

MAREK SLIPSKI

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EDUCATION

University of Colorado Boulder <i>PhD in Geophysics</i> Advisor: Bruce Jaksoky Department of Astrophysical and Planetary Sciences	Sep 2012 – Jan 2019
University of Rochester <i>Bachelor of Science in Physics and Astronomy</i> Department of Physics and Astronomy	Sep 2007 – Dec 2011

EXPERIENCE

Research Scientist <i>Jet Propulsion Laboratory</i>	Feb 2023 – present
NASA Postdoctoral Program Fellow/JPL Postdoctoral Fellow <i>Jet Propulsion Laboratory</i>	September 2019 – Feb 2023 <i>Advisor: Armin Kleinböhl</i>
Researcher <i>NASA Frontier Development Lab</i>	June 2020 – August 2020 <i>Advisor: Clem Tillier</i>
Research Scientist <i>Laboratory for Atmospheric and Space Physics, University of Colorado Boulder</i>	Feb 2019 – May 2019 <i>Advisor: Bruce Jakosky</i>
Graduate Research Assistant <i>Laboratory for Atmospheric and Space Physics, University of Colorado Boulder</i>	Jan 2013 – Feb 2019 <i>Advisor: Bruce Jaksoky</i>
NASA Undergraduate Student Research Assistant <i>NASA MSFC, NASA Undergraduate Student Research Program</i>	Jan 2010 – May 2010 <i>Advisor: James Adams</i>
Undergraduate Research Assistant <i>University of Rochester, REU Student</i>	Sep 2008 – Dec 2011 <i>Advisor: Eric Mamajek</i>

RESEARCH GRANTS SELECTED

Science PI NASA Mars Data Analysis Program <i>“Distribution and Composition of Mars Mesospheric Clouds from Mars Climate Sounder Observations”</i>	PI: Armin Kleinböhl 2022–2025
Science PI NASA Citizen Science Seed Funding Program <i>“Mars Mesospheric Cloud Citizen Science”</i>	PI: Armin Kleinböhl 2021–2022
Co-I NASA Mars Data Analysis Program <i>“Characterizing The Impact of Small Dust Storms on the Martian Climate”</i>	PI: Mark Wronkiewicz 2023–2026
Collaborator (Unfunded) NASA Citizen Science Seed Funding Program <i>“Martian Cloud Watching”</i>	PI: Matteo Crismani 2022–2023
Co-I (Unfunded) JPL R&TD Spontaneous Concept <i>“Characterizing Small Martian Dust Storms with Data Science for Mission Planning and Climate Modeling”</i>	PI: Mark Wronkiewicz 2022

MISSION ACTIVITIES

Science Planning and Mission Operations <i>Mars Climate Sounder</i>	2023–present
Instrument Science Team Member <i>Mars Climate Sounder</i>	2019–present
Joint ESA/NASA Cloud Tiger Team Member <i>Mars Sample Return</i>	2021–2023
Council of Atmospheres Member <i>Mars 2020 EDL</i>	2019–2020
Mission Concept Design Participant <i>JPL NRS Mission Incubation Program</i>	2021–2022
Mission Concept Design Participant, Role: Ground Systems <i>JPL Planetary Science Summer School</i>	2016
Science Team Member <i>MAVEN</i>	2013–2019

SELECTED PUBLICATIONS

- Slipski, M.**, Kleinböhl, A., Dillmann, S., Reimuller, J., Wronkiewicz, M., Doran, G. (2023). “The Cloudspotting on Mars citizen science project: Seasonal and spatial cloud distributions observed by the Mars Climate Sounder”, *Icarus*, <https://doi.org/10.1016/j.icarus.2023.115777>.
- Piqueux, S., Kass, D. M., Kleinböhl, A., **Slipski, M.**, Hayne, P.O., McCleese, D. J., Schofield, J. T., Heavens, N. (2023). “Mars thermal inertia and surface temperatures by the Mars Climate Sounder.” *Icarus*, <https://doi.org/10.1016/j.icarus.2023.115851>.
- Slipski, M.**, Kleinböhl, A., Tirsch, D., Kminek, G., et al. (2023). “The radiometric environment for Mars limb observations by the Mars Sample Return Earth Orbiter.” *Advances in Space Research*, 72, 9, 4048-4063, <https://doi.org/10.1016/j.asr.2023.07.019>.
- Slipski, M.**, Kleinböhl, A., Kass, D. M. (2022). Role of thermal tides and gravity waves in Mars equatorial mesospheric cloud formation revealed by Mars Climate Sounder observations. *Geophysical Research Letters*, 49, e2022GL100607, <https://doi.org/10.1029/2022GL100607>.
- Tirsch, D., **Slipski, M.**, Kleinböhl, A., Kminek, G., and Cloud Tiger Team. (2022). MSR/ERO Cloud Tiger Team Report. *ESA-NASA Technical Report*.
- Slipski, M.**, Venzor-Cardenas, I., Molina, M. J., Ahmed, N Cheung, M., Tillier, C., Edgington, S., Renard, G. (2020). Predicting Severe Thunderstorms with Machine Learning and Geostationary Lightning Mapper. *Frontier Development Lab Technical Memorandum*.
- Slipski, M.**, Jakosky, B., Benna, M., Elrod, M., Mahaffy, P., Kass, D., Stone, S., Yelle, R. (2018). Variability of Martian Turbopause Altitudes. *Journal of Geophysical Research - Planets*, 123, 2939-2957, <https://doi.org/10.1029/2018JE005704>.
- Jakosky, B. M., Brain, D., Chaffin, M., Curry, S., Deighan, J., Grebowsky, J., ... **Slipski, M.**, ... & Zurek, R. (2018). Loss of the Martian atmosphere to space: Present-day loss rates determined from MAVEN observations and integrated loss through time. *Icarus*, 315, 146-157, <https://doi.org/10.1016/j.icarus.2018.05.030>
- Elder, C., Bramson, A., Blum, L., Chilton, H., Chopra, A., Chu, C., Das, A., Davis, A., Delgado, A., Fulton, J., Jozwiak, L., Khayat, A., Landis, M., Molaro, J., **Slipski, M.**, Valencia, S., Watkins, J., Young, C., Budney, C., Mitchell K. (2017). OCEANUS: A high science return Uranus orbiter with a low-cost instrument suite. *Acta Astronautica*, 148, 1-11, <https://doi.org/10.1016/j.actaastro.2018.04.019>.

Jakosky, B. M., **Slipski, M.**, Benna, M., Mahaffy, P., Elrod, M., Yelle, R., Stone, S., Alsaeed, N. (2017). Mars' atmospheric history derived from upper-atmosphere measurements of $^{38}\text{Ar}/^{36}\text{Ar}$. *Science*, 355(6332), 1408-1410, <https://doi.org/10.1126/science.aai7721>.

Slipski, M., and Jakosky, B. M. (2016). Argon isotopes as tracers for martian atmospheric loss. *Icarus*, 272, 212-227, <https://doi.org/10.1016/j.icarus.2016.02.047>.

PUBLISHED DATASETS

Slipski, M., Kleinböhl, A, Dillmann, S, Kass, D., Reimuller, J., Wronkiewicz, M., Doran, G., (2023), "Replication Data for Cloudspotting on Mars Citizen Science Cloud Centroids for Mars Year 29", *Icarus, JPL Open Repository*, <https://doi.org/10.48577/jpl.UXMDDK>.

CITIZEN SCIENCE AND OPEN SOURCE CONTRIBUTIONS

Project Lead 2022–present
Cloudspotting on Mars NASA Citizen Science, Zooniverse
<https://www.zooniverse.org/projects/marek-slipski/cloudspotting-on-mars>
<https://github.com/Cloudspotting-on-Mars>

Maintainer 2022–present
mcstools
<https://github.com/Cloudspotting-on-Mars/mcstools>

Contributor 2023–present
mars_time Maintainer: Kyle Connour
https://github.com/kconnour/mars_time

HONORS, AWARDS, CERTIFICATIONS, AND PROGRAM PARTICIPATION

Certificate of Completion, NASA TOPS Open Science Module 1	2023
NASA Group Achievement Award (Mars 2020 Council of Atmospheres)	2022
Participant in JPL NRSO Mission Incubation Program	2022
NASA Group Achievement Award (MAVEN Science Team)	2018
Participant in NASA JPL Planetary Science Summer School	2016
NASA Group Achievement Award (MAVEN Science Team)	2016
Participant in NAI Summer School in Astrobiology	2014
Recipient of NASA MEPAG Student Travel Grant	2014
University of Rochester Cum Laude with Highest Distinction	2011
Participant in NASA Undergraduate Student Research Program	2010
Sigma Pi Sigma Inductee, National Physics Honors Society	2010
Participant in University of Rochester Summer REU program	2009, 2010, 2011
Recipient Iota Book Award, Iota Chapter of Phi Beta Kappa	2008
University of Rochester Dean's List	2007 – 2011
Wilder Trustee Scholarship	2007 – 2011

PRESS COVERAGE

- Interviewed for *New Scientist* story on *Cloudspotting on Mars*, "Join the hunt for clouds high up in the Martian atmosphere" (2022).
- Guest on The Planetary Society's *Planetary Radio* podcast: "Citizen Science: Join the search for Martian clouds." (2022).
- Interviewed for *WIRED* story about *Cloudspotting on Mars*, "NASA Is Crowdsourcing Cloud Research on Mars." (2022).
- *Cloudspotting on Mars* project featured in *NPR Morning Edition*, *Space.com*, *LAist*, *Gizmodo*, *KPCC*, *CNET*, *FOX Weather*, *EarthSky*, *Cloud Appreciation Society* (2022).

- NASA feature about *Cloudspotting on Mars*, “Help NASA Scientists Find Clouds on Mars.” (2022).
- Live guest on SETI Live episode “Frontier Development Lab: Lightning and Extreme Weather.” (2020).
- NASA Science nugget on *Variability of Martian Turbopause Altitudes*: “‘Breathing’ in Mars’ Upper Atmosphere.” (2019).
- Interviewed by *LA Times* for story about *Mars’ atmospheric history derived from upper-atmosphere measurements of $^{38}\text{Ar}/^{36}\text{Ar}$* , “How did Mars lose so much of its atmosphere? MAVEN has an answer.” (2017).
- Interviewed by *Daily Camera* for story about for story about *Mars’ atmospheric history derived from upper-atmosphere measurements of $^{38}\text{Ar}/^{36}\text{Ar}$* , “CU-led MAVEN mission to Mars quantifies atmospheric loss.” (2017).

ACADEMIC SERVICE

Referee for <i>GRL, Icarus, JGR-Planets, The Astrophysical Journal, The Planetary Science Journal, JGR-Atmospheres, MDPI</i>	2019–present
Proposal Reviewer for multiple NASA Programs	2019–present
Organizer and Host for JPL Mars Forum Seminar Series	2023–2024
Judge for Fall AGU Student Posters	2019–present
Served as Executive Secretary for NASA Review Panel	
AbGradCon Local Organizing Committee Member	2016
“Life” Synthesis Team member for the 8th International Conference on Mars	2014
Graduate student concerns committee representative	2013

PUBLIC OUTREACH

Cloudspotting on Mars Webinar Series, Virtual	2022-present
Cloudspotting on Mars blog (https://cloudspotting-on-mars.github.io)	2022-present
Guest speaker at Van Antwerp Middle School Community Service Project Day	2023
Public lecture on Planetary Atmospheres, Rotary Club, <i>Longmont, CO</i>	2015
Organized public lectures on astronomy, Rotary Club, <i>Longmont, CO</i>	2015 & 2016
Co-organized MAVEN demonstrations, CU Boulder Astronomy Day, <i>Boulder, CO</i>	2014 & 2015
Public lecture on MAVEN mission, Boardman High School, <i>Boardman, OH</i>	2013
Observing night lead, Sommers-Bausch Observatory, <i>Boulder, CO</i>	2012 – 2016
Science Fair Judge, <i>Kansas City, MO</i>	2012
Observing night lead, Mees Observatory, <i>Bristol Hills, NY</i>	2009 – 2011

MENTORING EXPERIENCE

Mentor, Kanpatom Kasonsuwan and Priya Patel (<i>AGU Planetary Sciences Mentoring Program</i>)	Winter 2022
Mentor to Steven Dillmann, <i>JPL Visiting Student Research Program</i>	Summer 2022
Mentor to Alex Scatena (Principal: Bruce Jakosky), <i>Fairview High School student</i>	Summer 2018
Mentor to Hind Saeed (Principal: Bruce Jakosky), <i>LASP REU student</i>	Summer 2017
Mentor to Noora Alsaeed (Principal: Bruce Jakosky), <i>LASP REU student</i>	Summers 2015 & 2016
Physics tutor, <i>University of Rochester</i>	2009–2011

TEACHING EXPERIENCE

IIAS/PoSSUM EDU 101: Citizen Science Research	2022–2024
<i>Guest lecturer: Cloudspotting on Mars</i>	
International Institute for Astronautical Sciences	
Planets and Their Atmospheres	Spring 2015
<i>Teaching Assistant to Jean-Michel Desert</i>	
<i>Guest Lecture: Climate and Evolution of Atmospheres</i>	
University of Colorado Boulder	

Introduction to Geology <i>Guest Lecture: Climates of the Terrestrial Planets</i> Front Range Community College	Spring 2015
Introduction to Astronomy <i>Laboratory Teaching Assistant to Seth Hornstein</i> University of Colorado Boulder	Fall 2012
Elementary Astrophysics <i>Undergraduate Teaching Assistant to Dan Watson</i> University of Rochester	Spring 2011
The Solar System and Its Origins <i>Undergraduate Teaching Assistant to Dan Watson</i> University of Rochester	Fall 2010

TECHNICAL STRENGTHS

Programming	Python, IDL, Linux/Unix, awk, Jupyter, Colab, pair coding
Analysis Tools	pandas, numpy, xarray, scipy, sklearn, skimage, numpyro, pymc3, dask,
Visualization	matplotlib, panel, bokeh, dash, plotly, Vega-Lite, streamlit
Writing & Presentation	MyST Markdown, LaTeX, Word, Powerpoint, Prezi, Google Workspace
Management/DevOps	git, pytest, CircleCI, Make, Docker, Trello, Google Drive
Cloud & Computing	High Performance Computing, Amazon Web Services, Google Cloud Platform

SELECTED TALKS AND PRESENTATIONS

<i>Workshop Talk</i>	Aug 2023
Slipski, M. , Kleinböhl, A. “Piecing together the loss of Mars’ CO ₂ and H ₂ O.” <i>Atmospheric and Interior Connection in rocky EXOplanets and what we can learn from the Solar System (ExoSS II)</i> .	
<i>Workshop Talk</i>	July 2023
Slipski, M. , Kleinböhl, A., Dillmann, S., Reimuller, J. D., Wronkiewicz, M., and Doran, G. B. “Mesospheric clouds on Mars observed in atmospheric limb measurements by the Mars Climate Sounder.” <i>Building Bridges between Earth and Planetary Clouds and Aerosols, Blue Sky Workshop</i>	
<i>Conference Poster</i>	May 2023
Slipski, M. , Kleinböhl, A., Dillmann, S. “Citizen Science in NASA Planetary Science: Lessons Learned from the Cloudspotting on Mars Project.” <i>C*Sci Conference</i>	
<i>Conference Talk</i>	Dec 2022
Slipski, M. , Kleinböhl, A., Dillmann, S., Reimuller, J. D., Wronkiewicz, M., and Doran, G. B. “Cloudspotting on Mars: Mapping Mesospheric Clouds through Citizen Science.” <i>American Geophysical Union, Fall Meeting</i> , abstract #P33D-08.	
<i>Conference Talk</i>	July 2022
Slipski, M. , Kleinböhl, A., Kass, Tirsch, D., and the Cloud Tiger Team. “The radiometric environment for Mars limb observations by the Mars Sample Return Earth Return Orbiter.” <i>COSPAR 2022</i> .	
<i>Conference Poster</i>	June 2022
Slipski, M. , Kleinböhl, A., Kass, D. M. “Aphelion Equatorial Mesospheric Clouds Observed by MCS.” <i>Seventh International Workshop on the Mars Atmosphere: Modelling and Observations</i> .	
<i>Conference Talk</i>	Dec 2021
Slipski, M. , Kleinböhl, A., Kass, D. M. “Aphelion Equatorial Mesospheric Clouds Observed by MCS: Local time variability and evidence for wave-induced cold pockets.” <i>American Geophysical Union, Fall Meeting</i> , abstract #P31B-04.	

- Conference Talk* Dec 2020
Slipski, M., and Kleinböhl, A. “Identification of Mars Mesospheric Clouds in Mars Climate Sounder Data Using a Machine-learning Algorithm.” *American Geophysical Union, Fall Meeting*, abstract #P008-04.
- Conference Talk* July 2019
Slipski, M., Jakosky, B., Kleinböhl, A. “Turbopause levels and mesospheric cloud formation.” *Ninth International Conference on Mars*, abstract 6313.
- Conference Talk* Dec 2018
Slipski, M., Jakosky, B., Benna, M., Elrod, M., Mahaffy, P., Kass, D., Stone, S., Yelle, R. “Variability of Mars’ Turbopause Altitudes.” *American Geophysical Union, Fall Meeting*, abstract #P32B-02.
- Conference Talk* Oct 2017
Slipski, M., Jakosky, B., Benna, M., Mahaffy, P., Elrod, M., Kass, D., Gonzalez-Galindo, F. (2017) “Variability of Martian Turbopause Altitudes.” *American Astronomical Society, DPS meeting #49*, #510.08.
- Conference Poster* Oct 2017
Slipski, M., Jakosky, B., Benna, M., Mahaffy, P., Elrod, M. K. (2017) “Atmospheric Argon Isotope Evolution Informed by MAVEN Results.” *Fourth International Conference on Early Mars*, LPI Contribution No. 2014, id. 3027.
- Conference Poster* May 2017
Slipski, M., Jakosky, B., Benna, M., Mahaffy, P., Elrod, M., Yelle R., Stone S., Alsaeed N., Vals M. (2017) “Homopause Variability as Observed by MAVEN.” *International Conference on Mars Aeronomy*.
- Conference Talk* Jan 2017
Slipski, M., Jakosky, B., Benna, M., Mahaffy, P., Elrod, M., Yelle, R., Stone, S., Alsaeed, N. (2017) “Total Atmospheric Loss from Upper-Atmospheric Structure of $^{36}\text{Ar}/^{38}\text{Ar}$ Observed by MAVEN.” *The Sixth International Workshop on the Mars Atmosphere*, p.3316.
- Conference Talk* Mar 2016
Slipski, M., Jakosky, B., Alsaeed, N., Mahaffy, P., Benna, M., Elrod, M. (2016) “Characterizing Mars’ Atmospheric Loss Through Argon Isotopic Fractionation Observed with MAVEN.” *47th Lunar and Planetary Science Conference*, LPI Contribution No. 1903, p.2422.
- Conference Poster* July 2014
Slipski, M., Jakosky, B. (2014) “Evolution of Argon Isotopes in the Martian Atmosphere.” *Eighth International Conference on Mars*, LPI Contribution No. 1791, p.1021.
- Conference Poster* Dec 2013
Slipski, M., Jakosky, B. (2013) “Effects of outgassing, sputtering, and erosion on the evolution of argon isotopes in the Martian atmosphere.” *American Geophysical Union, Fall Meeting*, abstract #P21B-1717.
- Conference Poster* Jan 2010
Slipski, M., Mamajek, E. (2010) “Improved Ages Estimates for Extrasolar Planet Host Stars” *American Astronomical Society, AAS Meeting #215*, 423.01.