**National Science Foundation**

**NSF-AST: Astronomical Sciences**

**[**Replace Header with ‘Data Management Plan’ prior to submission]

**Products of research**

[Enter content here, then remove the Guidance prior to submission]

**Guidance:**

Describe the types of data and products that will be generated in the research, such as images of astronomical objects, spectra, data tables, time series, theoretical formalisms, computational strategies, software, and curriculum materials.

Describe what data or other research products you will generate in the course of your project. Include the size or amount of data produced, the type of data files that will be generated, and where and when the data will be produced. Examples of research products include observational data, results from models, data generated from previous observations or models, physical samples, software, curriculum materials, etc. Consider the following:

* What data will be generated in the research?
* What data types will you be creating or capturing? (e.g. experimental measures, observational or qualitative, model simulation, processed etc.)
* How will you capture or create the data?
* If you will be using existing data, state that fact and include where you got it.
* What is the relationship between the data you are collecting and the existing data?
* How much data will be produced?

**Data format**

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**Guidance:**

Describe the format in which the data or products are stored (e.g., ASCII, HTML, FITS, VO compliant tables, XML files, etc.). Include a description of the metadata that will make the actual data products useful to the general researcher. Where data are stored in unusual or not generally accessible formats, explain how the data may be converted to a more accessible format or otherwise made available to interested parties. In general, solutions and remedies should be provided.

Describe the format of your data, and think about what details (metadata) someone else would need to be able to use these files. Metadata may entail descriptions of research details such as: experiments, apparatuses, computational codes, etc. Consider these questions:

* Which file formats will you use for your data, and why?
* What form will the metadata describing/documenting your data take?
* How will you create or capture these details?
* Which metadata standards will you use and why have you chosen them? (e.g. accepted domain-local standards, widespread usage).
* What contextual details (metadata) are needed to make the data you capture or collect meaningful?

**Access to data and data sharing practices and policies**

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**Guidance:**

"Access to data" refers to data made accessible without explicit request from the interested party, for example those posted on a website or made available to a public database. Describe your plans, if any, for providing such general access to data, including websites maintained by your research group, and direct contributions to public databases. If maintenance of a web site or database is the direct responsibility of your group, provide information about the period of time the web site or data base is expected to be maintained. Note that data taken at national or private observatories may be accessible through public archives (perhaps after a standard proprietary period). Various forms of data (e.g., FITS images and tables, other data tables) also may be deposited with published articles in the AAS journals and other journals. Particular attention should be paid to data sets that are products of well-defined surveys. Also describe your practice or policies regarding the release of data for access, for example whether data are posted before or after formal publication. "Data sharing" refers to the release of data in response to a specific request from an interested party. Describe your policies for data sharing, including where applicable provisions for protection of privacy, confidentiality, intellectual property, national security, or other rights or requirements.

Describe how you will make the data available to other researchers, as well as to the general public. Consider what data will be available (and in what formats) and where (on your website, available via ftp download, via e-mail, or another way). Please keep in mind that you are expected to adequately provide responses for both how you plan on making your data accessible without a specific request from a researcher, and how you will be able to provide data to the public. Make sure to mention how long the data will be kept private before making it available, and if different data products will be available on different schedules (e.g. raw data vs. processed data). Use this section to also explain policies for the protection of proprietary data, issues of privacy and confidentiality, and intellectual property as their impact on the dissemination of your data. Consider these questions:

* How and when will you make the data available?
* What are your plans for providing access to your data? (on your website, available via ftp download, via e-mail, or another way)
* What file formats will be used for data sharing?
* How long will the original data collector/creator/principal investigator retain the right to use the data before opening it up to wider use?
* How long do you expect to keep the data private before making it available? Explain if different data products will become available on different schedules (Ex: raw data vs processed data, observations vs models, etc.)
* Are there ethical and privacy issues? If so, how will these be resolved?
* Who will hold the intellectual property rights to the data and how might this affect data access?
* If applicable, what have you done to comply with your obligations in your IRB Protocol?
* How long will/should data be kept beyond the life of the project?

**Policies and provision for re-use, re-distribution and products of derivatives**

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**Guidance:**

Describe your policies regarding the use of data provided via general access or sharing. For example, if you plan to provide data and images on your website, will the website contain disclaimers, or conditions regarding the use of the data in other publications or products? If the data or products (e.g., images) are copyrighted (by a journal, for example), how will this be noted on the website?

Explain how the policies you outlined in the section above can be applied to the re-use and re-distribution of your data. Identify who will be allowed to use your data, how they will be allowed to use your data and whether or not they will be allowed to disseminate your data. If you will be restricting access, use or dissemination of the data, you must explain how you will codify and communicate these terms. Consider these questions:

* Will any permission restrictions need to be placed on the data?
* What and who are the intended or foreseeable uses/users of the data?
* How will the dataset be licensed if rights exist? (e.g. any restrictions or delays on data sharing needed to protect intellectual property, copyright or patentable data.)

**Archiving of data**

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**Guidance:**

Describe whether and how data will be archived and how preservation of access will be handled. If the data will be archived by a third party (e.g., national observatory or journal), please refer to their preservation plans if available.

Provide a description of your long-term strategy for archiving and preserving the data you plan to generate/use. Consider the following:

* What is the long-term strategy for maintaining, curating and archiving the data?
* Which archive/repository/database have you identified as a place to deposit data?
* What procedures does your intended long-term data storage facility have in place for preservation and backup?
* How long will/should data be kept beyond the life of the project?
* What data will be preserved for the long-term?
* What transformations will be necessary to prepare data for preservation / data sharing?
* What metadata/ documentation will be submitted alongside the data or created on deposit/ transformation in order to make the data reusable?
* What related information will be deposited?