B.20 HELIOPHYSICS LIVING WITH A STAR INFRASTRUCTURE

NOTICE: Amended August 10, 2021. This amendment releases this new program element in ROSES-2021. Neither NOIs nor Step-1 proposals are requested for this program. Proposals are due November 10, 2021.

1. Scope of Program

The Heliophysics Living with a Star Infrastructure (H-LWSIS) program solicits proposals to train and develop the next generation of heliophysicists to address complex cross-discipline system-wide problems that are central to understanding and modeling the Sun-Solar System connection. This element specifically covers the administration of the Jack Eddy Postdoctoral Fellowship (JEPF) Program over a period of 4 years and the management of the LWS Heliophysics Summer School (HSS). Descriptions of these two infrastructure-building programs are found below. Proposals to this element must address the administration and management of one or both of these programs. One of the great challenges for the LWS science program is to achieve the "systems" science required for enhancing our understanding that leads to predicting the Sun-Solar-System connection, phenomena that span the whole Sun-Earth domain and beyond over many temporal and spatial scales. As such, these two programs are central to the LWS Program.

One factor that has impeded progress in cross-disciplinary research is that the science community and, consequently, traditional Heliophysics Division Research programs, have always been structured according to discipline boundaries (e.g., solar, heliosphere, magnetosphere, ionosphere-thermosphere-mesosphere, and climate). Thus, the types of cross-disciplinary projects that LWS needs most are the ones least likely to be proposed to the traditional NASA Heliophysics basic science research and analysis programs and cross-disciplinary projects are less likely to be supported there.

Central to this challenge is the development of a research community that can cross traditional discipline boundaries and attack the system-wide problems that are central to understanding and modeling the Sun-Solar System connection. Summer schools and post-doctoral fellowships are possible avenues for addressing these development needs and for fostering cross-disciplinary research.

H-LWSIS is a component of the Heliophysics Research Program and proposers interested in this program element should read B.1, the Heliophysics Research Program Overview for Heliophysics-specific requirements. Common requirements for all ROSES elements and proposals are found in the ROSES-2021 *Summary of Solicitation* and the 2021 NASA *Proposer's Guidebook* and the order of precedence for proposers is the following: this document takes precedence, followed by B.1, The Heliophysics Research Program Overview, followed by the ROSES *Summary of Solicitation* and, finally, the *Proposer's Guidebook*. Proposers should be familiar with all of these resources.

Proposals to H-LWSIS must present a management plan that fosters and supports cross-disciplinary activities that train cross-disciplinary researchers. For both the annual heliophysics summer school and the Jack Eddy fellowships, proposals to this announcement should describe what, if any, recruitment strategies and review criteria

may be used to ensure an open, collaborative, diverse, and inclusive NASA science culture.

1.1 The Jack Eddy Postdoctoral Fellowship Program

The Jack Eddy Postdoctoral Fellowship (JEPF) Program was established by NASA's Living With a Star program in 2009, see https://lwstrt.gsfc.nasa.gov/. This prestigious fellowship program is named after pioneering solar researcher John A. "Jack" Eddy. The two-year fellowship is designed to train the next generation of heliophysics researchers. It matches early-career PhDs with experienced scientists at U.S. host research institutions. This Fellowship program is open to recent PhDs (PhD within 5 years) whose project directly addresses the objectives of the LWS program.

The organization that is selected to run the JEPF program, in consultation with NASA's Heliophysics Division, will determine the details of the program, but Jack Eddy Fellows must:

- not be a current or former recipient of a Presidential Early Career Award for Scientists and Engineers (PECASE).
- propose interdisciplinary research directly relevant to the objectives of the LWS program.

1.2 LWS Heliophysics Summer School

The LWS Heliophysics Summer School was established by NASA's Living With a Star program in 2007, see https://lwstrt.gsfc.nasa.gov/. This annual eight-day Summer School focuses on the physics of space weather events that start at the Sun and influence atmospheres, ionospheres and magnetospheres throughout the solar system. Admission is very competitive; about 35 students are selected to attend each year. The Summer School is open to graduate students, as well as first- and second-year postdoctoral fellows.

2. Proposal Requirements

As stated in Section 1, proposals to this element may address the administration and management of the Jack Eddy Postdoctoral Fellowship (JEPF) Program, the administration and management of the Heliophysics Summer School Program, or both. This section details the proposal requirements for the administration of the JEPFP alone (2.1), the HSS alone (2.2) and both the JEPF and HSS Programs together (2.3).

As stated in Section III (a) of the *ROSES Summary of Solicitation*, NASA recognizes and supports the benefits of having diverse and inclusive scientific, engineering, and technology communities. No HSS participant or JEPF fellow shall be denied on the grounds of race, color, age, ethnicity, national origin, religion, pregnancy, sexual orientation, gender identity, sex, marital status, disability, or U.S. Veteran status.

Proposals must include details of the plan to solicit, review and select participant/fellow proposals, and support fellows (JEPF) or participants (HSS) in these Programs. Requirements for the HSS Program include a description of the first year summer school topics as well as a description of the plan for determining topics for subsequent years.

2.1 Jack Eddy Postdoctoral Fellowship Program

2.1.1 *General Proposal Requirements*

Proposals for the administration of the Jack Eddy Postdoctoral Fellowship (JEPF) Program must provide the plans of the proposing organization for how it intends to recruit candidates, solicit and review proposals, and support fellowship awardees. Proposals must outline planned pay and benefits including but not limited to, health benefits; medical, family, and emergency leave; as well as any other fringe benefit.

Specific program details should be outlined by the proposal, providing examples of relevant past experience with management of similar programs. In all cases, the proposed program shall abide by the fellowship candidacy restrictions as listed in Section 1.1.

Proposals should plan for approximately 8 postdoctoral research fellows per year.

2.1.2 *Mentoring Plan or Agreement*

Proposals to manage, maintain, and improve the Jack Eddy Postdoctoral Fellowship Program must include a statement of how the proposing organization will encourage and support the development of mentoring plans by the mentor and postdoctoral fellow. The plan's purpose is to provide the fellow with a scheme for developing skills and acquiring knowledge and experiences necessary to successfully complete the research project and also develop the technical expertise and career skills of the Fellow for the future.

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 fellow’s research. It is to be hoped that the mentoring plan/agreement will set appropriate expectations for the working relationship early, be reviewed regularly, and be easily revisable, providing an opportunity for a Fellow to request adjustments that they may otherwise find uncomfortable bringing up with the advisors.

Through the mentoring plan, the advisor and JEPF identify and work toward research career development goals designed to deepen the Fellow’s understanding of the research and facilitate growth as new professionals. Mentoring activities may include but are not limited to: 1) training in the preparation of data, publications, presentations, etc.; 2) providing opportunities to collaborate with researchers from diverse backgrounds and/or disciplinary areas; and/or 3) coaching in responsible professional practices.

A Fellow’s potential for success improves when the advisor and the mentoring plan support the Fellow’s research development and independence; refer the Fellow to experts and resources; and provide the Fellow with regular, kind, clear, and honest input. For resources related to STEM mentoring see for example

- 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.

2.2 Heliophysics Early Career Summer School

2.2.1 *General HSS Proposal Requirements*

Proposals for the management of Heliophysics Summer School (HSS) Program for early career scientists should identify specific topic areas to be covered in the first year. In addition, a plan must be included that describes how ideas for future topics will be solicited from the Heliophysics community so as to ensure topics thereafter that will help to create a community that can cross traditional discipline boundaries and attack the system-wide problems in Heliophysics. Specific program details (e.g., format, location, duration, etc.) should be outlined by the proposer, as well as providing examples of relevant experiences with such events as evidence of the qualifications and capabilities of the team in this area. Other anticipated aspects of the HSS include but are not limited to:

- The HSS primary target population should be advanced graduate students with some research experience and post-doctoral researchers.
- The HSS should provide a broad service to the Heliophysics and Comparative Heliophysics communities with the goal of broadly educating the next generation of researchers in the field.
- The HSS should provide participants with a systems view and a description of universal properties in heliophysics (for example, magnetic reconnection, planetary and exoplanetary atmospheres and corona, planetary and stellar dynamos, etc.)
- The HSS also should include both professional development opportunities (elevator speech work, short talks, career panel discussions), and networking opportunities for students to interact with their peers and with the lecturers.

Proposals should plan for approximately 25-30 students per year in the HSS.

2.3 Joint JEPFP/HSS Proposals

Single proposals simultaneously describing the administration and management of both JEPF and HSS are welcome and for combined proposals, 30 pages is allotted for the Scientific/Technical/Management Section. These proposals must include the requirements detailed in both Sections 2.1 and 2.2. Special submission guidelines are found below in Section 3. Within a joint proposal, the JEPF and HSS components must be completely stand-alone and separable, such that a partial selection can be made if appropriate. The budget narrative and details section of the proposal, and the total budget file, shall provide separate budgets for the JEPF and HSS components.

3. Submission and Evaluation Guidelines

3.1 General Considerations

Each Principal Investigator (PI) may submit one and only one proposal to this program element. Within the proposing team, the PI and Co-Investigators (Co-Is) must each have specific and defined tasks in the project, and the tasks must be essential to the completion of the project. Unfunded team members who are performing tasks that are essential to completion of the project and require a non-trivial amount of time are unfunded Co-Investigators and must show outside support for their effort.

Proposals may be declared noncompliant if they are outside the scope of the H-LWSIS program (see Section 1 above) or if they fail to meet submission guidelines specified in this Section 3.

3.2 One-Step Submission Process

To streamline the submission process, this program uses a one-step proposal submission process. Neither Notices of Intent (NOIs) nor Step-1 proposals are requested for this program element.

3.3 Proposals

A proposal must be submitted electronically by the due date (see Table 2 and Table 3 of ROSES). The proposal must be submitted via NSPIRES or Grants.gov by the organization's Authorized Organizational Representative (AOR). A budget and other specified information is required.

3.3.1 *Proposal Content*

The process for preparation and submission of the proposals is the same as that for any other ROSES proposal. Guidelines for content and formatting proposals are specified in Table 1 of ROSES and the *ROSES Summary of Solicitation*. Proposals must adhere to formatting requirements (e.g., margins, font sizes, linespacing). Proposals describing either the management of the JEPF or HSS are restricted to fifteen (15) pages for the Scientific/Technical/Management section. Joint proposals describing the management of both JEPF and HSS are restricted to thirty (30) pages for the Scientific/Technical/Management section.

Rather than the standard requirement for the data management plan (DMP) described in Section 1.5 of B.1, The Heliophysics Research Program Overview, the DMP for proposals to this program element should describe how the collected publications, summer school tutorials, laboratory sessions etc., would to be made accessible to the wider heliophysics community.

Budget requests should be commensurate with the nature of the work to be conducted and should include sufficient funding for the support of approximately 8 postdoctoral research fellows per year and/or approximately 25-30 students per year in the HSS, as stated in Section 2, above.

3.4 Proposal Evaluation Criteria

Compliant proposals will be evaluated according to the criteria defined in the *Guidebook for Proposers* and as specified in Section V(a) of the *ROSES Summary of Solicitation*. These criteria are Intrinsic Merit, Relevance, and Cost Reasonableness. Clarifications and additions specific to this program element are listed below.

The evaluation of intrinsic merit will include the following, as appropriate:

- For the Jack Eddy Postdoctoral Fellowships, an assessment of the effectiveness and resilience of the plan to recruit candidates, solicit, review, and select Fellowship proposals, and support fellows in both their technical success as well as their career development.

- For the Heliophysics Early Career Summer School, an assessment of topic areas to be covered in the first year, and an assessment of the effectiveness and resilience of the plan to ensure topics thereafter that will help to create a community that can cross traditional discipline boundaries and attack the system-wide problems in Heliophysics. In addition, the plan to recruit participants, solicit, review, and select proposals, and support selected participants at the summer school will be considered.
- Quality, appropriateness and feasibility and resilience of the methodology for management of the HSS and/or the JEPF program.

Based on these factors, the evaluation will consider the overall potential impact and probable success of the proposed investigation.

Relevance to and priority within the H-LWSIS program element will be assessed based on the extent to which the proposal addresses the objectives discussed in Section 1.

The evaluation of cost reasonableness includes the level of effort proposed being commensurate with the work proposed.

4. Available Funds

It is expected that there will be approximately $2M per year available to support new Heliophysics LWS Infrastructure investigations including both JEPF and HSS Programs selected through this program element.

5. Award Type and Description of NASA Contribution

We anticipate that awards to non-governmental organizations will be cooperative agreements. The cooperative agreement(s) resulting from this element represent a partnership between NASA/SMD and the competitively selected team(s) to collaboratively promote and advance early-career researchers in heliophysics via fellowships and summer schools.

In addition to funding (subject to availability of appropriated funds), oversight, and monitoring, SMD's Heliophysics division (HPD) will be substantially involved by facilitating access for awardees to Heliophysics-sponsored scientists, programs, and projects. In particular, HPD shall participate in management activities including but not limited to:

- Provide policy guidance to the management awardees as needed
- Provide information on Heliophysics research programs and flight projects relevant to the development of the fellowship solicitation and summer schools
- Work with management awardees to develop a variety of approaches and products for the summer school.
- Work with the management awardees to develop appropriate mechanisms for the coordination and integration of fellowship and summer school programs
- Work with the management awardees to develop activities to stimulate events and collaboration among the fellows.

6. Summary of Key Information

Expected program budget for first year of new awards	~$2M for both JEPF and HSS.
Number of new awards pending adequate proposals of merit	Up to 2
Maximum duration of awards	4 years
Due date for full proposals	See Tables 2 and 3 of this ROSES NRA
Planning date for start of program	Within 6 months after proposal receipt.
Page limit for the central Science-Technical-Management section of proposal	15 pp. for a JEPF or HSS proposal. 30 pp for a combined JEPF and HSS proposal; see also Section 3.3, Table 1 of the *ROSES Summary of Solicitation* and Section 3.7 of the *Guidebook for Proposers*
Relevance	This program is relevant to the Heliophysics questions and goals in the NASA Science Plan. Proposals that are relevant to this program are, by definition, relevant to NASA.
General information and overview of this solicitation	See the *ROSES Summary of Solicitation*.
General requirements for content of proposals	See B.1, The Heliophysics Research Program Overview and Section IV and Table 1 of *the ROSES Summary of Solicitation*.
Detailed instructions for the submission of proposals	See NSPIRES Help at https://nspires.nasaprs.com/external/externalhelp/public/index.htm - t=First_Topic.htm, 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 permitted.
Web site for submission proposal via NSPIRES	http://nspires.nasaprs.com/ (help desk available at nspires-help@nasaprs.com or (202) 479-9376)
Web site for submission proposal via Grants.gov	http://grants.gov (help desk available at support@grants.gov or (800) 518-4726)
Funding opportunity number for downloading an application package from Grants.gov	NNH21ZDA001N-LWSIS

Point of contact concerning this program	Lika Guhathakurta Heliophysics Division Science Mission Directorate NASA Headquarters Washington, DC 20546-0001 Telephone: (202) 358-1992 Email:madhulika.guhathakurta@nasa.gov