
 - Bibliography/References as needed
 - Principal Investigator's 2 page CV
 - Letter of support from institution partner, scientific site and/or NASA collaborator

Budget Guidelines: Maximum award level is \$15,000 per year. Allowable costs include registration and entry fees, materials and supplies, salary and fringe benefits for staff or college student assistants, transportation (buses), and domestic travel expenses for faculty advisor, chaperone and students. Indirect costs are allowed. Required cost-share of at least 1:1 (\$CS:\$Award) must be provided by the proposing institution. Indirect costs are allowed and unrecovered indirect costs may be used as cost-share. In-kind cost-share of all allowable costs is permitted.

Longitudinal Tracking of Students: All students receiving compensation must be reported in KERS. Any student receiving \$5,000 or more in NASA funding or working 160 hours or more on NASA-supported projects or a combination of both will be longitudinally tracked by NASA for five years using information provided on the NASA KY Student Information Form (SIF). Longitudinally tracked students will need to keep their information current through follow-up correspondence for the 5-year period.