E.6 FUTURE INVESTIGATORS IN NASA EARTH AND SPACE SCIENCE AND TECHNOLOGY

NOTICE: Revised January 17, 2020. In this revision new text is in bold and deleted text is struck through in order to clarify the FINESST program element in ROSES-2019 as follows: 1) The Earth Science Division has a second funding point of contact: philip.m.larkin@nasa.gov. 2) The summary transcript from the optional pre-proposal teleconference held December 2, 2019, is available on NSPIRES under "Other Documents." 3) Section 3.2.2 "Data Management Plans"adds a "Clarifying Note" regarding why normally needed data resource support letters (RLS) are not necessary. 4) Section "4.1 FINESST Proposals" adds a page number placement and format sentence. 5) Section 4.1.6 "Budget Timeline and Narrative" provides another case to explain the content of special documentation and its formatting. 6) Under Section 4.1.8 "Proposal compliance" a reference to Section 3.17 "Statements of Commitment and Letters of Resource Support" in The 2018 Guidebook for Proposers Responding to A NASA Funding Announcement is added to clarify that FINESST does not invite affirmation, recommendation, or support letters, i.e., letters that endorse the Intrinsic Merit, including significance or impact, of a proposal or the Future Investigator. If such letters are submitted, they are included in the six (6) page limit for the Scientific/Technical/Management section or plan.

NOTICE: Amended November 1, 2019. This amendment adds this new program element to ROSES-2019. An optional pre-proposal teleconference will be held December 2, 2019, from 1:00-2:30 p.m. Eastern Time, see Section 1.1 for details. A Notice of Intent is not requested for this program element. Proposals are due by February 4, 2020.

1. Introduction and Funding Opportunity Description

The Future Investigators in NASA Earth and Space Science and Technology (FINESST) is a new program element in Research Opportunities in Space and Earth Sciences (ROSES)-2019. ROSES is an "omnibus" solicitation, having default guidelines and information in the *ROSES Summary of Solicitation* that apply to all of ROSES, including this program element. Through FINESST, the Science Mission Directorate (SMD) solicits proposals from accredited U.S. universities and other eligible organizations for graduate student-designed and performed research projects that contribute to SMD's science, technology and exploration goals.

The Future Investigator (FI, i.e., the student participant) shall have the primary initiative to define the proposed FINESST research project and must be the primary author, with input or supervision from the proposal's Principal Investigator (PI), as appropriate. In cases when the PI already has an ongoing research award from NASA, the research proposed under FINESST may address a similar topic, but the proposal should make clear how the proposed research goes beyond what NASA has already agreed to support.

In 2018, SMD released FINESST as a stand-alone, successor solicitation to the NASA Earth and Space Science Fellowship (NESSF); however, FINESST is not a fellowship. FINESST awards are research grants. If necessary, however, as described in Section 3.4 of the Grant and Cooperative Agreement Manual (GCAM) "Determining Whether to Issue a Grant or Cooperative Agreement", NASA may issue cooperative agreements to the submitting universities or other eligible institutions.

The titles of proposals that were selected by the participating divisions under the inaugural FINESST competition can be accessed on the NSPIRES page for FINESST-2019 by downloading the PDF files under the heading "Selections". In 2020, SMD estimates it will receive about ~1000 FINESST proposals and will select/award about 100. Dissimilar to FINESST-2019, in addition to the PI and FI names and institutions, abstracts of selected projects will be posted on the FINESST NSPIRES page.

A key criterion for proposal evaluation (See Section 5) and selection is the relevance of the proposed investigation to the Science Mission Directorate (SMD). Information on NASA's Strategic Goals and Objectives and SMD's high-level objectives is in 2018 NASA Strategic Plan. Detailed plans/objectives that correspond to the science divisions of SMD: Heliophysics, Earth Science, Planetary Science, and Astrophysics appear in Chapter 4 of the 2014 NASA Science Plan. All FINESST proposals must address one or more goal(s) and objective(s) relevant to at least one SMD division.

The proposal must present a well-defined research problem/activity and a justification of its scientific significance to NASA, as well as a detailed approach for its solution/conduct. Proposals should explain how the research is relevant to the particular SMD division that will review the proposal. The proposal should refer to a specific research topic(s) solicited by a Division (e.g., but not limited to, the program or program elements listed in Table 3 of ROSES).

Proposal submission requires choosing just one reviewing division. However, proposals that are relevant to more than one division are welcome. If, prior to a proposal's review, NASA determines that a submitted proposal belongs to a different division, then it may suggest that the proposal be sent to another division for review. Alternatively, NASA may choose to reassign the proposal without consulting the proposer and notify the proposer later.

1.1 Pre-Proposal Teleconference (Optional)

On a no-advance-reservation, first-to-dial-in basis callers can attend the pre-proposal teleconference. Email HQ-FINESST@mail.nasa.gov any teleconference agenda suggestions and questions using "December 2019 Telecon" in the email's subject line on or before November 25, 2019.

The optional pre-proposal teleconference on December 2, 2019, begins 1:00 p.m. and ends 2:30 p.m. Eastern Time. SMD will post the teleconference charts no later than noon Eastern Time on the teleconference day under "Other Documents" on FINESST's NSPIRES page.

An operator will add callers in listen-only mode and on-hold music will play until the FINESST leaders start the conference. If there is time to take caller questions, the operator who moderates will provide instructions during the call. Caution: to preserve

anonymity callers, callers must not disclose their names or institutions. If a caller can't join the call for any reason, e.g., scheduling conflict, number of callers exceeds capacity, see Section 1.2 "Record/Replay of the Pre-Proposal Telecon".

No earlier than 30 minutes prior to the start time, call 1-888-324-3185 (U.S.-only Toll Free) or 1-630-395-0272 (U.S. Toll) and use Participant Passcode: 8018549. Restrictions may prevent the use of a toll-free number from a mobile or free-phone or from telephones outside the U.S.

For TTY-equipped callers or other types of relay services no earlier than 30 minutes before the start of the teleconference, call 711 and provide the same conference call number 1-888-324-3185 (U.S.-only Toll Free) or 1-630-395-0272 (U.S. Toll) and Participant Passcode: 8018549.

1.2 Record/Replay of the Pre-Proposal Telecon (Optional)

Unless the recording quality prevents it, e.g., poor sound, concerns about loss of caller anonymity, etc., audio-only, on-demand replays of the pre-proposal teleconference should be available by 6:00 p.m. Eastern Time starting on December 2. No later than 9:00 p.m. Eastern on January 30, 2020, on-demand replays will end. For the FINESST pre-proposal telecon replay call numbers 800-947-6790 (Toll Free) or 402-220-4622 (Toll) and enter Passcode: 120219.

Reminders: Restrictions may prevent the use of toll-free replay number from a mobile or free-phone or from telephones outside the U.S. For relay services call 711 and provide the FINESST pre-proposal telecon replay call numbers.

NSPIRES ~~will~~ post**ed** a written summary of the recorded call under "Other Documents" ~~no later than 45 days following the teleconference~~ **on January 16, 2020. [revised January 17, 2020]**

2. Scope of Program: Division Research Overviews

This section presents a partial overview of the research funded by SMD's science divisions that review FINESST proposals. Proposers may refer to the list of research program element(s) solicited by a particular division(s) in Table 3 of this year's ROSES solicitation to get an indication of topics that are covered by each division. This list is not exhaustive since it changes from year to year. If a particular program element is listed as "not solicited this year", TBD, or even absent this year, that topic is still in scope for FINESST. For example, despite the fact that ROSES-2019 does not solicit Biodiversity as program element A.7, a potential proposer to FINESST with an interest in that research may propose it to Earth Science. Similarly, though the DSCOVR Science Team doesn't appear on the list this year at all, Deep Space Climate Observatory data is still of interest to Earth Science. If the proposed project would be relevant to more than one division (e.g., exoplanets) then please note this in the abstract and specify those other divisions.

2.1 Earth Science Research Program

Earth Science proposers must review ROSES-2019 A.1 Earth Science Research Overview for complete information.

The Earth Science Research Program, managed by the Earth Science Division (ESD) of the Science Mission Directorate (https://science.nasa.gov/earth-science), contributes to NASA's mission, in particular, Strategic Objective 1.1: "Understanding The Sun, Earth, Solar System, And Universe" (from the 2018 NASA Strategic Plan). This strategic objective involves the following key questions:

- How is the global Earth system changing?
- What causes these changes in the Earth system?
- How will the Earth system change in the future?
- How can Earth system science provide societal benefit?

The ESD welcomes proposals that relate to: Research and Analysis, Applied Sciences, Earth Science Technology Office, and Flight. ESD encourages proposals that place particular emphasis on the utilization of unique NASA capabilities in studies of the Earth.

Do not submit to the Earth Science Division proposals on these topics:

- molecular biology, biochemistry, development, physiology, or evolution of living organisms, without a direct utilization of remote sensing approaches or global/regional modeling which makes use of remote sensing data, or
- efforts in laboratory and/or theoretical chemistry that are not directly related to remote sensing and/or computational modeling of atmospheric gas phase and particulate composition, or
- social science research that is not directly linked to NASA observations and/or models.

Proposers should examine the relevance to other SMD programs in FINESST (e.g., astrobiology in the Planetary Science Research Program) or graduate research opportunities funded elsewhere at NASA, e.g., the Space Technology Mission Directorate, etc., or outside NASA.

2.2 Heliophysics Research Program

Heliophysics proposers must review ROSES-2019 B.1 Heliophysics Research Program Overview for complete information.

Chapter 4.1 of the *SMD Science Plan 2014* available at http://science.nasa.gov/about-us/science-strategy/ describes the Heliophysics research program. The NASA Strategic Objective for Heliophysics is to understand the Sun, Earth, Solar System, and Universe. In pursuit of this objective, and with guidance from the National Research Council's most recent decadal survey, *Solar and Space Physics, A Science for a Technological Society* (download free PDF), key questions are:

- What causes the Sun to vary?
- How do the geospace, planetary space environments, and the heliosphere respond?
- What are the impacts on humanity?

The research program supports theory, modeling, and data analysis utilizing remote sensing and *in situ* measurements. The program also supports investigations of the physics of magnetospheres, including their formation and fundamental interactions with

plasmas, fields, and particles and the physics of the terrestrial mesosphere, thermosphere, ionosphere, and auroras, including the coupling of these phenomena to the lower atmosphere and magnetosphere. For further information, consult *Our Dynamic Space Environment: Heliophysics Science and Technology Roadmap for 2014-2033* (download PDF).

2.3 Planetary Science Research Program

Planetary Science proposers must review ROSES-2019 C.1 Planetary Science Research Program Overview for complete information.

The Planetary Science Research Program, managed by the Planetary Science Division, sponsors research that addresses the broad strategic objective to "Ascertain the content, origin, and evolution of the Solar System and the potential for life elsewhere." To pursue this objective, the Planetary Science Division has five science goals that guide the focus of the division's science research and technology development activities. As described in Chapter 4.3 of the SMD 2014 Science Plan (https://science.nasa.gov/about-us/science-strategy), these are:

- Explore and observe the objects in the Solar System to understand how they formed and evolve.
- Advance the understanding of how the chemical and physical processes in the Solar System operate, interact and evolve.
- Explore and find locations where life could have existed or could exist today.
- Improve our understanding of the origin and evolution of life on Earth to guide our search for life elsewhere.
- Identify and characterize objects in the Solar System that pose threats to Earth or offer resources for human exploration.

The Planetary Research Program invites a wide range of planetary science and astrobiology investigations in order to address the goals above, but this program also supports research into:

- Investigations into the potential for both forward and backward contamination during planetary exploration, methods to minimize such contamination, and standards in these areas for spacecraft preparation and operating procedures;
- Investigations which enhance the scientific return of NASA Planetary Science Division missions through the analysis of data collected by those missions;
- Advancement of laboratory- or spacecraft-based (including small satellites, e.g., CubeSats) instrument technology that shows promise for use in scientific investigations on future planetary missions; and
- Analog studies, laboratory experiments, or fieldwork to increase our understanding of Solar System bodies or processes and/or to prepare for future missions.

2.4 Astrophysics Research Program

Astrophysics proposers must review the ROSES-2019 D.1 Astrophysics Research Program Overview for complete information.

The Astrophysics Research Program, managed by the Astrophysics Division, explores the Universe beyond our Solar System: from the search for planets and life in other stellar systems to the origin, evolution, structure, and destiny of the universe itself.

Investigations submitted to the Astrophysics research program should explicitly support past, present, or future NASA astrophysics missions. These investigations may include theory, simulation, data analysis, and technology development. The Astrophysics research program and missions are described in Chapter 4.4 of the SMD 2014 Science Plan available at https://science.nasa.gov/about-us/science-strategy.

3. FINESST Program Principles and Proposal Constraints

3.1 Eligibility and Restrictions on Submissions

Participation in ROSES-funded research by non-U.S. organizations in this program is welcome, but on a "no exchange of funds" basis. It is NASA policy that each international partner, its sponsoring agency, or its funding/sponsoring institution, covers its own research contributions (further information on foreign participation is provided in ROSES FAQ #14 on this topic and the *NASA Guidebook for Proposers*).

Normally, a higher education institution will submit the proposal; however, other institutions that may receive a grant and that have a relationship with an educational institution may submit a proposal as long as the FI is enrolled at an accredited U.S. higher education institution. The budget justification must provide evidence from the U.S. institution of the student's enrollment/good standing in an eligible degree program.

This call solicits proposals for a research project conducted by an individual Future Investigator (FI) who is or will be pursuing a Masters or PhD degree in an Earth or space sciences-related discipline from an accredited U.S. university. By the proposal due date, the student, known as a future investigator (FI), must have applied to, been admitted to, or be enrolled as a graduate student at an eligible, accredited U.S. university.

An FI may be a participant on only one submitted FINESST proposal at a time.

There must be a principal investigator (PI) at the submitting institution who will serve as the research mentor and acts as a champion for the FI by serving as guide, role model, teacher, etc., who supports the FI's research and professional development. The PI is determined based on the norms, policies, and practices of the proposing institution and the requirements of the proposed research. NASA does not advise or assist on who should be the PI.

A PI may submit more than one proposal to this program element (if it is on behalf of more than one student). See Section 3.2.

A PI may have FINESST and other (e.g., ROSES) proposals with overlapping tasks submitted at the same time. However, upon selection of either, the PI must alert both the funding FINESST program scientist and the other program manager. Proposals that overlap with previously submitted proposals still under consideration should acknowledge, e.g., in the budget justification, that funds are requested elsewhere. If NASA selects both the FINESST and non-FINESST proposals, the AOR/PI must inform the NASA managers so that budget negotiations/adjustments may ensue.

Although a proposing organization may submit more than one proposal to this solicitation, duplicative proposals from the same organization in the same year are not solicited and may be returned without review. However, the resubmission of a not-funded proposal from a prior competition is permitted and will treated the same as an entirely new submission.

A student currently or in the past supported by a NESSF award is not normally eligible for FINESST. Only students supported by NESSF for fewer than three years are eligible for support via FINESST and only up to a maximum of three years total support from NESSF and FINESST combined.

An FI who proposed to, but was not funded by, a prior FINESST or another solicitation such as NESSF is eligible to be included on a proposal in response to this program element. Similarly, a FI (or PI) who previously declined to accept NASA funding is eligible.

Since a FINESST award requires a significant commitment, an FI whose time is already funded by another award is not eligible to propose to this opportunity.

Students in the first or second year of a multi-year fellowship (such as from National Science Foundation or another source) that provides stipend and tuition beyond September 2020 are discouraged from participating in this FINESST solicitation.

During the period that a FINESST proposal is under consideration or during the period of performance of a FINESST grant, the funded institution’s Authorized Organization Representative (AOR) must inform NASA if the student has accepted any Federal fellowship or traineeship that 1) provides stipend and other participant support costs, e.g., tuition *and* 2) is longer than three months in duration. In an instance when such a proposal is selected, NASA may require a revised budget and, if appropriate, a revised proposal for any active award to ensure that the FI can devote sufficient time to the FINESST research.

Since FINESST is a research grant and not a fellowship, there are no deferments, reserves, or tenure years. Only after selection or award are requests for a period of performance change potentially allowable. The funding program’s technical officer in conjunction with the NASA Shared Service's Center (NSSC) handles/decides such requests on a case-by-case basis.

In accordance with 2 CFR 200 and a recipient's institutional policies, students funded by a FINESST grant may be eligible to pursue other employment, e.g., teaching, consulting, etc., or receive stipend support from another source if it does not conflict with or preclude conducting the FINESST research.

NASA recognizes and supports the benefits of having diverse and inclusive scientific, engineering, and technology communities. FIs (and PIs) with disabilities and/or from underrepresented minority groups are urged to propose. No proposal shall be denied consideration on the grounds of race, color, age, ethnicity, national origin, religion, pregnancy, sexual orientation, gender identity, sex, marital status, disability, or status as of a team member as a U.S. Veteran.

3.1.1 Limitations on Participants and Research Conducted in Designated Countries

In accordance with language in Appropriation Acts that restrict NASA from funding certain projects involving the People's Republic of China (PRC), NASA is "prohibited from funding any work that involves the bilateral participation, collaboration, or coordination with China or any Chinese-owned company or entity, whether funded or performed under a no exchange of funds arrangement." Proposing organizations will be required to certify compliance with regarding this NASA PRC funding restriction. Prospective FINESST PIs or/and FIs affiliated with PRC institutions may not be eligible. See https://science.nasa.gov/researchers/sara/faqs/prc-faq-roses/ for the ROSES FAQ on this subject.

The purpose of FINESST is to provide support primarily for fundamental research and/or technology development projects that normally would not expect to be subject to export control. However, should the FI's proposed research project fall under International Traffic in Arms Regulations (ITAR) or Export Administration Regulations (EAR), then only U.S. persons may be participants, and proposers must identify the parts of the proposal that contain ITAR material as instructed in Appendix A of the *NASA Guidebook for Proposers*.

Proposals that would involve research or collaboration outside the United States in "Designated Countries" that also are "State Sponsors of Terrorism" will be subject to additional levels of review by the Office of International and Interagency Relations (OIIR) that may result in a proposal being denied. NASA's "Designated Country (DC) List" is hosted on the NASA Export Control website at https://www.nasa.gov/oiir/export-control. The relevant part of the list is Column II, i.e., Countries determined by the Department of State to support Terrorism. The DC list is updated regularly; therefore, please consult the website to ensure use of the most up-to-date list. Otherwise, beyond the standard restrictions that prevent subawards to non-U.S. institutions, there are no restrictions on international collaboration. The FINESST program does not allow subawards/contracts.

NASA Centers and other Federal entities that do not grant degrees are not eligible institutions for FINESST awards. Federal civil servants who lack status or a qualifying affiliation at an eligible degree-awarding institution may not serve as Principal Investigators. Federal civil servants who are eligible to propose through an eligible institution may serve as PIs.

Regarding participation from a NASA Center, NASA civil servants must avoid any perception of or potentially real conflict of interest (COI). Civil servants who want to appear as a Collaborator or Co-Investigator in a FINESST proposal must follow the policies and procedures in place at their employing center or facility and, if applicable or necessary, refer questions to their Center's General Counsel. No Co-Investigators, including civil servants will be funded through this program.

3.2 Data Limitations and Requirements

3.2.1 *Data Eligibility*

Spacecraft mission data to be used in proposed work must be available in a publicly accessible archive (e.g., https://earthdata.nasa.gov/, http://spdf.gsfc.nasa.gov/,

https://science.nasa.gov/astrophysics/astrophysics-data-centers, https://pds.nasa.gov/, and http://umbra.nascom.nasa.gov/) at least 30 days prior to the proposal due date.

Proposals that require spacecraft mission data that has not been public for at least 30 days prior to the full proposal due date are not compliant and may be returned without review or declined after review, no matter the peer review score. Proposals that can proceed with public data, i.e., are not reliant on future data, but would make use of future data if/when it comes along during the duration of the award are acceptable. Proposers should make it clear that the project would be improved by future data, but such data is not necessary.

The data eligibility requirement applies only to spacecraft mission data, not to other kinds of data, such as airborne campaigns, field campaigns, fieldwork, etc., that are collected as part of the proposed research. Proposing to use any kind of data that has not yet been collected is a risk but not prohibited. If a project is completely dependent on "risky" data, e.g., not acquired, not publicly available, etc., that could prevent selection and/or be noted as a proposal weakness.

3.2.2 *Data Management Plans*

In keeping with the NASA Plan for Increasing Access to Results of Federally Funded Research, a Data Management Plan (DMP), or an explanation of why one is not needed given the nature of the work proposed, is required to be contained by the NSPIRES coversheet. The DMP is not part of the proposal page limit, but it is limited to two, 4000-character plain text boxes on the NSPIRES web pages associated with the proposal. The goal of the policy is to ensure the public release of data that is generated as a result of federally funded research programs like this one. Thus, proposers should plan that all data will be made available by the end of the award, with certain notable exceptions: work that is proprietary or may affect U.S. economic competitiveness; work that results in personally identifiable human subjects research data; export-controlled data; controlled unclassified information data; national security classified data; and SBIR/STTR contracts. The point of the DMP is to ensure that the proposer plans in advance what data will be made public and that time is allocated to that important task. A DMP should answer these types of questions:

1. What data types, volumes, formats, and (e.g., where relevant) data standards?
2. Where does the project intend to make these data available?
3. When will these data be made available?
4. Who will do archiving and what experience do they have with this kind of data, archive, etc.?

Regardless of what the DMP submitted with the proposal says, grantees must still meet the mandatory minimum requirement that the data behind figures and tables in peer-reviewed publications be available electronically at the time of release, ideally in supplementary material with the article. See the ROSES DMP FAQs.

Clarifying Note: Third-party resource support letters to archive the data, permissions from data owners/authors, data licenses, or any other scenario are not required. Simply state in the DMP who has agreed to what. A data resource support letter(s) may be submitted with the FINESST budget. For additional guidance, see Section 4.1.6 “Budget Timeline and Narrative.” Reminder: Do not

add resource support letters from any collaborator or team member listed under Section VI of the NSPIRES cover page and who acknowledges commitment via NSPIRES. When a data collaborator directly confirms in NSPIRES, that is sufficient resource commitment to the FINESST project. [revised January 17, 2020]

3.2.3 *Archiving Manuscript Versions of Publications*

In keeping with the NASA Plan for Increasing Access to Results of Federally Funded Research, awards deriving from ROSES, including this FINESST program, include terms and conditions requiring that as accepted manuscript versions of peer-reviewed publications (hereafter "manuscripts") that result from ROSES awards be uploaded into NASA's part of the PubMed Central (PMC) repository called NASA PubSpace. The Federal Register notice on this subject specifies that manuscripts be deposited within one year of completion of the peer review process. Please note that not doing so may delay or prevent awarding of funds. This applies only to peer reviewed manuscripts. Patents, publications that contain material governed by personal privacy, export control, proprietary restrictions, or national security law or regulations will not be covered by this requirement. For more details on public access to scientific publications and digital scientific data resulting from NASA-funded research, please see: https://www.nasa.gov/open/researchaccess.

4. Proposal Preparation and Submission

The FI (student) must be the primary author of the proposal's research project description and personal statement.

Proposals are due: 11:59 p.m. Eastern Time, February 4, 2020.

All proposals must be submitted in electronic format only. For those unfamiliar with NSPIRES, instructions, tutorials, and FAQs for submitting electronic proposals are located at https://nspires.nasaprs.com/tutorials/index.html. If you already know how to submit an NSPIRES proposal, just go to the NSPIRES page for this FINESST element of ROSES and click on the appropriate "Create" button. Proposers must complete the NSPIRES cover pages, including the FINESST Program Specific Data questions, such as filling out the text box for the Data Management Plan, described above.

When creating the proposal one must choose the division (see Section 2) to which the proposal will be submitted. If the proposed project would be relevant to more than one division (e.g., exoplanets) then please note this in the abstract and specify those other divisions.

4.1 FINESST Proposals

The contents of the proposal must include the elements listed below, clearly identified, starting on a new page, and appearing in the order below in a single PDF file. **Page numbers are permitted in headers and footers, and no format style, letters, numbers, or combination is specified [revised January 17, 2020]**. Main body text of proposals and captions must use an easily read font of no more than 15 characters per horizontal inch (typical of 12-point Times New Roman) and no more than 5.5 lines per vertical inch (*i.e.,* single-spaced). There must be at least one-inch margins on all sides,

and the proposal must be sized for U.S. letter size (8.5x11) paper. Non-compliant proposals may be returned without review. FINESST proposals do not require current and Pending Support, nor a Summary Table of Work Effort. In addition to (and after) the table of contents, the content of the proposal is as follows:

4.1.1 *Personal Statement*

This section must contain a personal statement of up to two pages authored by the FI that addresses the research readiness criterion from Section 5.1 and

a. Outlines the FI's goals, expertise, attributes, any relevant barriers to study and/or research encountered and steps taken to overcome any such barriers, etc.
b. Highlights any relevant academic or other experiences prior to proposal submission, e.g., undergraduate studies, or other degree(s), graduate study already completed, etc.
c. Provides a graduate study timeline that at minimum states the degree type (Ph.D/M.Sc. or both) and the start and completion dates estimates.

This section may total no more than two pages, conforming to formatting requirements (line spacing etc.) in Section 4.

4.1.2 *Science/Technical/Management Section*

This section describes the proposed research project and may include figures and tables as appropriate. This section, excluding citations, may total no more than six (6) pages conforming to formatting requirements in Section 4. The project description should include the following elements:

a. A well-defined problem with a justification of its scientific significance and a detailed approach for its resolution.
b. A statement describing the relevance of the proposed work to the appropriate SMD Division and a program within that division. Note: If the research is relevant to more than one division/program, please identify the other division(s).
c. A description of the approach to be taken to address the chosen problem.
d. A period of performance or timeline for the proposed project listing anticipated accomplishments and major milestones, including planned publications.

4.1.3 *References/Citations and Acknowledgements*

Citations and/or endnotes must directly follow the project description and are not included in the research description's 6-page limit. Provide all references and citations for the 6-page project description using easily understandable, standard abbreviations for journals and complete names for books. Providing URLs is done at the proposer’s own risk. Reviewers are not obligated to follow any links.

Though this FINESST element does not specify what is "allowed content" for either References/citations nor the Acknowledgements, it should not include technical information that belongs in the project description. The *Guidebook for Proposers Responding to A NASA Funding Announcement* explains restrictions and preferences for bibliographies and appendices.

In an acknowledgement statement of up to 150 words, describe the FI and PI or any other team member roles in preparing the proposal. This statement must affirm that the

proposal is the work of the FI. It is acceptable for an FI to receive editorial and/graphic support from a writing center, copy editor, colleagues, and peers to improve the proposal (e.g., grammar, clarity, structure), but this help should be acknowledged, if applicable.

4.1.4 *Curriculum Vitae (CV) for the PI (mentor) and the FI*

The PI's and FI's CV or resume are mandatory and limited to two pages each. Any mentors beyond the PI may be given the role of (unfunded) Co-Is or collaborators, depending on their level of involvement. The CV is optional for any Co-I(s). Do not provide CVs for collaborators.

4.1.5 *Mentoring plan or agreement*

The Mentoring Plan/Agreement should not exceed 2-pages**.** Both the FI and PI prepare and sign this agreement that may include more than one mentor; however, having additional mentors does not extend the page limit. Non-PI mentors do not have to be at the submitting institution. It is optional to include mentors beyond the PI, but if they are named, they must be added to the NSPIRES cover page as team members.

At minimum, the Mentoring Plan must include a statement that the FI and PI have committed to the accomplishment of the research project. The content, format, and organization of mentoring plan are at the discretion of PI-FI team.

If the submitting institution has a standard Mentor-Mentee checklist, plan, agreement, template, etc., and it is longer than 2-pages, uses font size, margins, etc., that do conform to this solicitation, then the institution’s standard is acceptable.

The plan’s purpose is to provide the FI with a plan for developing skills and acquiring knowledge and experiences necessary to complete the research project and should address the research readiness criterion from Section 5.1. This mentoring plan does not need to re-state information provided in response to sections 4.1.1-4.1.4. The mentor(s) may explain in the mentoring plan why the mentor has agreed to support this FI’s research.

If the proposing institution has no mentorship standards, policies, forms, templates etc., then see Explanatory Note E: Mentoring Plan/Agreement: An Introduction for PI-FI Teams

4.1.6 *Budget Timeline and Narrative*

This section should not exceed 2-pages, excluding any special documentation that, for example, may be required from a non-profit that is not an education organization that the proposed FI is enrolled/in good standing in an eligible degree program at a university. **Another example of special documentation allowed by ROSES and Section 3.17 in the *Proposer's Guidebook's* are "Letters of Resource Support" ROSES Table 1 explains: "A letter of support is required from the owner of any facility or resource that is not under the direct control of the PI or a Co-I acknowledging that the facility or resource is available for the proposed use during the proposed period." If possible, use the FINESST format requirements for special documents such as, but not limited to, Resource Support Letters (RSL) [revised January 17, 2020].**

Propose a budget start date and end date. However, given NASA's review schedule and other limitations, the start date cannot be much earlier than September 1. In general, the latest proposed start date is one year (approximately) from this solicitation's February due date. NASA reserves the right to change the requested start date/end date for the award's period of performance.

Propose a timeline that makes sense for the research project month-by-month, quarterly, semester, etc. The budget timeline must include a brief budget justification narrative that explains the proposed allocation of funds across eligible participant support categories, e.g., what is the stipend? What is for the FI's activities as a mentee, e.g., travel, subscriptions, workshop registrations, society memberships, etc.? What, if any, amount is requested for tuition or similar funds for the university? When the university is committing to reduce or waive tuition and fees for the student, specify that amount in the budget justification. See Section 10 Explanatory Note B - Limitations on FINESST Budget Categories.

Students funded by a FINESST grant may receive funding from other sources for expenses not covered by this award (e.g., to purchase equipment). FIs may take a hiatus to pursue other activities such as internships, family leave, military leave, etc. When a student is on hiatus for any period after the funding has been awarded, the student will not receive a FINESST stipend, and the institution shall not draw down/spend the FINESST stipend funds during the FI's hiatus.

FINESST funds may be requested to support an FI's tuition; fees (allowable under 2 CFR 200 and consistent with university policy); travel in support of the research investigation or to conferences, symposia, or collaborative meetings; text books or other instructional supports; expendable laboratory supplies; page charges for journal articles; printing of a thesis; or health insurance policy, see Section 10.2 Explanatory Note B-Limitations on FINESST Budget Categories.

4.1.7 *Optional High-End Computing Appendix*

The High-End Computing (HEC) program (https://www.hec.nasa.gov/) provides a specialized computational infrastructure to support NASA's research community. Proposers to FINESST may apply for HEC resources to support their research by uploading an Appendix as a separate PDF file, so do not include it in the main proposal

PDF file. See Section 10.1, Explanatory Note A, below for details on how to pursue this option.

4.1.8 *Proposal compliance*

- Proposals containing unsolicited appendices/attachments may be declared noncompliant.
- Do not include undergraduate or graduate transcripts for the FI. This is a research grant not a fellowship.
- Proposals not submitted by the required deadlines, and/or that do not meet the eligibility, page length, formatting and/or other requirements as listed in the funding announcement may be returned without review.
- Team members beyond the FI and PI are permitted in cases where needed, e.g., to show a second mentor. NASA wants to know who will be participating on the project in order to manage organizational conflict of interest during peer review, but, in general, additional team members do not give any advantage nor may they be funded via FINESST.
- All team members must be listed on the NSPIRES cover page. Please note that a proposal cannot be submitted if any listed team member, including unfunded collaborators, do not log into NSPIRES and confirm their role on the proposal.
- **FINESST does not invite recommendations or support letters. A recommendation letter is a type of "letter of affirmation," i.e., letters that endorse the Intrinsic Merit, including significance or impact, of a proposal. If letters of affirmation are submitted, they may not be submitted as an appendix; they are counted and included within the six (6) page Scientific/Technical/Management section. For full details see Section 3.17 "Statements of Commitment and Letters of Resource Support" of The 2018 Guidebook for Proposers Responding to A NASA Funding Announcement. [revised January 17, 2020]**

4.2 Confirmation of Proposal Submission and Late Proposals

Proposals must be complete and submitted electronically by 11:59 p.m. Eastern Time on the due date given in Tables 2 and 3 of ROSES. NSPIRES generates an automatic acknowledgement when any proposal is submitted. When the FINESST solicitation completely shuts down on NSPIRES, the proposer is prevented from finishing a submission. If the institution did not receive an email confirming submission of a proposal, check spam filters and junk boxes. If unable to locate the email acknowledgement, contact the NSPIRES Help Desk or log in directly to NSPIRES to check a submission status.

NSPIRES marks FINESST proposals submitted after the due date or deadline as "late". Late proposals will be handled in accordance with the SMD Policy on Late Proposals. SMD does not pre-approve the submission of a late proposal. The decision to submit a late proposal is solely that of the proposer, and it is then NASA's decision whether to accept it or not. Late proposals are rarely accepted, except in cases of problems with NSPIRES. The FINESST program scientists/administrators are not empowered to authorize the submission of a late proposal.

5. Proposal Evaluation and Selection

5.1 Review

NASA Headquarters Science Mission Directorate scientist(s) and program managers/executives, or their designees, conduct proposal evaluations through one or a combination of the following methods: individual reviews, virtual panels, or face-to-face panels. Reviewers can be from the external community including scientists at NASA Centers. While reviewers may not be experts in every subtopic or discipline within the FI's proposed research field, the reviewers will be experts in the broader research.

If SMD determines that a proposal has been submitted to the wrong division prior to review, then it may give permission for a proposal to be reassigned to another SMD division or shared for additional review.

For a detailed description of standard NASA review processes for proposals, including qualitative rating definitions, see APPENDIX D of the most recent *NASA Guidebook for Proposers* (also known as *Guidebook for Proposers Responding to a NASA Research Announcement* and *Guidebook for Proposers Responding to a NASA Funding Announcement*) available at: https://www.hq.nasa.gov/office/procurement/nraguidebook/.

The standard proposal review process includes for each review criterion a narrative assessment of a proposal's strengths and weakness. For detailed information, see the *ROSES-19 Summary of Solicitation* Section VI. "PROPOSAL REVIEW INFORMATION."

This program element has criteria that differ from the default presented in the ROSES Summary of Solicitation. The criteria for evaluation of FINESST proposals are:

(a) The scientific merit of proposed research project. Assessing the scientific merit of the proposed research includes:

1. The compelling nature of the research topic.
2. The exhibited depth of understanding of the research topic.
3. The expected impact of the research, should it succeed.
4. The feasibility of the proposed research plan, including the availability of resources for successful completion of the project.
5. The robustness of the research plan to anticipated setbacks.

(b) The relevance of the proposed research or technology development to SMD's objectives in Earth and/or space science as described in Section 2: Division Research Overviews. Proposals must be specific about how the proposed research is relevant to the particular division/program that will review the proposal. Note: peer reviewers may comment on relevance, but the funding SMD Division makes the ultimate determination on relevance.

(c) Research readiness assessment.

This criterion focuses on how the FI's research design, approach, attitudes, or perceptions correlate to their actual research skills/capabilities as described in the:

1. FI's personal statement.

2. The PI-FI Mentoring Plan/Agreement.
3. The FI's curriculum vitae/resume.
4. The PI's curriculum vitae/resume.

Reviewers evaluating research readiness may be asked to consider the following questions: Does the FI's record of performance demonstrate an ability to excel and to learn? Does the choice of research mentor(s) complement the proposed research project? Has the FI been involved in any activities within or outside of academia that make them particularly capable of conducting the proposed research? Will the proposed mentoring activities advance the FINESST research and enable access to resources, prepare the FI to apply for NASA opportunities, and/or in other ways facilitate the FI's growth as a new professional?

(d) Cost reasonableness.

FINESST grants are limited cost category awards. NASA personnel will look at the split between stipend and other participant support costs (see Section 6).

5.2 Selection

The Directors of the Science Divisions of SMD at NASA Headquarters or their designees make the respective award selections. The Selection Officials will select proposals as judged against the evaluation criteria in Section 5.1, divisional objectives, and those in this announcement, programmatic considerations, and the available financial resources.

Many proposals will receive scores that make them fundable but may not be selected for programmatic reasons, e.g., either because the proposed work is redundant with another FINESST project, or the topic is deemed by NASA to be of lower priority for funding/selection. Other programmatic considerations include and are not limited to balance across subdisciplines and institution types, technologies, methodologies, data accessibility, etc.

At the conclusion of the review/selection process, an NSPIRES email will be sent to the PI and the university asking them to log into the NSPIRES. PIs/organization representatives are responsible to download NASA letters and feedback and share with the FI. Abstracts of selected proposals will be publicly posted on the NSPIRES page for FINESST.

6. Award Information and Restrictions

Unless otherwise specified in the proposal, the default start date of all new awards is September 1, 2020. A NASA grant officer at the NASA Shared Services Center (NSSC) in Mississippi will conduct a pre-award review of risk associated with the proposer (*i.e.,* submitting university or non-profit) as required by 2 CFR 200.205.

FINESST supports an independent research project performed by a Future Investigator (FI). The PI and the FI are to work with the university Office of Sponsored Research or its equivalent to determine the appropriate allocation in each budget category.

The maximum amount of a FINESST award is $45,000 per 12-months and up to $135,000 total for a period of performance maximum of 36 months (not including a hiatus, if applicable).

SMD suggests a student stipend of $35,000 per 12 months; however, the stipend should be comparable with the institution's prevailing rate**.** When the FI's level of effort will be less than 12 months, and when a $35,000 stipend is the institution's normal prevailing rate, then the institution normally prorates the FINESST stipend in the budget.

The FINESST grant can fund up to a three-year research project, contingent upon availability of funds and satisfactory progress as demonstrated through the annual progress report from the university. If the NSSC implements the change of a period of performance as an administrative supplement or amendment, the duration or project's period of performance may exceed three calendar years or 36 months. For example, SMD will accommodate reasonable requests for a hiatus (to pause and later resume the research project and hence costing the FINESST grant), e.g., for family, medical, or military leave or for the student to gain other experiences (e.g., teaching, conducting fieldwork). Awardees may seek a No-Cost Extension Request at https://www.nssc.nasa.gov/nocostextension.

An FI supported for fewer than three years while obtaining a Masters may continue as a student participant on the FINESST grant while they pursue a PhD at the awarded institution. Even after completing a terminal degree, if acceptable to the awarded institution, the FI may remain at the grantee institution to continue the research. Not all projects require the maximum amount available in the period of performance. Proposers should lay out the proposal's budget justification as explained in 4.1.7 *Budget Timeline and Narrative*.

If, prior to the award's expiration date, a student departs the university, or ceases to perform the research project without a reasonable justification and expectation of return to the project, the university must communicate promptly to NASA. See Section 10 Explanatory Note D - Change of Original FINESST Student.

If the PI needs to be changed, then the standard NASA policies in the Grants and Cooperative Agreement Manual (GCAM) apply.

Students, faculty or staff in programs receiving NASA financial assistance, such as grant awards from this program, may raise allegations of discrimination, including harassment, by contacting the NASA Office of Diversity and Equal Opportunity. Find information on filing a complaint through ODEO at https://missionstem.nasa.gov/filing-a-complaint.html.

FINESST awards can follow a student to a new institution. FIs who have had less than the 3 years of FINESST funding are eligible to be on a proposal from the new institution with a new PI. The Science Mission Directorate may consider funding the FINESST student on a single source proposal, i.e., a non-competitive, invitation-only mechanism or, if timing permits, ask that a follow-on or transfer proposal be submitted to an open FINESST solicitation.

These decisions are made on a case-by-case basis with approval required from the funding SMD Division's Selecting Official and the NASA Shared Services Center. For

example, when only the student is transferring and not the PI to a new institution, e.g., to start a PhD program or due to family reasons, etc., then the student, PI, and AOR must email HQ-FINESST@mail.nasa.gov, or if an Earth awardee claire.i.macaulay@nasa.gov, and the FINESST award's technical officer to determine whether funding is available. Send such requests as soon as they arise, and allow at least six (6) months for NASA processing.

7. Reporting Requirements and Intellectual Property

In accordance with any award terms and conditions provided by the NSSC at the time of award, a progress report must be emailed annually by March 15. If an adequate progress report is not received, then the NSSC will not send funds. See Section 10. Explanatory Note C - Elements of a FINESST Progress Report for the email addresses.

Expenditures under any NASA grants, including FINESST, are subject to inspection and audit during the period of the grant and for three (3) years thereafter. Records at the awarded institution must be maintained in sufficient detail to evidence prudent management and to facilitate the preparation of the required reports for determining whether expenditures are being/were made for the purposes for which the funds were granted.

Reporting requirements consistent with 2 CFR 200 will be specified by the official grant sent to the university upon issuance of the award, see Exhibit E – Required Publications and Reports of the NASA Grant and Cooperative Agreement Manual (accessible from https://prod.nais.nasa.gov/pub/pub_library/srba/index.html).

Award recipients may be subject to reporting requirements under the NASA Plan for Increasing Access to the Results of Scientific Research, including submitting peer-reviewed manuscripts and metadata to a designated repository (currently PubMed Central) and reporting publications with progress reports. For more details on public access to scientific publications and digital scientific data resulting from NASA-funded research, please see: https://www.nasa.gov/open/researchaccess. Any such requirements will be identified in the Notice of Award from the NSSC.

For information about data rights and other aspects of intellectual property such as invention rights resulting from awards, see the file entitled "Award and Intellectual Property Information" under the section called "Grant and Cooperative Agreement Guidance" at https://prod.nais.nasa.gov/pub/pub_library/srba/.

8. Collection of Demographic Information

NASA requests and collects demographic data from principal investigators and other NSPIRES users for the purpose of analyzing demographic differences associated with its award processes. Information collected will include name, gender, race, ethnicity, and disability status. Submission of the information is voluntary, confidential, and is not a precondition of award.

9. Points of Contact and Frequently Asked Questions

The Astrophysics, Earth Science, Heliophysics, and Planetary Science Divisions provide representatives to the SMD-wide FINESST Team. Members of the Deputy

Associate Administrator for Research (DAAR) team coordinate FINESST. Email questions to: HQ-FINESST@mail.nasa.gov.

ROSES-2019 E.6 FINESST questions and responses, with identifying information removed, will be posted on the NSPIRES page for this program under "Other documents".

10. Explanatory Notes

10.1 Explanatory Note A: NASA-Provided High-End Computing (HEC) Resources

SMD provides a specialized computational infrastructure to support its research community, managed on its behalf by NASA's High-End Computing (HEC) program (see the HEC website at https://www.hec.nasa.gov/). Two major computing facilities are offered, namely, the NASA Center for Climate Simulation (NCCS) at the Goddard Space Flight Center (GSFC), and the NASA Advanced Supercomputing (NAS) facility at the Ames Research Center (ARC).

The HEC program facilities maintain a range of computing systems with significant data storage resources. These offerings are summarized at https://www.hec.nasa.gov/about/overview.html. Augmentation and refreshment of these central systems occur on a periodic basis. The HEC program also provides assistance in code porting, performance tuning, scientific data visualization, and data transfer.

Any need for computing time and other HEC Program resources for the proposed research must be justified by completing a request for inclusion with a FINESST proposal (see sections i and ii below).

(i) Generate Request for HEC Resources

The purpose of this step is to inform FINESST reviewers at NASA of your computational needs, and if the FINESST proposal is selected, establish eligibility to use HEC resources. The PI (not the FI) completes and submits a request in the HEC Request Management System (RMS) at https://request.hec.nasa.gov or https://request.hec.nasa.gov/login?url=%2F. The form includes a written justification of how the computational resources would support the investigation as well as a multi-year resource-phasing plan, in annual increments, identifying the computing time and data storage requirements covering the duration of the proposed award period.

About the RMS User Interface: The RMS asks for information in six different sections. Some RMS items will capture responses in a text box and some items provided restricted or limited choices. When RMS asks:

1. NASA Sponsoring Directorate, select NASA Science Mission Directorate (SMD).
2. NASA Sponsoring Program, select the proposal's reviewing/funding division, e.g., Astrophysics Division (APD), etc.
3. Requested Start Date, type in 09/01/2020. Reminder: Normally FINESST start on this date, but if you have a different start date on your NSPIRES cover page, then use that date.
4. Project Duration (in years), select either 1 or 2 or 3.
5. Funding Type, select Research Opportunities in Space and Earth Science (ROSES).
6. Funding Year, select 2019

7. Funding Name, select Future Investigators in NASA Earth and Space Science and Technology (FINESST).
8. Funding Manager, select the name of funding division's FINESST Program Scientist, i.e., Astrophysics (APD) = Evan Scannapieco, Earth (ESD) = Allison Leidner, Heliophysics (HPD) = Roshanak Hakimzadeh, and Planetary (PSD) = Lindsay Hays.

Computing time must be described in the request using Standard Billing Units (SBUs), a common unit of measurement employed by the HEC program for allocating and tracking computing usage across its various architectures. The RMS has a built-in calculator to help convert processor (CPU) hours to SBUs. SBU Conversion Factors are also available at https://www.hec.nasa.gov/user/policies/sbus.html, or proposers may contact HEC support staff for further assistance calculating SBUs. Contact information can be found at https://www.nas.nasa.gov/hecc/support/user_support.html for NAS User Support and https://www.nccs.nasa.gov for NCCS User Services Group.

If you are having difficulties using RMS and need technical support, then please email support@hec.nasa.gov and specify in the subject line "NNH19ZDA001N-FINESST HEC Request". Please allow 72 hours for a response before sending a second email.

(ii) Upload Request for HEC Resources

Save a PDF copy of your request after submitting it using the button provided in RMS. During the proposal submission in the NSPIRES system:

- Upload the PDF version of your computing time request as a separate file from your proposal and select "Appendix" as the document type when uploading.
- On the NSPIRES Cover Page
  - Check the box indicating that a request for HEC resources is included in the proposal, and
  - Enter the HEC Request Number (specified on the PDF). Reminder: Be sure to answer the HEC Program Specific Data questions with the NSPIRES Cover Page**.**

During the review of the proposed investigation, NASA will consider whether the computing time requested is an appropriate use of the highly constrained resources dedicated to FINESST.

Selection of your FINESST proposal does not guarantee that your HEC request is will be fully allocated; it means that your HEC request is eligible to progress to the next step for evaluation by the HEC Program (see section iii). While you are guaranteed some HEC time, it may differ from your request given resource constraints.

(iii) Allocation of HEC Resources

If your proposal is selected for funding, your HEC request will be evaluated by the HEC Allocation Authority. The HEC program will then issue letters identifying yearly allocations of HEC resources for the duration of the project, which again, may differ from your request due to limited availability of resources. However, PIs may submit requests to increase or decrease allocations of HEC resources if there are unexpected changes to computational needs. Requests for modifications must be submitted via RMS. Allocation in full cannot be guaranteed, but SMD will make every attempt to

satisfy the needs in the context of the overall set of requirements, resource constraints, and science priorities.

To expedite initiation of new projects where PIs and/or users are foreign nationals (whose accounts will require additional documentation and longer processing), the HEC program will consider providing a minimal allocation to such projects that have been notified of pending funding soon after the PI submits an allocation request in RMS. PIs must provide the name of the FI participant (note that an FI is not a Co-I) who may use the account and identify foreign national status in the HEC request abstract.

For further information (no-how-to-use RMS questions) about NASA-provided High-End Computing resources, please contact Dr. Tsengdar Lee at Tsengdar.J.Lee@nasa.gov or 202-358-0860.

10.2 Explanatory Note B: Limitations on FINESST Budget Categories

FINESST research grants are limited to the cost categories identified in 2 CFR 200.75 Participant Support

- stipends
- subsistence allowances
- travel allowances
- registration fees paid to or on behalf of the student in connection with conferences

In general, NASA does not permit indirect costs (overhead) to be requested or recovered on participant support costs.

Because FINESST is not a fellowship, there is flexibility in what can be included as a reasonable, allowable, and allocable participant support cost, i.e., supplies, etc. However, because this particular program is limited solely to participant support costs, do not request indirect costs in the budget. Indirect costs are not an allowable, allocable, or reasonable cost under FINESST. NASA may return a non-compliant proposal that includes indirect costs without review.

Since a PI's, Co-I, or Collaborator's current employment includes compensation and continues whether or not the proposal is selected by NASA, no salary, travel, or other costs shall be requested from SMD for the PI's, Co-I's, or Collaborator's use.

While the purchase of equipment in excess of $5,000 is not permitted through FINESST awards, if an institution's policy permits the purchase of computers, digital devices, or materials, such as to support mentoring activities for the FI or to construct a CubeSat as a participant support cost without charging indirect, then these "other" charges are allowable.

FINESST budgets require a narrative justification in the proposal (about 1-2 pages) by three or four broad cost categories 1) FI stipend; 2) FI allowance(s), *e.g.,* travel, *etc.*; 3) University Fees/Tuition; and 4) Other.

Input these FI costs on the NSPIRES coversheet under letter E. Direct Costs-Participant/Trainee Support Cost. NSPIRES listed subcategories are 1) Tuition/Fees/Health Insurance, 2) Stipends, 3) Travel, 4) Subsistence, and 5) Other.

FINESST awards are limited to a single students, so the Number of Participants/Trainees on the NSPIRES cover sheet is never greater than one.

SMD suggests an FI's maximum stipend normally is $35,000 in any 12-month period. If an FI's stipend will be less (or more) than $35,000, then the amounts in the stipend and other participant support budget categories may be adjusted/exchanged. Normally, however, the FI's travel, registration fees, and other participant support costs do not exceed $10,000 in a 12-month period. Any request for partial year, i.e., a period of less than 12 months, should propose an appropriate prorate of the stipend and other costs.

In cases where the FINESST $45,000 is not enough to cover the standard cost of the student at the university for a 12-month period then, in order to cover the remaining FI costs, the university may choose to cover these additional expenses from other sources and show in the proposed budget the amount and source of the cost share. Alternatively, the proposal can plan that the FI take a hiatus to work on something funded by a non-FINESST source.

If NASA determines the proposal provides sufficient justification, then the amounts in the stipend and other budget categories are adjustable as long as the total amount requested does not exceed $45,000 in a 12-month period.

Changes to the period performance, including no cost extensions, will follow normal NASA grant procedures. The PI and FI are to work with the university's Office of Sponsored Research, or its equivalent, to determine the appropriate allocation in each budget category at the time of proposal and any subsequent changes to the budget post award in the annual progress report.

A proposed project's proposed start date, for example, may or may not be the same as its award date. A revised budget and revised detailed narrative justification may be requested before a selection or an award can be made. No commitment on the part of NASA should be inferred from technical or budgetary communications with a SMD civil servant, contractor, or JPL employee requesting budget revisions. Proposers are cautioned that only a NASA Grant/Contracting Officer from the NSSC may make commitments, obligations, or awards on behalf of NASA or authorize the expenditure of funds.

While the NSPIRES coversheet asks for cursory budget data, it is not a budget; therefore, it is necessary to address Section 4.1.6 Budget Timeline and Narrative. Proposed budgets, with narrative and any necessary supporting documentation, are a required section of the FINESST proposals and are subject to NASA procurement policies and negotiations.

10.3 Explanatory Note C: Elements of a FINESST Progress Report

As normal NASA grants under 2 CFR 200, this program requires only the standard mandatory minimum Research Performance Progress Report (RPPR). Progress reports are due annually by March 15. If March 15 falls on a non-work day, however, the next business day is a suitable email delivery/send date. The first progress report will be for a period of performance shorter than 12 months and due by March 15, 2021.

Progress Reports for Space Science: Email an annual progress report as a PDF attachment to NSSC-Grant-Report@mail.nasa.gov and the Space Science, (i.e., Astrophysics, Heliophysics, Planetary Science) technical officer identified on the NASA Form 1687, which is the first page of the grant award documents from the NSSC.

Progress Reports for Earth Science: Email the progress report as a PDF attachment to NSSC-Grant-Report@mail.nasa.gov and claire.i.macaulay@nasa.gov.

All FINESST progress report emails must have subject line that states 1) the NSSC-issued award number, 2) PI Name and 3) Institution Name. Failure to use and include the three items in the email subject line may significantly delay processing.

If for any reason, the organization will not be requesting continuation of a FINESST grant, a progress report should not be submitted. Instead, send an email to the award's 1) technical officer, 2) HQ-FINESST@mail.nasa.gov, 3) only applicable for Earth Science, the Earth Science FINESST administrative point of contact, and 4) the Grant's Officer at the NASA Shared Services Center (NSSC) to the effect that the project is ending early and a final report forthcoming to close out the award. Various final and closeout reports will be described in the NSSC award documentation.

Progress reports are short documents of approximately 2-4 pages, particularly for the first report. Progress reports are not new proposals. Progress report elements, excluding the optional high-end computing appendix, must be combined into a single PDF document and include the following, although each given section may be brief:

I. Administrative

- Name and address of the recipient's institution & Award Number
- Name of the Principal Investigator
- Name of the Future Investigator
- Award Title
- Type of Report: Choose one: Annual/Final
- Period covered by the report: <Month/Year to Month/Year>

II. Accomplishments

Start by reminding NASA what are the major goals and objectives of the project, and what did the FI do to progress toward those goals?

Did the FI do coursework or receive any professional development funded by the project? Provide an update toward completing a degree program with month/year completion date estimated. If no course work was planned or taken, state no coursework for this period.

III. Status/Changes/Issues/Updated Budget Narrative Justification (if applicable)

FI should discuss any stated goals not met or started.

If the PI/Institution got a warning/notification from the NSSC (e.g., "zero drawdown") because funds are not being spent, then the progress report should explain the lack of funds drawn down (e.g., because the student is on hiatus).

If not previously reported in writing to the NASA Shared Services Center and the awards technical officer at NASA Headquarters through other mechanisms, i.e., calls, emails, provide the following additional information:

Changes in approach and reason for change.
Actual or Anticipated problems or delays and actions or plans to resolve them.
Changes that have a significant impact on expenditures.

An updated budget justification narrative, if needed, especially if it is anticipated that the student may graduate, take a hiatus, or leave the program or university for any reason.

IV. Dissemination Activities (if applicable)

Have the results/activities been disseminated? For example, include a list of presentations, publications, videos with URLs, etc. Publications including web postings should acknowledge NASA support, including the FINESST program name and the NASA award number.

V. An Updated PI/FI mentoring plan/agreement (optional)

For example, if there will be a proposed PI change on the current FINESST award, explain that change to the mentoring plan and include a 2-page bio for the new PI requesting the change.

VI. Known Future Plans

Do the PI/FI anticipate a hiatus and/or no-cost extension?
If this is a final report, will the work continue post funding?
Is the FI remaining at the institution or moving on to new studies or a job offer, etc.?

VII. High-End Computing (if applicable)

If applicable, a progress report may include a new (or updated) request or modify high-end computing resources. If you are submitting a new HEC request, see Explanatory Note A of this solicitation for details. Be sure to allow enough time to compete the steps outlined in Explanatory Note A in order to create a new HEC appendix request for the progress report. A copy of a new HEC request should be provided as separate PDF file from FINESST award's progress report to the technical officer. The NSSC does not need a copy of the HEC request. If the project has an existing HEC-issued award and a modification is needed, please follow the guidance provided with the HEC award.

10.4 Explanatory Note D: Change of Original FINESST Student

In the event that an FI leaves the institution prior the completion of the research project or ceases to participate in the FINESST research for any other reason, NASA will determine how best to proceed.

The PI and FI should email the NASA program manager to let them know of the anticipated request so that the program manager can weigh in on the best course of action. On a case-by-case basis, NASA will formally consider a request for an FI change from the PI when the university's AOR emails a change request to the award's FINESST manager at HQ; the grants officer at the NSSC; and to HQ-FINESST@mail.nasa.gov.

An FI change request may propose that a masters or Ph.D. candidate, who is pursuing similar research, be named to expend the balance of the FINESST funds already with the institution. The request from the PI and the Office of Sponsored Research must include: 1) A statement (preferably from the original FI) indicating the date and reason for departure. 2) The successor FI's 2-page CV and mentoring plan. 3) Confirmation of the substitute student's status as a M.Sc. or Ph.D. candidate. 4) Specify what, if any, change is necessary to the period of performance and/or research scope. NASA will consider FI changes for administrative and/or merit-based reasons.

NASA review of such change requests includes, but is not limited to, scientific merit and continued relevance to NASA factors before deciding whether to approve. If approved, NASA may only allow a substitute student to use the current grant year funds and will not provide additional funds in future years. Caveat: Students who had three years of NESSF funding are not eligible to be named as an FI.

If the institution chooses not to propose a substitute FI, then the AOR still must email the award's program officer at HQ; grants officer at the NSSC; and HQ-FINESST@mail.nasa.gov with the news of the FI's departure and request an earlier end date to the period of performance. NASA will then proceed to grant close out.

10.5 Explanatory Note E: Mentoring Plan/Agreement: An Introduction for PI/FI Teams

Please verify whether your organization has mentorship resources or templates available. Go to your institution's website and search on key words, e.g., "mentor", "mentee", "mentor resources", etc., and communicate with your PI and organization about mentorship resources. If your proposing organization has mentorship information, please use it and refer to it. If your organization really has no mentorship plan, then adapting a mentoring plan designed originally for another purpose (such as a postdoctoral fellowship, NSF award) for use with FINESST is acceptable.

A mentoring plan or an agreement is not a confidential recommendation; rather, it sets respectful, reasonable expectations or goals and thus may help to foster a good working relationship that will further the FINESST research. It is to be hoped that the FINESST mentoring plan/agreement will set appropriate expectations for the working relationship early, be reviewed regularly, and be easily revisable, providing an opportunity for FIs to request adjustments that they may otherwise find uncomfortable bringing up with the PIs.

Through the mentoring plan, the PI and FI identify and work toward research career development goals designed to deepen the FI's understanding of the FINESST research, career pathways, broaden resource networks, and facilitate growth as new professionals. A non-exhaustive list of mentoring activities that a plan may include, but is not limited to: 1) training in the preparation of data, publications, presentations, etc.; 2) opportunities to collaborate with researchers from diverse backgrounds and/or disciplinary areas; and/or 3) responsible professional practices coaching.

A FINESST selection by NASA has the potential to be life changing for the FI as a graduate student and in the early career years that follow degree attainment. A FI's potential for success improves when the PI and the mentoring plan support the FI's research development and independence; recognizes when to refer an FI to other

experts and resources; and provides the FI with regular, kind, clear, and honest input. For resources related to STEM mentoring, selected URLs include:

American Association for the Advancement of Science STEM Mentor Resources
Pathways to Science: Mentoring Manual
Committee on the Status of Women in Astronomy's Mentoring Page

10.6 Explanatory Note F FINESST Proposal Preparation: Item Check List, Page Limits and Number of PDF Files

All FINESST proposals must include the following materials in the following order. First, the system-generated Proposal Cover Page created by filling out the required fields such as name of the FI, electronic Commitments from Co-Is or any Collaborators, if any, answering the questions on the NSPIRES web page, e.g., providing the Data Management Plan, a research abstract suitable for public posting upon selection, etc. There is no page limit, NSPIRES will generate the required number of pages and automatically place this at the front of the proposal if the fields are filled out. There is no need to download the cover page and attach it to the uploaded PDF file.

Checklist of Items to be included in the single proposal PDF File (all page limits maximum, unless specified):

- Table of Contents - 1 page.
- Personal Statement (authored by the FI) - 2 pages.
- Science/Technical/Management Section (authored by the FI) 6 pages
  Including illustrations, tables, figures, and foldouts.
- References/Citations and Acknowledgements 1 page or more as needed.
  At minimum must include a statement that the proposal is the work of the FI.
- Resume/Curriculum Vitae (CV) For the PI and FI – 2 pages each.
- CV for Co-I(s): Optional – 1 page each.
- A PI-FI mentoring plan or agreement – 2 pages.
  Exception: If the submitting institution has a standard Mentor-Mentee checklist, plan, agreement, template, etc., and it is longer than 2-pages, uses font size, margins, etc., that do conform to this solicitation, then the institution's standard is acceptable.
- Budget Timeline and Narrative – 2 pages.
  Excluding any special documentation, e.g., when submitting institution is not an education organization, proof that the proposed FI is enrolled/in good standing in an eligible degree program at a university, etc.

Second PDF File - only when applicable

- Optional High-End Computing (HEC) Appendix, See Explanatory Note- A for details.

Unlike other ROSES elements, there is no need for a separately uploaded "Total Budget" file.

11. Summary of Key Information

Expected annual program budget for new awards	No dedicated budget; selected proposals will be funded by the relevant SMD program.

Number of new awards pending adequate proposals of merit	The number of proposals selected will be dependent on the number and quality of proposals submitted and on the availability of funds from the relevant SMD program.
Maximum duration of awards	3 years and see Section 6.
Due date for Notice of Intent to propose (NOI)	Not Applicable. Notices of Intent are not requested/accepted for this program element.
Due date for proposals	Proposals may be submitted at any time until 11:59 pm Eastern time on February 4, 2020.
Planning date for start of investigation	September 1, 2020
Page limit for the central Science/Technical/Management section of proposal	6 pp; see also Sections 4.1 and 10.6 of this program element.
Relevance	See Section 2. Proposals that are relevant to this program element are, by definition, relevant to NASA.
General information and overview of this solicitation	See the *ROSES Summary of Solicitation*. Grants and cooperative agreements will be subject to the policies and provisions identified in the regulations at 2 CFR (Code of Federal Regulations) 200, *NASA Grants and Cooperative Agreements Manual* (GCAM), and the *NASA Guidebook for Proposers*. In the case of any conflict, the order of precedence is as follows: regulations, NASA GCAM, this program element, the umbrella NRA, and then the *NASA Guidebook for Proposers*.
General requirements for content of proposals	See Section 3 of the *NASA Guidebook for Proposers* and Section IV and Table 1 of *the ROSES Summary of Solicitation*.
Detailed instructions for the submission of proposals	See https://nspires.nasaprs.com/tutorials/ Sections 3.22-4.4 of the *NASA Guidebook for Proposers* and Section IV(b) of *the ROSES Summary of Solicitation*.
Submission medium	Electronic proposal submission is required; no hard copy is required or permitted.
Web site for submission of proposal via NSPIRES	http://nspires.nasaprs.com/ (help desk available at nspires-help@nasaprs.com or (202) 479-9376)
Web site for submission of proposal via Grants.gov	http://grants.gov (help desk available at support@grants.gov or (800) 518-4726)
Funding opportunity number for downloading a proposal package from Grants.gov	NNH19ZDA001N-FINESST

Funding Points of Contact **[new POC added January 17, 2020]**	Emails FINESST Program Scientists by Division: Earth Science: allison.k.leidner@nasa.gov **Earth Science: philip.m.larkin@nasa.gov** Planetary Science: lindsay.hays@nasa.gov Astrophysics: evan.scannapieco@nasa.gov Heliophysics: hakimzadeh@nasa.gov
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