Jeremy Emmett

+31 62 7345813 | j.emmett@vu.nl
Age: 32, Citizenship: United States
LinkedIn: www.linkedin.com/in/jeremyemmett

I'm a doctoral graduate with six+ years of astronomy (planetary science) research experience and 3 years of postgraduate earth science research. My graduate project, primarily supported through a nationally competed and selected NASA Earth and Space Science Fellowship award, focused on interpreting the climate record in Mars' layered polar caps. My postdoctoral research, supported by the Netherlands Earth System Science Centre, investigates the role of microbial dynamics in Earth's permafrost carbon feedback with a combination of process-based modeling and fieldwork in the Canadian subarctic. I have a continuing interest in academic focused on data analysis, modeling, or field/lab-technical work in an astronomy or earth science context.

Education

New Mexico State University, Las Cruces, NM, USA

Doctor of Philosophy ***(PhD), Astronomy*** **Conferred: 05/2020**

Dissertation: "Dependence upon Obliquity of the Formation of Martian PLD Vertical Structure". Advisor: Prof. James R. Murphy

Master of Science ***(MS), Astronomy*** **Conferred: 08/2021**

University of Colorado Boulder, Boulder, CO, USA

Bachelor of Arts ***(BA), Astronomy***, with distinction (minor in mathematics) **Conferred: 05/2014**

Employment

Department of Earth Sciences, Vrije Universiteit Amsterdam **09/2021 – 09/2024**

Postdoctoral Researcher*, Supervisors: Prof. dr. Jorien Vonk & Prof. dr. Sander Houweling*

Investigating the role of microbe dynamics in driving methane emission (or uptake) surface fluxes in the subarctic, using a self-developed, process-based model (*Python*). Field and lab work to measure surface gas fluxes and various biogeochemical soil properties. Python teaching assistant.

Planetary Data System Atmospheres Node, New Mexico State University **06/2020 – 07/2021**

Research Engineer, Associate*, Supervisor: Dr. Nancy Chanover*

Migration of spacecraft instrument datafile labels from PDS3 (ASCII) to PDS4 (XML) (*Python*).

Department of Astronomy, New Mexico State University **08/2014 – 05/2020**

Graduate Research Assistant*, Advisor/Supervisor: Dr. Jim Murphy*

Interpreting Martian polar ice stratigraphy as a planetary climate record, using the 'NASA Ames Mars GCM' (*FORTRAN*) and a self-developed long-term polar ice & dust deposition model (*IDL*) to predict layer production in response to climate variations. Astronomy teaching assistant.

Laboratory for Atmospheric and Space Physics **05/2013 – 07/2014**

Undergraduate Research Assistant*, Supervisor: Dr. Nick Schneider*

Identifying optimal time windows for MAVEN spacecraft observations of Martian aurorae, using self-developed routines (*IDL*) and the 'NASA SPICE' data toolkit to visualize instrument observation geometries with respect to global magnetic field topology.

Skills

- Python, IDL, FORTRAN, MATLAB
- Planetary/Earth science research & teaching
- Numerical modeling, data analysis & visualization
- Linux, MS Windows, MS Office

Research Grants

Microbial-Focused Modelling of Methane Emission in Canadian Permafrost

Netherlands Earth System Science Centre **09/2021 – 09/2024**
Pre-funded

Formation of the Martian Polar Layered Terrains: Quantifying net annual polar water ice and dust surface deposition during current & past orbital epochs with the NASA Ames Mars General Circulation Model

NASA Earth and Space Science Fellowship Award #NNX16AP37H **09/2016 – 08/2019**
Primary Proposal Writer

Quantifying Net Annual Polar Deposition Rates of Water Ice and Dust on Mars at Various Obliquities with the NASA Ames Mars Global Climate Model

New Mexico Space Grant Consortium Award/NASA Agreement #NNX15A51H **09/2019 – 12/2019**
Primary Proposal Writer

Publications

Peer-Reviewed

Emmett, J., J. Murphy, and M. Kahre. Obliquity Dependence of the Formation of the Martian Polar Layered Deposits. 2020. *Planetary and Space Science.*

Smith, I., + 37 co-authors including **J. Emmett***. The Holy Grail: A Roadmap for Unlocking the Climate Record Stored within Mars' Polar Layered Deposits. 2020. *Planetary and Space Science.*

Becerra, P. + 18 co-authors including **J. Emmett***. Past, Present and Future of Mars Ice Research: Conclusions and Outlook of the 7th International Conference on Mars Polar Science and Exploration. 2021. *The Planetary Science Journal.*

In-Preparation

Emmett, J., G. Hensgens, J. Vonk, S. Houweling, J. Weedon, and W. Lenstra. Documentation of a microbial model of methane production in subarctic active layer soils. 2024.

Field & Lab Work

- Soil and sediment coring
- Chamber surface gas flux measurement
- Plant root mass and shape analysis
- Soil bulk density, moisture, composition
- Soil temperature, pH, O_2, SOC, DOC
- Soil microbe DNA extraction

Teaching

Department of Earth Sciences, VU Amsterdam, Amsterdam, Netherlands

Teaching assistant **08/2021 – 12/2021**

Advanced Spatial Analysis (undergraduate level)
Instructors: Prof. dr. Nick Schutgens

Taught two-hour lab sessions, twice per week, assisting students with Python programming and geospatial analysis practice assignments Lab work grader.

Department of Astronomy, New Mexico State University, Las Cruces, NM, USA

Teaching assistant **08/2014 – 05/2020**

Astronomy 105 "The Planets" and 110 "Intro to Astronomy" (undergraduate level)
Instructors: Profs. James McAteer, James Murphy, Moire Prescott, Kristian Finlator

Taught two-hour lab sessions, once-to-twice per week, focused on astronomy topics from planetary science to cosmology. Lab and exam grader. Substitute class lecturer.

Conferences and Workshops

Talks

NESSC Days 2021
November 4 - 5, 2021 – Hotel Zuiderduin, Egmond aan Zee, Netherlands | *A Microbial-Focused Model of Methane Emission from Permafrost Terrains*

7th International Conference on Mars Polar Science and Exploration
January 13 - 17, 2020 – Austral Center for Scientific Research (CADIC), Ushuaia, Argentina | *Dependence upon Obliquity of the Formation of Martian PLD Vertical Structure*

NASA Ames Research Center Mars Global Climate Model Group Meeting
July 23 - 26, 2017, Oregon State U., Corvallis, OR, USA | *Understanding the Polar Layered Terrains*

6th International Conference on Mars Polar Science and Exploration
September 5-9, 2016 – Uni. Iceland, Reykjavik, Iceland | *Quantifying Polar Water Ice & Dust Surface Deposition on Mars during Current & Past Orbital Epochs with the NASA Ames Mars GCM*

Posters

NESSC Days 2022 / 2024
November 10 - 11, 2022 / April 11 – 12, 2024 – Hotel Kontakt der Kontinenten, Soesterberg, Netherlands | *A Microbial-Focused Model of Methane Emission from Permafrost Terrains*

2nd Polar Microbes Symposium
May 3 - 6, 2022 - Tvarminne Zoological Station, Hanko, Finland | *A Microbial-Focused Model of Methane Emission from Permafrost Terrains*

9th International Conference on Mars
July 22 - 25, 2019 - Caltech, Pasadena, CA, USA | *Quantifying Net Annual Polar Water Ice and Dust Deposition on Mars with the NASA Ames Global Climate Model*

Mars Workshop on Amazonian and Present Day Climate
June 18 - 22, 2018, Planetary Science Institute, Lakewood, CO, USA | *Quantifying Polar Water Ice Dust Surface Deposition During Current and Past Orbital Epochs with the NASA Ames Mars GCM*

100th American Geophysical Union
December 10 - 14, 2018, Washington D.C., USA | *Quantifying Net Annual Polar Deposition Rates of Water Ice and Dust on Mars at Various Obliquities with the NASA Ames GCM*

6th Mars Atmosphere Modelling and Observations Workshop
January 17 - 20, 2017 - University of Granada, Granada, Spain | *Quantifying Polar Water Ice and Dust Deposition on Mars in Present and Past Orbital Epochs with the NASA Ames Mars GCM*

48th DPS 48/EPSC 11
October 16-21, 2016 - Pasadena, CA, USA | *Quantifying Polar Water Ice and Dust Surface Deposition during Current and Past Orbital Epochs with the NASA Ames GCM*

Workshops

Unlocking the Climate Record Stored within Mars' Polar Layered Deposits – Part I and II
November 28 - December 1, 2017; August 8 - 11, 2017 - The Keck Center, Caltech, Pasadena, CA, USA *https://www.kiss.caltech.edu/workshops/polar/polar.html* **(Invited Participant)**

NASA Ames Research Center Mars Global Climate Model Group Meeting and GCM Tutorial
July 13-17, 2015 – NASA Ames Research Center, Mountainview, CA, USA

Other Honors & Awards

2019/2020 Barry Neil Rappaport Endowed Memorial Scholarship ($1000) **05/2020**

College of Arts and Sciences Graduate Student Travel Grant ($500) **10/2019**

Sixth and Seventh International Conferences on Mars Polar Science and Exploration Student Travel Grants (6th - $2250, 7th - $400) **09/2016** and **01/17/2020**

Professional Service

NASA ROSES Solar System Working Program – ***Executive Secretary*** and ***Secondary Reviewer*** **03-05/2021**

Outreach

Telescope operator and observing guide at Las Cruces Farmer's Market, NMSU Observatory Open House, school star parties, eclipse & planet-sun transit events **2014 - 2020**

Leader of the design and construction of an 8" Dobsonian outreach telescope, as President of the NMSU Amateur Astronomy Club **01/2018 – 05/2018**

Planning of a scale model solar system design effort for NMSU main campus **2019 – 2020**

Reference Contacts

Prof. dr. Jorien Vonk
Vrije Universiteit Amsterdam, Dpt. of Earth Sciences, Amsterdam, Netherlands. Professor.
Relationship: Primary postdoctoral supervisor
j.e.vonk@vu.nl | +31 20 59 87366

Dr. Jim Murphy
New Mexico State University, Dpt. of Astronomy, Las Cruces, NM, USA. Emeritus Professor, Retired Associate Dean for Research Arts/Sciences
Relationship: PhD Advisor/Supervisor
murphy@nmsu.edu

Dr. Melinda Kahre
NASA/Ames Research Center, Mountain View, CA, USA. Director, Mars Climate Modeling Center
Relationship: External PhD research collaborator
melinda.a.kahre@nasa.gov | +1 (650) 604-3863

Prof. dr. Sander Houweling
Vrije Universiteit Amsterdam, Dpt. of Earth Sciences, Amsterdam, Netherlands. Professor.
Relationship: Secondary postdoctoral supervisor
s.houweling@vu.nl | +31 20 59 83687

Dr. Nancy Chanover
New Mexico State University, Dpt. of Astronomy, Las Cruces, NM, USA. Professor, PI of NASA PDS Atmospheres Node | Relationship: PDS supervisor
nchanove@nmsu.edu | +1 (575) 646-2567