



Purple &
Gold

May 2021

APRIL SHOWERS FUNDS FOR AUTISM AWARENESS

To celebrate Autism Awareness month, UDHS students and staff gathered in the back field to participate in an April Showers Fundraiser for Unified Sports and the Special Olympics. With the support of the school community, Upper Darby raised over \$5,000, the third largest donation amount in the state.

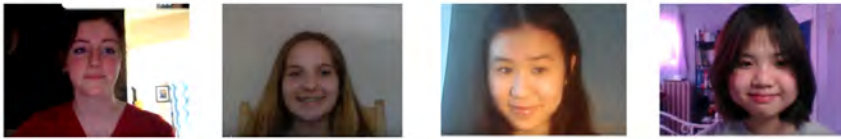


APRIL SHOWERS (Continued)

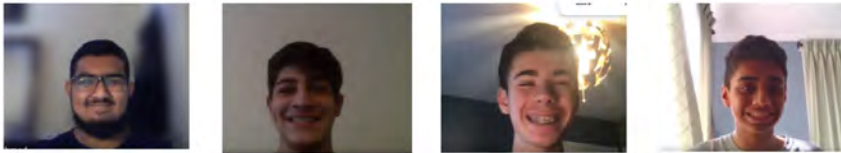


TEAMS ENGINEERING EXCELLENCE

UDHS excelled in The National Test of Engineering Aptitude, Mathematics and Science.



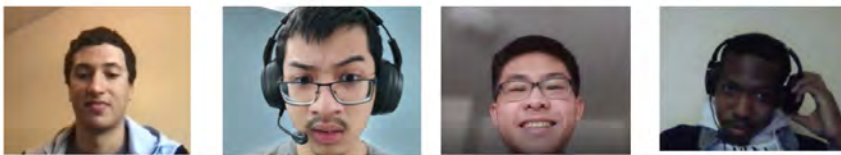
The 10th grade team of Olivia Cavalli, Liya Hauben, Nhi Lang, and Xinqing Xu placed 3rd in Multiple Choice, 2nd in Design Challenge and 3rd Overall in the state.



The 10th grade team of Shaikh Ahmed, Ryan Clarici, Lucas Collins, and Josiah Saddick placed 1st in the state in the Essay.



The 12th grade team of Ummayh Siddiqua, Maggie Smith, Lauren Stokes, and Hena Ansari placed 1st in the state in Multiple Choice.



The 12th grade team of Max Peters, Phi Nguyen, Alfonsus Rahardjo and Terrel Jenkins placed 2nd in the state in the Essay.

SPRINGTIME ORCHESTRAL SOUNDS

The Upper Darby High School Orchestra is Proud to Present:

"Blackberry Blossom"

<https://www.youtube.com/watch?v=k7uVloFbQ5k>

"Can't Help Falling In Love"

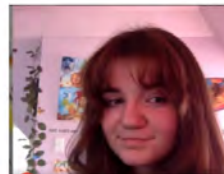
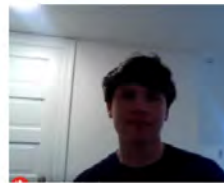
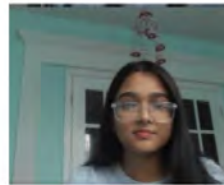
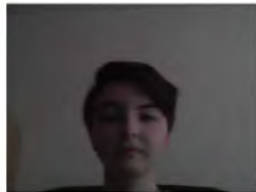
https://youtu.be/HR_v5DYKr70



DELAWARE VALLEY SCIENCE FAIR WINNERS

Our Delaware County Science Fair winners advanced to the highly competitive Delaware Valley Science Fair. The fair is among the oldest and largest in the country, with close to 800 students entering from local fairs in Southeastern PA, South Jersey and Delaware. UDHS had their best year yet with three students (Elise Olmstead, Nishat Tasnin and James Yocco) nearly advancing to the highest level, The International Science Fair.

Congratulations to the UDHS Students Recognized at The Delaware Valley Science Fair!



Remotely using a telescope at the Greenbank Observatory in West Virginia, Elise Olmstead collected radio wave data from around the Milky Way Galaxy to determine the redshift and rotational speed at various locations throughout the galaxy to predict the percentage of dark matter in our galaxy. Nishat Tasnin and James Yocco used a geospatial information system to access the most recent and detailed images of Pluto from the New Horizons Mission. Analyzing close to 200 craters on Pluto for shape and size, they compared the data with the craters on other planets to predict the surface composition of Pluto.

Elise Olmstead - First Place in 9th Grade Earth & Space Sciences - *The Rotation Curve of the Milky Way Galaxy: Dark Matter*

Nishat Tasnin and James Yocco - 2nd Place in Teams Category - *Using Craters to Predict Surface Composition of Pluto*

Ayela Sullivan - 3rd Place in 9th Grade Medicine & Health - *The Effect of Mask Wearing on Respiration*

Alaina Swift - Honorable Mention in 9th Grade Behavioral Sciences - *Do Colors Affect Learning?*

Lylah Hoque - Honorable Mention in 9th Grade Medicine & Health - *Correlations Between Age and Coronavirus Smell Loss*

Maggie Smith - Honorable Mention in 12th Grade Chemistry - *Making Usable Digestible Biodegradable Plastics*

Luke Olmstead - American Meteorological Society Certificate of Outstanding Achievement for creative scientific endeavor in the areas of atmospheric and related oceanic and hydrologic sciences.

Jabe Cox - ASM International Philadelphia Liberty Bell Chapter award (\$200 and an ASM medallion) for the best materials engineering project based on use of material-related concepts, a demonstration of some aspect of the materials paradigm, and a quality presentation.

UDHS CHEERLEADERS FINISH 9TH at NATIONALS



JULIEN LAVENTURE - ALL DELCO WRESTLING



NATIONAL HONOR SOCIETIES

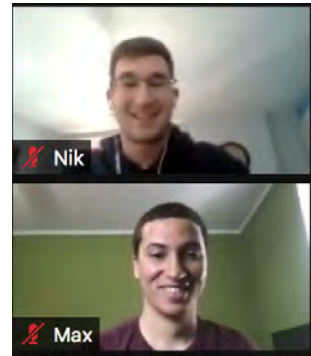
Congratulations to all recent inductees into the following:

- National English Honor Society
- National Spanish Honor Society
- National Art Honor Society
- National French Honor Society
- National Science Honor Society



LUNAR RESEARCH AT NASA CONFERENCE

Seniors Nik Gjidede and Max Peters presented the UDHS Lunar Team's year long research project entitled, "Composition of Lunar Pyroclastic Deposits" at the national Exploring the Moon and Asteroids for Secondary Students (ExMASS) contest. The students used JMARS, a geospatial information system, to access reflectance data of past lunar volcanic eruptions at three separate wavelengths, then analyzed the data to determine the relative titanium and iron concentrations. This information will be presented at NASA's Exploration Science Forum in July and will be useful for future lunar missions.



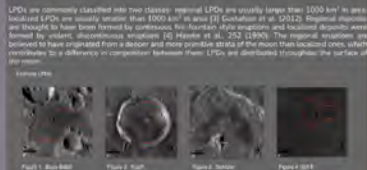
Composition of Lunar Pyroclastic Deposits

Max Peters, Nikolas Gjidede, Elyas Himdi, Olivia McConnell, Phi Nguyen, Nishat Tasnin, James Yocco
Upper Darby High School, 601 N Lansdowne Ave, Drexel Hill, PA 19026

INTRODUCTION

Lunar Pyroclastic Deposits (LPDs) are fine-grained debris originating from past volcanic eruptions [1]. Head, 202 [1974]. These eruptions of fragmented basalt and iron-bearing mafic materials, great than their characteristic low-albedo [2] Haskin et al., 203 [1970]. Because LPDs contain anorthite materials such as volcanic glasses and beads, which are found only sparsely in other areas on the Moon, they are a prime area of study.

LPDs are commonly classified into two classes: regional LPDs are usually larger than 1000 km² in area, localized LPDs are usually smaller than 1000 km² in area [3] Gaultier et al., 2012. Regional eruptions are thought to have been formed by continuous flow eruptions and localized deposits were formed by volcanic discontinuous eruptions [3] Haskin et al., 203 [1970]. The regional eruptions are believed to have originated from a deeper and more pervasive strata of the Moon than localized ones, which contributes to a difference in composition between these LPDs and distributed throughout the surface of the Moon.



CENTRAL QUESTION

Our research seeks to determine the composition of the 12 LPDs identified in Gaultier et al., 2012 with the Lunar Reconnaissance Orbiter (LRO) and compare to the composition of the 76 LPDs identified in Gaultier et al., 2012. Our goal is to gain a better understanding of LPDs [2-3]. This research would either verify the current understanding of LPD composition, or present new insights into the composition of the lunar surface.

RATIONALE

The composition of Lunar Pyroclastic Deposits provide insight into the history of the lunar surface. Presently, LPDs are of interest because their composition has implications for future lunar exploration missions. LPDs contain useful resources like pyroxene grains and anorthite minerals that are rarely found elsewhere on the lunar surface [4]. Haskin et al., 203 [1970]. By examining the surface composition of newly discovered LPDs, our research expands the available potential resource-rich locations for lunar landing sites, and helps identify lunar resources.

METHODOLOGY

The JMARS application was used to access the Clementine Ultraviolet/Visible (UVVIS) Mission of the Moon [5]. Clementine is an (2011), launched in 1994. Clementine uses a camera and two laser rangefinders that are used to map the lunar surface. The UVVIS data allows us to measure the reflectance at each wavelength to provide the mineral content of basalt and iron-bearing deposits on the LPDs.

After locating the LPDs identified in Gaultier et al., 2012, the Custom Data Layer of JMARS was used to designate a polygon to all of the regions of interest for each LPD in region of interest or an area which was necessary for the LPD.



The reflectance intensity at 450nm, 750nm, and 950nm wavelengths were used for each pixel in the region of interest and an average was found for each wavelength. To prevent the Clementine data from the 0-64 values in JMARS to 15-64, a scaling factor of 3.31616¹⁰ was used.

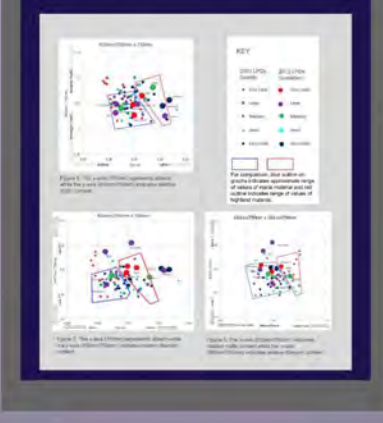
Following the methods of Gaultier et al., the 12 LPDs that we studied were divided into 5 classes based on size, with sizes from 0-100km² being very small, 100-200km² being small, 200-400km² being medium, 400-1000km² being large, and 1000km² being very large.

Ratios of 415nm/750nm and 950nm/750nm wavelengths were calculated for each LPD. We made use of the 415/750 nm and 950/750 nm wavelength ratios of LPDs that were observed by Gaultier et al., 2012, as well as the wavelength ratio data provided by Gaultier et al., 2003. The relative ratios of a LPD's reflectance of each different wavelength provides information about its composition. The ratio of the 415/750 nm ratio, the more intense titanium content, and the lower the 950/750 nm, the more intense high titanium [2] Gaultier et al., 271 [2003].

RESULTS

LPD Average Reflectance by Wavelength

LPD	Size	450 nm	750 nm	950 nm	450/750 ratio	950/750 ratio
Anderson_E	small	0.118	0.195	0.204	0.609	1.046
Anderson_F	small	0.115	0.208	0.228	0.602	1.057
Bellevue_Mayor_MW	small	0.081	0.105	0.126	0.780	1.249
Bellevue_Mayor_WW	medium	0.189	0.176	0.151	0.581	0.862
Bellevue_Mayor_WW	medium	0.087	0.113	0.118	0.769	1.041
Bellevue_Mayor_N	large	0.060	0.105	0.116	0.570	1.068
Bellevue_Mayor_N	large	0.085	0.103	0.106	0.837	1.032
Ray-Baldut	large	0.095	0.148	0.133	0.655	1.049
Wadhwa_A	large	0.130	0.300	0.205	0.568	1.026
Ray-Linnac_N	large	0.085	0.140	0.144	0.608	1.028
Ray-Linnac_NE	large	0.082	0.137	0.144	0.604	1.048
Wadhwa	large	0.081	0.151	0.165	1.065	0.881



CONCLUSIONS

Our research confirmed the composition of the LPDs identified in Gaultier et al., 2003. The majority of the LPDs we investigated appear to have similar composition to the LPDs from Gaultier et al., 2003 as indicated by their proximity on the three plots. However, our research supports previous research on the composition of newly discovered LPDs. It verifies our understanding of the used it denotes these LPDs ratio.

Our data is slightly skewed towards higher reflectance than low contrast from the rest of the Moon's surface, which is accounted for by the fact that the 12 LPDs we studied were not identified in Gaultier et al., 2003 and received the higher resolution images from the LRO camera.

The majority of the LPDs from Gaultier et al., 2003 were within the range of the three figures. An LPD from Gaultier et al., 2003 that was outside the range of the three plots and outside of Figure 3. The large LPD from the greatest range of plots, although it had low (0.07) and high (0.04) of the LPD ratio ratio, strength within the range of the three plots and highlands.

Three identified large LPDs, Ray E and Ray-Baldut, showed a high 450nm/750nm ratio (0.847 and 0.834 respectively, Figure 3) and a low 950nm/750nm ratio (0.773 and 0.849 respectively), indicating that they are rich in titanium and iron. It would be worth studying these LPDs in further detail.

From LPDs, general age dating using the Lunar Mass resource data (2) three resource-rich zones, and the research supports the general findings about the lunar resources.

REFERENCES

- [1] Christensen, P.R., Engle, E., Anwar, E., D'Amico, S., Neis, C., Gaultier, N., Weiss, M., et al. JMARS - A Planetary GIS. http://habitable.mars.nasa.gov/2009ADL/FMAN202A_08C
- [2] Gaultier et al. (2013) Compositional analysis of lunar pyroclastic deposits. *Lunar* 141, 262-280.
- [3] Gaultier et al. (2012) Characterization of previously unidentified lunar pyroclastic deposits using Lunar Reconnaissance Orbiter Camera data. *Journal of Geophysical Research* 117, E00426.
- [4] Haskin et al., (1969) Petrology of the 20th Lunar and Planetary Science Conference, 248-258.
- [5] Hies, J.W., Jr. (1994) Lunar dark mantle deposits: possible clues to the distribution of early moon formation. *Plan. Lunar Sci. Conf.* 80, pp. 209-222.
- [6] Planetary Data System (PDS) Catalogue and Imaging Science Node (ISN) (2017). Clementine Mission.

ACKNOWLEDGEMENTS

We would like to thank Dr. Sarah Ingham for her assistance in this project and Center for Lunar Science and Exploration and Lunar Planetary Institute for hosting our team and providing us with Secondary Student.

Special thanks to Dr. Lee Gaultier for consulting with us on her paper on Lunar Pyroclastic Deposits in general.

JOE NIAGARA: COACH OF THE YEAR

Boys Lacrosse Coach, Joe Niagara was named **Central League Boys Lacrosse Coach of the Year** by his coaching peers. Niagara's determination, positive attitude, and his commitment to growing the sport of Lacrosse in Upper Darby is both respected and admired by his fellow coaches. The Central League boasts some of the most competitive and highly ranked teams in the state of Pennsylvania; Niagara works diligently to prepare his players- many of whom have never played the sport before- for such high-level opponents. Each day, Niagara instills in his players the desire and dedication to improve, to be a good teammate and to show good sportsmanship no matter what. The Upper Darby Athletic program is lucky to have Joe, and we're confident under his leadership that the sport of Lacrosse will grow, and our team will continue to improve!

NATIONAL WALK AT LUNCH DAY

Upper Darby High School teachers took advantage of the beautiful weather by participating in *National Walk At Lunch Day*.



ADDAMS FAMILY: QUARANTINED

The family you know and love is coming to our stage and living streaming to your living room! The Upper Darby High School students are hard at working preparing this comical feast featuring this wacky well known family. Follow *The Addams Family* as they navigate through life's love, fears, secrets, and the usual torture here and there!
(blurb courtesy of UDPAC)

