Meng-Hua Zhu

Curriculum Vitae (2025.08)

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Education

- Ph.D. in Information Science at Macau University of Science and Technology (2010)
- B.S. in Computer Science at National University of Defense Technology, China (2003)

Profession

Macau University of Science and Technology (2010- present), RA, Postdoc, AP, AsP, Professor

Research Interests

- Moon's formation and evolutional history
- Late accretion history of terrestrial planets
- Impact cratering process on planetary surface
- Lunar and planetary remote sensing observations

Professional Service and Membership

- **Reviewer** for *NASA Postdoctoral Program Fellowship* (2016-); *Research Grants Council of HongKong* (2017-); *National Natural Science Foundation of China* (2018-); *The German-Israeli Foundation for Scientific Research and Development* (2024).
- **Reviewer** for journals including *American Mineralogist*, *Earth and Planetary Science Letters*, *Earth and Space Science*, *Earth and Planetary Physic*s, *Geophysics Research Letters*, *Icarus*, *IEEE Transactions on Geoscience and Remote Sensing*, *Journal of Geophysical Research-Planets*, *Meteorites and Planetary Science*, *Nature*, *Nature Astronomy*, *Nature Communication*, *Nuclear Instruments and Methods in Physics Research Section A*, *Planetary Science Journal*, *Planetary and Space Science*, *Science*, *Science China Physics, Mechanics & Astronomy*, *Scientific Report*.
- **Conference convener and Committee**: Geophysics session (China young scientists for geophysics, 2024&2025); Planetary session (AOGS, 2011&2019);
- **Award Judge:** Best Poster Award (*International Symposium on Lunar and Planetary Science, 2018*); Dwornik Award (*LPSC*, 2015; 2017); Outstanding Student Paper Award (*AGU*, 2018)
- **Nominator:** Frontiers Planet Prize (2023 -); VinFuture Prize (2025 -).
- **Space Missions:** CNSA *Chang'E-1/2* mission (GRS member), *Chang'E-3* to *Chang'E-6* mission (participant scientist), *Tianwen-1/2* mission (participant scientist); ESA *Hera* mission (Impact WG member, since 2020); JAXA *Kaguya* mission (GRS investigator, 2010).
- **Memberships:** AGU (2016-); AOGS (2010-); Chinese AstroSoc (2014-), MetSoc (2015-).

Awards & Honors

- Asteroid 6283 1980VX1 named Menghuazhu (2025)
- State Council Special Allowance Expert (2024);
- Icarus Best Reviewer Awards (2022);
- Macao Science and Technology Research Award (Natural Science Award-First Class, 2020; 2016; -Third Class, 2012);
- Chinese Scholarset Science and Technology Persons of the Year Outstanding Achievement Award (2019);
- MUST BOC Excellent Research Award (2016; 2013);
- China Top 10 Astronomical Advancements (2014; 2013);

Peer-reviewed Publications (selected; *corresponding)

(1). Luo, X. Z., **M. -H. Zhu***, M. Ding, L. Manske, R. Luther, K. Wunnemann (2025). Shock melting and melt deposit patterns in oblique impacts: Insights from numerical simulations. *Journal of Geophysical Research: Planets* (*accepted*).

(2). Liu, T., **M. -H. Zhu*,** Q. M. Li, and L. Chen (2025). Velocity criterion for rate-dependent deformation and failure mechanisms in glassy polymers under quasi-isentropic uniaxial strain tension, *Polymer*, 336, 128896.

(3). Wei, Z., Y. Zhuang, H. Zhang, P. Zhang, Y. Li, **M.-H. Zhu**, T. Jiang, R. Pang (2025). Spectral feature variations of low-iron olivine under intense pulse-laser irradiations. *Icarus*, 440, 116665. doi:10.1016/j.icarus.2025.116665.

(4). Lu Y., **M. -H. Zhu***, Q. Wu, and S. Ren (2025). Hypervelocity impact experiments in Iron alloy targets. *Icarus*, 435, 116575. doi: 10.1016/j.icarus.2025.116575.

(5). Song T., J. Liu, C. Zhang, X. Yang, T. Chen, S. Jiang, F. Xu, N. Li, **M. -H. Zhu**, S. Li, and M. Zhou (2025) Characterization of the micro-morphology and compositional distribution of Chang'e-5 lunar soil mineral surfaces using TOP-SIMS. *Advanced Science*, 2416639, doi:10.1002/advs.202416639.

(6). Su Y. Z., L. Xu, and **M. -H. Zhu***(2025), Impact gardening affects the composition of Chang'E-5 lunar soils, *Journal of Geophysical Research: Planets*, 130, e2024JE008501. doi:10.1029/2024JE008501.

(7). **Zhu, M. -H**.*, M. Ding (2025), Moon experienced more large impacts than we currently see on its surface. *Nature Astronomy*, doi:10.1038/s41550-024-02445-y.

(8). **Zhu, M. -H**.*, M. Ding, M. Wieczorek, A. Morbidelli, L. Xu, and Q. Yin (2025), Obliteration of ancient impact basins on the Moon by viscous relaxation, *Nature Astronomy*, doi:10.1038/s41550-024-02444-z.

(9). Xu L. Y., L. Qiao, M. Xie, Y. Wang, **M. -H. Zhu**, and J. Yan (2025). Chronology, local stratigraphy, and foreign ejecta materials at the Chang'e-6 landing site: constraints on the provenance of samples returned from the Moon's farside. *Geophysical Research Letters*, 51, e2024GL111311.

(10). Wang, J. Z., K. Wang, Y. Yu, Y. Lu, W. Xiao, Z. Sun, F. Liu, Z. Zou, Y. Gao, L. Yang,

H.-Y. Zhou, H. Map, W. Zhao, L. Huang, L. Zeng, R. Guo, I. Chong, B. Deng, L. Cheng, X. Chen, J. Luo, **M.-H. Zhu**, D. Baptista-Hon, O. Monteiro, M. Li, K. Xue, E. Oerann, H. Luo, Y. Yin, K. Zhang, and J. Qu (2024). Self-improving generative foundation model for synthetic medical image generation and clinical applications. *Nature Medicine*, doi:10.1038/s41591-024-03359-y.

(11). Su Y. Z., L. Y. Xu, **M. -H. Zhu*,** and X. L. Cui (2024), Composition and provenance of the Chang'e-6 lunar samples: Insights from the simulation of impact gardening process. *The Astrophysical Journal Letters*, 976, L30.

(12). Dai, K., X. Luo, **M. -H. Zhu***, G. Collins, T. Davison, R. Luther, and K. Wünnemann (2024), Numerical simulation of impacts on large boulders of asteroids, *Planetary Science Journal*, doi:10.3847/PSJ/ad72eb.

(13). Jin, Z., T. Hou, **M.-H. Zhu**, Y. Zhang, and O. Namur (2024), Late-stage microstructures in Chang'E-5 basalt and implications for the evolution of lunar ferrobasalt, *American Mineralogist*, doi:10.2138/am-2024-9448.

(14). Liu T., L. Chen, **M. -H. Zhu***, W. Li, Z. Liu, J. Zhang, X. Zhang, S. Zhu and X. Hou (2024), Atomic insight into multi-level microstructure evolution and energy variation mechanism of polyimide under shock compression, *Macromolecules*, doi:10.1021/acs.macromol.4c00307.

(15). Chen J. Y., Wang, Y., Zhang, A., Liao, S., Li, S., Sky, B., and **M.-H. Zhu*** (2023), Olivine alteration and merrillite Pb-Pb age in Dong Ujimqin Qi: implications for reheating events on the mesosiderite parent body, *Journal of Geophysical Research: Planets*, 128, e2023JE007954.

(16). Sun Q. H., W. Fa, **M.-H. Zhu**, and J. Du (2023), Evolution of physical properties of sub-kilometer scale impact craters on the lunar maria, *Research in Astronomy and Astrophysics,* 23, 125001.

(17). Sun Q. H., W. Fa, **M.-H. Zhu**, and J. Du (2023), Morphological characteristics of impact craters with diameters of 5-20 km on the Moon, *Icarus*, doi:10.1016/j.icarus.2023.115688.

(18). Hu X. Y., T. Jiang, P. Ma, H. Zhang, P. Lucey, and **M. -H. Zhu** (2023), A spectral library study of mixtures of common lunar minerals and glass. *Remote Sensing*, 15, 2195.

(19). Ma P., H. Zhang, Y. Yang, T. Jiang, D. Britt, and **M. -H. Zhu** (2023), A laboratory study of the phase ratio imagery method, *Icarus*, 401, 115608.

(20). Sun, Y., T. Jiang, Y. Zhuang, H. Zhang, D. T. Britt, and **M. -H. Zhu** (2023), A laboratory study of the photometric properties of Mars Global Soil Simulant MGS-1 and its variants, *Planetary and Space Science,* 227, 105639*,* doi: 10.1016/j.pss.2023.105639.

(21). Luo, X. Z., **M. –H. Zhu***, and M. Ding (2022), Ejecta patterns from oblique impacts on the Moon – Insights from the numerical simulation, *Journal of Geophysical Research: Planets*, e2022JE007333, doi: 10.1029/2022JE007333.

(22). Xi X. Y., M. Ding, and **M. –H. Zhu** (2022), Groove formation on Phobos from re-impacting orbital ejecta of the Stickney crater, *Earth and Planetary Physics*, doi: 10.26464/epp2022027.

(23). Gao Y. J. and **M. -H. Zhu*** (2022), Application of the reflectionless discrete perfectly

matched layer for acoustic wave simulation. *Frontiers in Earth Science*, doi: 10.3389/feart.2022. 883160.

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(25). Ding, M. and **M. –H. Zhu*** (2022), Effects of Regional Thermal State on the Crustal Annulus Relaxation of Lunar Large Impact Basins, *Journal of Geophysical Research: Planets*, e2021JE007132, doi: 10.1029/2021JE007132.

(26). Lin X., Z. Zhu, X. Yu, X. Ji, T. Luo, X. Xi, **M. -H. Zhu**, and Y. Y. Liang (2022), Lunar crater detection on digital elevation model: a complete workflow using deep learning, *Remote Sensing*, 14, 621, doi:10.3390/rs14030621.

(27). Zhang N., M. Ding, **M. –H. Zhu**, H. C. Li, H. Y. Li, and Z. Yue (2022), Lunar compositional asymmetry explained by mantle overturn following the South Pole-Aitken impact, *Nature Geosciences*, 15, 37-41, doi: 10.1038/s41561-021-00872-4. (**Highlighted by Nature**)

(28). Yang Y. Z., S. Li, **M. –H. Zhu**, Y. Liu, J. Du, W. Fa, R. Xu, Z. He, J. Yang, B. Xue, and Y. Zou (2021), Impact remnants rich in carbonaceous chondrites detected on the Moon by the Chang'e-4 rover, *Nature Astronomy*, doi:10.1038/s41550-021-01530-w.

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(31). Gou S., Z. Yue, K. Di, R. Bugiolacchi, **M. –H. Zhu**, P. C. Pinet, and Z. Cai (2021), Mare basalt flooding events surrounding Chang'E-4 landing site as revealed by Zhinyu crater ejecta, *Icarus*, 360, 114370, doi:10.1016/j.icarus.2021.114370.

(32). Jiang T., X. Y. Hu, H. Zhang, P. Ma, C. Li, X. Ren, B. Liu, D. Liu, J. Yang, B. Xue, W. Jin**, M. –H. Zhu**, C. Huang, and H. Lin (2021), *In-situ* lunar phase curves measured by Chang'E-4 in Von Karman crater, South Pole-Aitken Basin, *Astronomy&Astrophysics*, 646, A2, doi:10.1051/0004-6361/202039252.

(33). Zhang J‡., B. Zhou‡, Y. Lin, **M. –H. Zhu**‡, H. Song, Z. Dong, Y. Gao, K. Di, W. Yang, H. Lin, J. Yang, E. Liu, L. Wang, Y. Lin, C. Li, Z. Yue, Z. Yao, and Z. Ouyang (2020), The regolith thickness and subsurface structure of Von Karman crater in South Pole-Aitken basin probed by the lunar rover Yutu-2, *Nature Astronomy,* doi:10.1038/s41550-020-1197-x. (‡ ***Equal contribution to this work***)

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(35). Lin H. L., Z. P. He, W. Yang, Y. T. Lin, R. Xu, C. Zhang, **M. –H. Zhu**, R. Chang, J. H. Zhang, C. Li, H. Lin, Y. Liu, S. Gou, Y. Wei, S. Hu, C. Xue, J. Yang, J. Zhong, X. Fu, W. Wan, and Y. Zou (2020), Olivine-norite rock detected by the lunar rover Yutu-2 likely crystallized from the SPA impact melt pool, *National Science Review*, 7, 913-920, doi:10.1093/nsr/nwz183.

(36). Di K., **M. –H. Zhu**, Z. Yue, Y. Lin, W. Wan, Z. Liu, S. Gou, B. Liu, M. Peng, Y. Wang, S. Niu, J. Zhang, J. Li, J. Xie, L. Xi, J. Yang, and B. Xue (2019), Topographic evolution of Von Karman crater revealed by the lunar rover Yutu-2, 2019, *Geophysical Research Letters*, 46, 12,764-12,770, doi:10.1029/2019GL085252 (**Paper on Front Cover of Journal**)

(37). Du J. W. Z. Fa, M. Wieczorek, M. G. Xie, Y. Z. Cai, and **M. –H. Zhu** (2019), Thickness of lunar mare basalts: new results based on modeling the degradation of partially buried craters, *Journal of Geophysical Research: Planets*, 124, 2,430-2,459, doi:10.1029/2018JE005872.

(38). Hu X. Y., P. Ma, Y. Z. Yang, **M. –H. Zhu**, T. Jiang, L. Z. Sun, H. Zhang, P. G. Lucey, C. L. Li, R. Xu, Z. P. He, H. Y. Lin, and C. N. Huang (2019), Mineral abundances inferred from reflectance measurements of Chang'E-4 landing site in South Pole-Aitken basin, *Geophysical Research Letters,* 46,9,439-9,447, doi: 10.1029/2019GL084531 (**Featured Article of Journal**)

(39). **Zhu M. –H.***, N. Artemieva, A. Morbidelli, Q. –Z. Yin, K. Wünnemann, and H. Becker (2019), Reconstructing the late accretion history of the Moon, *Nature*, 571, 226-229, doi:10.1038/s41586-019-1359-0 (with '**News and Views'** by James Day).

(40). Zhang X. Y. and **M. –H. Zhu**, R. Bugiolacchi (2019), Mafic minerals of the South Pole-Aitken basin, *Journal of Geophysical Research: Planets*, 124, 1,581-1,591, doi:10.1029/2018JE05870.

(41). Zhong Z., G. Yan, S. G. Jin, **M. –H. Zhu**, J. Alexis, P. Rodriguez, H. Q. Zhu, and Y. Li (2019), Selenophysical parameter inversion in the lunar southern hemisphere highlands based on mutant particle swarm optimization, *Physics of the Earth and Planetary Interior*, 292, 55-66, doi: 10.1016/j.pepi.2019.05.001.

(42). **Zhu M. –H.***, K. Wünnemann, R. W. K. Potter, T. Kleine, and A. Morbidelli (2019), Forming the Moon's nearside-farside dichotomies via giant impact, *Journal of Geophysical Research: Planets*, 124, 2,117-2,140, doi: 10.1029/2018JE005826 (**Featured Article and Paper on Front Cover of Journal**).

(43). **Zhu M. –H.***, J. Chang, T. Ma (2019), Thorium distribution on the Moon: new insights from Chang'E-2 Gamma-ray Spectrometer, *Research in Astronomy and Astrophysics,* 19 (6), 76, doi:10.1088/1674-4527/19/6/76.

(44). Zhang F. and **M. –H. Zhu**, et al. (2018), Diversity of basaltic lunar volcanism associated with buried impact structures: Implications for intrusive and extrusive events, *Icarus*, 307, 216-234, doi:10.1016/j.icarus.2017.10.039.

(45). Luther R., **M. –H. Zhu**, G. Collions, and K. Wünnemann (2018), The effect of target properties on ejection dynamics and ejecta deposition, *Meteoritics and Planetary Science*, 53, 1,705-1,732, doi:10.1111/maps.13143.

(46). **Zhu M. –H.***, K. Wünnemann, and N. Artemieva (2017), Target's thermal effect on the ejecta thickness distribution of large-scale impact basins on the Moon, *Geophysical Research Letters*, 44, 11,292-11,300, doi: 10.1002/2017GL075405.

(47). Xie M. G. and **M. –H. Zhu***, et al. (2017), Effect of topography degradation on crater size-frequency distributions: Implications for populations of small craters and age dating, *Geophysical Research Letters*, 44, 10,171-10,179, doi:10.1002/2017GL075298.

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(49). Xu X. M., T. Kenkmann, Z. Xiao, S. Sturm, N. Metzger, Y. Yang, D. Weimer, H. Krietsch, and **M. –H. Zhu** (2017), Reconnaissance survey of the Duolun ring structure in Inner Mongolia: Not an impact structure, *Meteoritics and Planetary Science*, doi:10.1111/maps.12890.

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