ASTROMATERIALS CURATION ONLINE RESOURCES FOR PRINCIPAL INVESTIGATORS.

Nancy S. Todd[1], Ryan A. Zeigler[2], Lina Mueller[3], [1] UTC Aerospace Systems/JETS Contract, NASA Johnson Space Center, Mail Code XI2, Houston, TX 77058; nancy.s.todd@nasa.gov. [2] NASA Johnson Space Center, 2101 NASA Rd 1, Mail Code XI2, Houston, TX 77058; ryan.a.zeigler@nasa.gov. [3] Bastion Technologies, Inc., NASA Johnson Space Center, Mail Code XI2, Houston, TX 77058; lina.p.mueller@nasa.gov.

Introduction: The Astromaterials Acquisition and Curation office at NASA Johnson Space Center curates all of NASA's extraterrestrial samples, the most extensive set of astromaterials samples available to the research community worldwide. The office allocates ~1500 individual samples to researchers and students each year and has served the planetary research community for 45+ years.

The Astromaterials Curation office provides access to its sample data repository and digital resources to support the research needs of sample investigators and to aid in the selection and request of samples for scientific study. These resources can be found on the Astromaterials Acquisition and Curation website at https://curator.jsc.nasa.gov [1]. To better serve our users, we have engaged in several activities to enhance the data available for astromaterials samples, to improve the accessibility and performance of the website, and to address user feedback. We havealso put plans in place for continuing improvements to our existing data products.

Sample Request and Allocation Resources: The Curation office provides sample investigators a variety of materials and reference documents to assist them throughout the process of requesting, receiving, and returning astromaterials samples from NASA's collections. The website includes sample request deadlines, sample allocation policies, sample investigator guides, supporting forms and documents, and contact information for each of the sample collections.

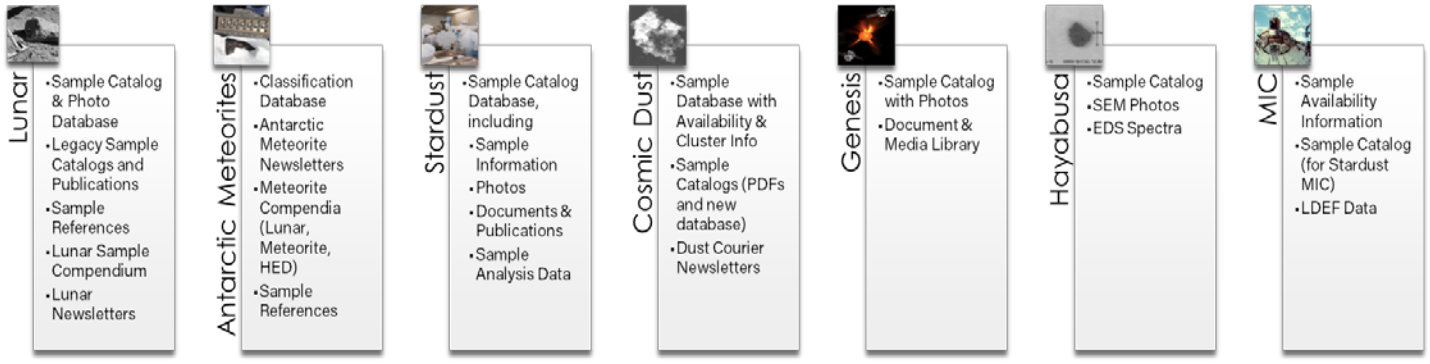
Sample investigator guides. Each curated collection provides a sample investigators guide that describes policies and guidelines regarding the access and use of samples for research purposes, accountability requirements, and specific procedures to follow when requesting, securing, handling, transferring, documenting and returning samples. The guide also describes and shows examples of the forms, loan agreements, and correspondence available to manage the sample allocation process. This document represents the official set of procedures and guidelines to be followed by Curation personnel and sample researchers.

Supporting forms and documents. Loan agreements, sample request forms, and sample accountability forms are available in Adobe PDF form or Microsoft Word format for PI use. Currently, the forms have to be filled out, printed and sent to the appropriate curator. However, as part of NASA's efforts to reduce paperwork and the cost of mailing, scanning forms, and archiving, some of the forms are being converted to allow filling out, signing, and submitting the forms online through Adobe Sign [2]. The advantages of using Adobe Sign for these forms include: forms are accessible through a web browser and are independent of the user's device platform, forms can be signed online using digital authentication methods suitable for the type of form and have security features that track changes and prevent tampering with the signed form, forms can be signed by both domestic and international users, form data is sent in digital form allowing automated entry into databases, and form submission status can be tracked through Adobe Sign.

The first set of forms available for signing through Adobe Sign are the Sample Loss/Consumption Forms for the Antarctic meteorites, Stardust, Cosmic Dust, MIC, and Hayabusa collections and the Lunar Return Sample Accountability and History Form. Links to the forms are available from the website under each collection's *Sample Request Dates and Forms* page.

Available Data Products: In addition to the resources available to support sample allocations to PIs, the Astromaterials Curation website serves as a searchable data repository for curated sample collections. Examples of the data products available for the sample collections include, sample catalogs, newsletters, sample research compendia, searchable sample data and images, sample references and legacy documentation, and selected sample analysis data. The purpose of these data products is to assist investigators in selecting appropriate samples for request. Figure 1 illustrates the available data products for each collection. The amount and depth of the available data varies by collection.

Figure 1. Available Data Products By Sample Collection



Recent Enhancements: Many of the data products available through the website have been updated to improve performance, add functionality and incorporate feedback received from users. Some updates were ained at improving the accessibility of data by eliminating platform-dependent technologies, such as Flash-based content, and enabling access of data through mobile devices and tablets. The following sections describe some of these recent updates and new data products.

Lunar Sample & Photo database [3]. This searchable database was completely redone to eliminate its reliance on Adobe Flash, make it more accessible to all users and to improve the performance of searches and photo galleries. New content was added to the database, including lists of available thin sections, links to catalogs and NASA reference documents, public display samples, and scientific references related to lunar samples with links to abstracts and content. Another enhancement was the addition of a photo feedback form to make it easier to report issues with photos or associated metadata.

Stardust Sample Catalog database [4]. This searchable database received many enhancements and updates to restore functionality for users. It was also completely redone to improve its accessibility to users, eliminate its dependence on Adobe Flash and to improve its performance. Important changes to this database include numerous bug fixes, particularly for issues related to viewing track data, missing images and broken links to attached documents, and the addition of sample data for sample splits of the original parent samples. Sample availability data has also been included in this version.

Cosmic Dust Sample Catalogs database [5]. In addition to publishing the latest sample catalog, Volume 20, we have started the transition of all sample catalog data and images into a database to make the particle and cluster data searchable online. This change will allow greater access to Cosmic dust samples through the website. The latest newsletter is available in the database and as a PDF.

Genesis Sample Catalog database [6]. The Genesis sample database has been expanded to include concentrator target, gold foil, and polished Al samples.

Scientific Reference Database [7]. The latest addition to the Curation website is a scientific reference database. This database is fully searchable by paper title, author, journal or conference name. References are also searchable by sample numbers for those collections that have this information available. The first collections with references available on the website include the Antarctic Meteorite collection and the Lunar Sample collection. There are over 1500 peer-reviewed references for Antarctic Meteorites with associated sample numbers, encompassing the years 1978 to present in the reference database. For lunar samples, there are over 3,700 references currently available which have been partially associated with corresponding sample numbers, and more references are being added as they are compiled.

References:

[1] *NASA Astromaterials Acquisition and Curation*, https://curator.jsc.nasa.gov.
[2] *Adobe Sign*. Adobe Systems, https://acrobat.adobe.com/us/en/sign.html.
[3] *Lunar Sample & Photo Database*, https://curator.jsc.nasa.gov/lunar/samplecatalog/.
[4] *Stardust Sample Catalog Database*, https://curator.jsc.nasa.gov/stardust/catalog/.
[5] *Cosmic Dust Sample Catalogs*, https://curator.jsc.nasa.gov/dust/catalogs/.
[6] *Genesis Sample Catalog*, https://curator.jsc.nasa.gov/gencatalog/.
[7] *Antarctic Meteorite Reference Database*, https://curator.jsc.nasa.gov/antmet/references.cfm.