

HEPHZIBAH CHRISTOPHER

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EDUCATION

DOCTOR OF PHILOSOPHY, EARTH AND ATMOSPHERIC SCIENCES Georgia Institute of Technology, Atlanta, GA	[AUG'23– PRESENT]
MASTER OF SCIENCE, GEOLOGY Auburn University, Auburn, AL	[AUG'21– MAY'23] CGPA 3.89/4
BACHELOR OF ENGINEERING, GEO-INFORMATICS College of Engineering Guindy, Anna University, Chennai, India	[JUL'17– MAY'21] CGPA 9.36/10

RESEARCH EXPERIENCE

COMPARING POTENTIAL VOLATILE ABUNDANCES AND THEIR DISTRIBUTION AMONG ARTEMIS CANDIDATE LANDING REGIONS | *SUMMER INTERNSHIP* [SUMMER 2024]

- Characterization of oldest and coldest permanently shadowed regions (PSR) at Artemis Candidate Landing Regions and estimation of volatile mass within them
- Numerical simulations of crater degradation to infer the erosion timescale of PSR-hosting craters
- Assessment of the In-Situ Resource Utilization (ISRU) potential of the studied PSRs

EJECTA STRATIGRAPHY MODELING OF THE NASA/VIPER EXPLORATION ZONE AT MONS MOUTON NEAR THE LUNAR SOUTH POLE | *MASTER'S THESIS* [SPRING 2022 – SPRING 2023]

- Mapping crater population around the mission site to characterize the structure of ejecta layering in the subsurface
- Development of an illumination model to find Permanently Shadowed Regions
- Monte Carlo simulations to estimate ejecta thickness distribution and to predict possible accumulations of ice and burial by ejecta
- Assisting the VIPER science team in framing rover route plans and in-situ sampling activities based on the model results

GEOMORPHOLOGICAL AND MINERALOGICAL CHARACTERIZATION OF GERARD Q REGION ON THE MOON: A COMPREHENSIVE STUDY | *BACHELOR'S THESIS* [SPRING 2021]

- Geomorphologic mapping of Gerard Q crater complex using LRO datasets
- Reconstruction of the geologic history of the region through crater chronology
- Assessment of mineralogical diversity using Chandrayaan-1 M³ hyperspectral image cubes
- Interpretation of its implication in lunar stratigraphy and thermal evolution of the crust

MAGMATIC INTRUSION DRIVEN FLOOR DEFORMATIONS IN LUNAR IMPACT CRATERS | *MINI PROJECT* [SUMMER 2020]

- Utilization of topography data from Lunar Reconnaissance Orbiter LRO Mission to catalog impact craters with up-bowed floor morphology
- Classification of identified craters according to the axi-symmetry and geometry of the sub-crater intrusions
- Estimation of geometric parameters of the craters to quantify the amount of intrusion
- Analysis to understand the formation constraints of domical craters

CLASSIFICATION OF LUNAR CRATERS BASED ON THEIR FLOOR SUBSIDENCE | *SUMMER INTERNSHIP* [SUMMER 2019]

- Identification of craters with floor subsidence using WAC data from Lunar Reconnaissance Orbiter Mission and LRO LOLA-SELENE Kaguya TC DEM
- Categorization of the craters on the basis of their floor morphology
- Analysis to find out the reasons for their subsidence and their association with regional magmatism
- Interpretation of global distribution of subsided craters

RESEARCH INTERESTS

Understanding planetary surface features and processes through computational modelling, geological mapping and analysis of remote sensing data to gain insights into the origin and evolution of planetary bodies

PUBLICATIONS

- **Christopher, H.**, Hirabayashi, M., and 9 other coauthors, (2024), *STATISTICAL PREDICTION OF EJECTA STRATIGRAPHY AT NASA VIPER EXPLORATION SITE*, Planetary Science Journal [In prep].
- Montalvo, P. E., **Christopher, H.**, Hirabayashi, M., Fassett, C., and King Jr, D. T., (2023), *QUANTIFYING THE EJECTA THICKNESS FROM LARGE COMPLEX CRATERS ON (1) CERES*, Journal of Geophysical Research: Planets, 128(6).

CONFERENCE PROCEEDINGS

- Hirabayashi, M., **Christopher, H.**, Li, S., Wray, J., Rivera-Hernandez, F., Jones, B., Orlando, T., *MASS WASTING CHALLENGES THE PROPOSED TIMESCALE FOR FORMATION OF LUNAR HEMATITE*, NASA Exploration Science Forum, 2024.
- Beyer, R., Bickel, V., **Christopher, H.**, Colaprete, A., Deutsch, A., Fassett, C., Heldman, J., Hirabayashi, M., Nefian, A., *APOLLO 16 SHAPE-FROM-SHADING INDICATES THAT SMALL CRATERS ARE SHALLOW*, 55th Lunar and Planetary Science Conference, 2024. Abstract # 2110.
- **Christopher, H.**, Hirabayashi, M., and 9 other coauthors, *MONTE CARLO MODELING OF EJECTA THICKNESS EVOLUTION AT NASA VIPER INVESTIGATION AREA*, 54th Lunar and Planetary Science Conference, 2023. Abstract # 1828.
- **Christopher, H.**, Hirabayashi, M., and 8 other coauthors, *MODELING EJECTA BLANKETING AROUND THE NASA/VIPER INVESTIGATION SITE NEAR THE LUNAR SOUTH POLE: IMPLICATION OF MATERIAL TRANSPORT AND BURIAL OF WATER ICE*, AGU Fall Meeting, Chicago, USA, 2022.
- Montalvo, P.E., **Christopher, H.**, Hirabayashi, M., Fassett, C. I., and King Jr., D. T., *EJECTA BLANKET THICKNESS FROM LARGE COMPLEX CRATERS ON CERES*, AGU Fall Meeting, Chicago, USA, 2022.
- Hirabayashi, M., Fassett, C., Montalvo, P., **Christopher, H.**, *AUTOMATED CRATER COUNTING APPROACH TO EFFECTIVELY COUNT SMALL CRATERS IN HEAVILY BOMBARDED REGIONS ON CERES*, AGU Fall Meeting, 2021.
- **Christopher, H.**, N. Kumari, K. Shanmugapriya, S. Vijayan, *GERARD Q CRATER REGION, MOON: KREEP INDUCED VOLCANISM IN MARE-HIGHLANDS BOUNDARY?*, 52nd Lunar and Planetary Science Conference, 2021. Abstract # 1809.
- **Christopher, H.**, K. Shanmugapriya, S. Vijayan, *GEOLOGICAL AND MINERALOGICAL CHARACTERIZATION OF GERARD Q CRATER ON THE MOON*, Indian Planetary Science Conference, 2021.

TEACHING EXPERIENCE

- GRADUATE TEACHING ASSISTANT | AUBURN UNIVERSITY [FALL 2021, SPRING 2022]
- Taught Concepts of Science laboratory course to undergraduate students

AWARDS

- ANNA UNIVERSITY GOLD MEDAL for the achievement of the highest rank in Geo-informatics class of '21 [SUMMER 2021]
- SUMMER RESEARCH FELLOWSHIP by the Indian Academy of Sciences [SUMMER 2019]

TECHNICAL SKILLS

PROGRAMMING	Python, SQL, C, C++, Matlab
SOFTWARE	ArcGIS, QGIS, ENVI, ERDAS Imagine, GRASS, ISIS3
DATA PROFICIENCY	Earth: LANDSAT (VIS, THERMAL, PAN), Aerial Photographs

	Moon: LRO (WAC, NAC, WAC-DTM), CHANDRAYAAN-1 (M^3), LOLA, KAGUYA (SP) Ceres: DAWN (HAMO, LAMO)
FIELD WORK	Contouring, Levelling, Traversing, GPS Data Collection, Longitudinal and cross-sectioning of Road, Total Station Surveying, Town Resurvey