

**DIGITIZATION OF THE RONALD GREELEY 35mm SLIDE COLLECTION.** D. A. Williams and D. M. Nelson. School of Earth and Space Exploration, Arizona State University, Tempe, AZ, 85287-1404 ([David.Williams@asu.edu](mailto:David.Williams@asu.edu)).

**Introduction:** The Ronald Greeley Center for Planetary Studies (RGCPs) is the former NASA Regional Planetary Image Facility (RPIF) at Arizona State University (ASU, 1977-2020). It continues to operate as an ASU's planetary data center, with support from the ASU School of Earth and Space Exploration (SESE) and various other NASA projects. The RGCPs continues to archive NASA photographic products (prints and film negatives) in climate-controlled rooms, and maintains a library of planetary science books, geologic maps and globes, and mission documents from past and current NASA and ESA planetary missions. It also has a Planetary Geographic Information Systems (GIS) Laboratory with 6 dual-screen PC workstations that run ArcGIS™, JMARS, ISIS3, and other software to support planetary research by the SESE community. Over the last decade, the RGCPs has undertaken multiple NASA-funded projects to digitize our unique collection of photographic materials produced from NASA-funded research by Dr. Greeley over his long career, and place those products online for greater accessibility by the broader planetary community. This abstract discusses the latest project, the digitization of Ronald Greeley's 35mm slide collection.

**Background:** ASU Regents Professor Ronald Greeley (1939-2011) produced a collection of 14,435 35mm slides over his career as a NASA-funded planetary geologist. The slides include: 1) text slides and graphs of research used in conference presentations, particularly at past LPSC, GSA and AGU meetings; 2) images of planetary objects from NASA missions in which he was involved, particularly Mariner 9 and Viking (Mars), Voyager (outer planets and their moons), SIR-C (radar images of terrestrial volcanoes and dune fields), Magellan (Venus), and Galileo (Earth-Moon flybys, asteroid flybys, Galilean satellites); 3) derived products such as planetary geologic maps and image mosaics; 4) results from field and laboratory experiments in the ASU Planetary Geology Wind Tunnel and the NASA-Ames Planetary Aeolian Laboratory and Vertical Gun (impact experiments); and 5) aerial and field photographs of terrestrial geologic features for comparison to those on the Moon, Mars, Venus and Io, particularly lava flow fields, calderas, lava tubes, sand dunes, ventifacts, among others. Both active and inactive eruption products were photographed by Dr. Greeley, at locations including Hawaii, California, Idaho, Colorado, New Mexico, and Washington in the USA, and in Bolivia.

**Technical approach:** In Spring 2020 the whole slide collection was professionally digitized by

DigMyPics.com (Gilbert, AZ), where each slide was digitized at 4000 px/inch. Upon delivery to us, we (DAW and DMN) organized the slides into PDS4-compatible bundles and collections, and created metadata for each slide based on information hand-written on each slide by Dr. Greeley or on the slide holders. Where possible, we correlated individual slides with known published papers and/or abstracts by Dr. Greeley and colleagues, which we included in README files for each PDS4 collection. This process was slowed because of delays and closures caused by the COVID-19 Pandemic in 2020 and 2021. It took the two of us 14 months to go through every slide in the collection, from July 2020 through September 2021. But metadata has been completed for all of the professionally-digitized slides.

**Status of Project:** The first PDS4 bundle, the Jovian System slides, was submitted to the NASA Planetary Data System for review, overseen by the Geosciences Node at Washington University (St. Louis). These slides were reviewed in late 2020-early 2021, and DMN has been editing the slide metadata based on reviewer comments. We hope to post the PDS-approved Jovian System bundle by end of Spring 2020.

We chose the Jovian System slides first because they may be relevant for the upcoming NASA Europa Clipper and ESA Jupiter Icy Moons Explorer (JUICE) missions. The next slide sets to be submitted for PDS review will be the field slides. Although the project officially ends in February 2022, we will continue to prepare the slides according to PDS4 guidelines and will post them on our website (<https://rgcps.asu.edu>) on a best efforts basis.

**Digital Products Currently Available:** The following products are currently available on our website:

*Other 35mm Slides (our initial pilot study):*

1) 1979 Pioneer 11 flyby of Saturn, produced by LPI: ([https://rgcps.asu.edu/slides\\_pioneer11/](https://rgcps.asu.edu/slides_pioneer11/)).

2) Artists' concepts of Future Planetary Missions, 1977-2003:

([https://rgcps.asu.edu/slides\\_mission\\_concepts/](https://rgcps.asu.edu/slides_mission_concepts/)).

3) Russian Venera 15 and 16 Radar Mosaics of Venus, 1983: ([https://rgcps.asu.edu/slides\\_venera15-16/](https://rgcps.asu.edu/slides_venera15-16/)).

4) NASA JPL Marsokhod Rover Field Test at Kilauea Volcano, Hawaii, 1995:

([https://rgcps.asu.edu/slides\\_marsokhod/](https://rgcps.asu.edu/slides_marsokhod/)).

*Products digitized from our first PDART grant:*

5) 266 aerial and field photographs (w/PDS4 labels) of the martian volcanic and aeolian analog site Amboy

Crater, California  
([https://rgcps.asu.edu/fieldings\\_amboy\\_crater/](https://rgcps.asu.edu/fieldings_amboy_crater/)).

6) Ten 16-mm movies of a 1990s aeolian experiment at Pismo Beach, CA [1]): (<https://rgcps.asu.edu/downloadables-videos-aeolian/>);

7) Ten classic NASA Reports and Special Publications from the 1970s-1990s, led by Ron Greeley and colleagues (e.g., [2-10] Greeley, 1974; Greeley and Schultz, 1974; Greeley and King, 1977; Greeley et al., 1978; Carr and Greeley, 1980; Greeley et al., 1982; Greeley et al., 1985; Greeley, 1990; Greeley and Thomas, 1994; Theilig, 1982); (<https://rgcps.asu.edu/nasa-pubs/>). Six additional Apollo-era documents were added in Fall 2021, at the request of the NASA Planetary Science Division;

8) Eight videos from the 1980s-2000, scanned from VHS videotape, including animations from planetary missions, such as the *Galileo* Earth-Moon flybys (1990, 1992) and *Magellan* at Venus (1991): <https://rgcps.asu.edu/video-files/>.

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**References:** [1] Greeley, R., et al., 1996. *Sedimentology*, 43, 41-52; [2] Greeley, R. 1974. Geologic Guide to the Island of Hawaii: A Field Guide for Comparative Planetary Geology, *NASA Conference Report 152416*, 257 pp.; [3] Greeley, R., and Schultz, P., 1974. A Primer in Lunar Geology, *Ames Research Center – NASA report*, 574 pp.; [4] Greeley, R., and King, J.S., 1977. Volcanism of the Eastern Snake River Plain, Idaho: A Comparative Planetary Geology Guidebook, *NASA Conference Report 154621*, 308 pp.; [5] Greeley, R., et al., 1978. Aeolian Features of Southern California: A Comparative Planetary Geology Guidebook, *NASA report*, 264 pp.; [6] Carr, M.H., and Greeley, R., 1980. Volcanic Features of Hawaii: A Basis for Comparison with Mars, *NASA Special Publication 403*, 211 pp.; [7] Greeley, R., et al., 1982. Planetary Geology: A Teacher's Guide with Activities in Physical and Earth Sciences, 2<sup>nd</sup> Ed., NASA SP-179 (1<sup>st</sup> Ed.; 2<sup>nd</sup> Ed.: EG-1998-03-109-HQ), 223 pp.; [8] Greeley, R., et al., 1985. Analysis of the Gran Desierto-Pinacate Region, Sonora, Mexico, via Shuttle Imaging Radar, *NASA Contractor Report 177356*, 44 pp.; [9] Greeley, R. (1990). Mars Landing Site Catalog, *NASA Reference Publication 1238*, 208 pp. and Greeley, R. and Thomas, P.E., 1994. Mars Landing Site Catalog, *NASA Reference Publication 1238*, 2<sup>nd</sup> ed., 401 pp.; [10] Theilig, E., 1982. A Primer on Sulfur for the Planetary Geologist. NASA Contractor Report 3594, 38 pp.