# MAREK SLIPSKI

3855 Armer Avenue, Boulder, CO 80305
(+1) 330-774-5489 ⋄ marek.slipski@colorado.edu

## EDUCATION

**University of Colorado Boulder** Sep 2012 – Jan 2019
*PhD in Geophysics*
Advisor: Bruce Jaksoky
Department of Astrophysical and Planetary Sciences

**University of Rochester** Sep 2007 – Dec 2011
*Bachelor of Science in Physics and Astronomy*
Department of Physics and Astronomy

## RESEARCH EXPERIENCE

**Graduate Research Assistant** Jan 2013 – Present
*Laboratory for Atmospheric and Space Physics, University of Colorado Boulder*
*Advisor: Bruce Jaksoky*

- Compared Mars' thermal structure in the lower atmosphere using MRO MCS temperature profiles and upper atmosphere using MAVEN NGIMS densities to investigate the physical processes setting the turbopause level and causing its observed variability.
- Derived scale heights and homopause and exobase altitudes from MAVEN NGIMS neutral densities to determine the fractionation of Ar isotopes and integrated Ar escape.
- Modeled the effects of volcanic outgassing, sputtering, crustal degassing, and impacts on Ar isotope ratios throughout Mars' history to assess total atmospheric loss.

**Undergraduate Research Assistant** Jan 2010 – May 2010
*NASA Marshall Space Flight Center, NASA Undergraduate Student Research Program*
*Advisor: James Adams*

- Began development of a model to predict worst-case solar proton environments for spacecraft missions by analyzing spectral energy distributions of solar particle events.

**Undergraduate Research Assistant** Sep 2008 – Dec 2011
*University of Rochester*
*Advisor: Eric Mamajek*

- Searched for nearby candidate dwarf stars using photometry and astrometry from the All-Sky Compiled Catalogue.
- Derived ages for exoplanet host stars using chromospheric activity measurements and empirical activity-rotation-age calibrations.

## HONORS AND AWARDS

| | |
|---|---|
| Participant in NASA JPL Planetary Science Summer School | 2016 |
| Participant in NASA 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 |

## ACADEMIC SERVICE

| | |
|---|---|
| Served as Executive Secretary on 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 |

## MENTORING EXPERIENCE

| | |
|---|---|
| Co-mentor to Alex Scatena, *Fairview High School student* | Summer 2018 |
| Co-mentor to Hind Saeed, *LASP REU student* | Summer 2017 |
| Co-mentor to Noora Alsaeed, *LASP REU student* | Summers 2015 & 2016 |
| Physics tutor, *University of Rochester* | 2009 – 2011 |

## TEACHING EXPERIENCE

**Planets and Their Atmospheres** Spring 2015
*Teaching Assistant to Jean-Michel Desert*
*Guest Lecture: Climate and Evolution of Atmospheres*
University of Colorado Boulder

**Introduction to Geology** Spring 2015
*Guest Lecture: Climates of the Terrestrial Planets*
Front Range Community College

**Introduction to Astronomy** Fall 2012
*Laboratory Teaching Assistant to Seth Hornstein*
University of Colorado Boulder

**Elementary Astrophysics** Spring 2011
*Undergraduate Teaching Assistant to Dan Watson*
University of Rochester

**The Solar System and Its Origins** Fall 2010
*Undergraduate Teaching Assistant to Dan Watson*
University of Rochester

## PUBLIC OUTREACH

| | |
|---|---|
| Public lecture on Planetary Atmospheres, Rotary Club, *Longmont, CO* | 2015 |
| Organized public lectures on astronomy, Rotary Club, *Longmont, CO* | 2015 & 2016 |
| Co-organized MAVEN demonstrations, CU Boulder Astronomy Day, *Boulder, CO* | 2014 & 2015 |
| Public lecture on MAVEN mission, Boardman High School, *Boardman, OH* | 2013 |
| Observing night lead, Sommers-Bausch Observatory, *Boulder, CO* | 2012 – 2016 |
| Science Fair Judge, *Kansas City, MO* | 2012 |
| Observing night lead, Mees Observatory, *Bristol Hills, NY* | 2009 – 2011 |

## PUBLICATIONS

**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, 29392957.

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.

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*.

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 $^{38}Ar/^{36}Ar$. *Science*, 355(6332), 1408-1410.

**Slipski, M.**, and Jakosky, B. M. (2016). Argon isotopes as tracers for martian atmospheric loss. *Icarus*, 272, 212-227.

## TALKS AND PRESENTATIONS

*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.

*Poster* Sep 2018
**Slipski, M.**, Jakosky, B., Benna, M., Elrod, M., Mahaffy, P., Kass, D., Stone, S., Yelle, R., Scatena, A. "Variability of Homopause and Turbopause Altitudes and Implications for Ar loss." *MAVEN Project Science Group Meeting*.

*Poster* Mar 2018
**Slipski, M.**, Jakosky, B., Benna, M., Mahaffy, P., Elrod, M., Gonzalez-Galindo, F. "Variability and Control of the Homopause Level." *MAVEN Project Science Group Meeting*.

*Conference Talk* Oct 2017
**Slipski, M.**, Jakosky, B., Benna, M., Mahaffy, P., Elrod, M., Kass, D., Gonzalez-Galindo, F. "Variability of Martian Turbopause Altitudes." *American Astronomical Society, DPS meeting #49*, #510.08.

*Poster* Oct 2017
**Slipski, M.**, Jakosky, B., Benna, M., Mahaffy, P., Elrod, M., Gonzalez-Galindo, F. "Variability of Mars' homopause and 'wave-turbopause.'" *MAVEN Project Science Group Meeting*.

*Conference Poster* Oct 2017
**Slipski, M.**, Jakosky, B., Benna, M., Mahaffy, P., Elrod, M. K. "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. "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. "Total Atmospheric Loss from Upper-Atmospheric Structure of $^{36}Ar/^{38}Ar$ Observed by MAVEN." *The Sixth International Workshop on the Mars Atmosphere*, p.3316.

*Talk* Nov 2016
**Slipski M.** "Variability of the homopause." *MAVEN Project Science Group Meeting*.

*Conference Talk* Mar 2016
**Slipski, M.**, Jakosky, B., Alsaeed, N., Mahaffy, P., Benna, M., Elrod, M. "Characterizing Mars' Atmospheric Loss Through Argon Isotopic Fractionation Observed with MAVEN." *47th Lunar and Planetary Science Conference*, LPI Contribution No. 1903, p.2422.

*Talk* Oct 2015
**Slipski, M.** "Exobase and Homopause altitudes." *MAVEN Project Science Group Meeting*.

*Conference Poster* July 2014
**Slipski, M.**, Jakosky, B. "Evolution of Argon Isotopes in the Martian Atmosphere." *Eighth International*

*Conference on Mars*, LPI Contribution No. 1791, p.1021.

*Talk* Jan 2014

**Slipski, M.** "Argon Isotopic Evolution in the Martian Atmosphere." *MAVEN Project Science Group Meeting.*

*Conference Poster* Dec 2013

**Slipski, M.**, Jakosky, B. "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. "Improved Ages Estimates for Extrasolar Planet Host Stars" *American Astronomical Society, AAS Meeting #215*, 423.01.

(Talks and posters contributed to available upon request)

## TECHNICAL STRENGTHS

| | |
|---|---|
| **Programming** | UNIX, Python, IDL, FORTRAN, Mathematica, awk |
| **Data processing** | pandas, sklearn, Excel |
| **Plotting and Visualization** | matplotlib |
| **Writing and Presentation** | LaTeX, Word, Powerpoint, Prezi |
| **Workflow** | git, Jupyter, Make, pydoit |
| **Development** | Docker |
| **Web scraping** | beautifulsoup, urllib2, requests |