

# Dr. Lauren E. Mc Keown

ASSISTANT PROFESSOR, DEPARTMENT OF PHYSICS

University of Central Florida

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## Summary

I am a Tenure Track Assistant Professor in Planetary Science within the Department of Physics at the University of Central Florida. My research specialization is in icy planetary surface analog experiments and I am currently building my FROSTIE icy planetary surface processes lab. Prior to UCF, I was a Postdoctoral Research Fellow at NASA Jet Propulsion Laboratory. I am skilled in thermal-vacuum chamber operation, modification and planetary regolith and ice simulant production. I am particularly interested in cross-disciplinary collaboration between engineering and science for planetary simulation studies. I am curious, driven and passionate about understanding how physics behaves differently under a variety of planetary regimes through empirical observations in low pressure and temperature environments. I am a Legal Permanent Resident of the USA.

## Relevant Professional Experience

### Tenure Track Assistant Professor

UNIVERSITY OF CENTRAL FLORIDA

Orlando, FL

Feb 2025–present

- Building icy planetary surface processes group, teaching Introduction to Astronomy, conducting analog experimental research on phase change–driven geomorphology on Mars, Europa and small bodies.

### Jet Propulsion Laboratory Professional Affiliate

Orlando, FL

Apr 2025–present

### JPL Postdoctoral Fellow

NASA JET PROPULSION LABORATORY

Pasadena, CA

Jan 2022–Jan 2025

- Led experiments to investigate CO<sub>2</sub> ice sublimation on Martian regolith simulant in the JPL DUSTIE t-vac chamber. Study published in the Planetary Science Journal.
- Led planetary analog laboratory experiments in liquid nitrogen–cooled glovebox to test hypothesis that Europa’s Manannán crater ‘spider’ feature formed in a similar manner to Terrestrial lake stars. Study under review at Nature Communications Earth and Environment
- Ran ‘post-impact’ brine behavior Ceres and Vesta experiments in the JPL DUSTIE t-vac chamber. Study published in the Planetary Science Journal.
- Developed Enceladus plume simulant and ran analog experiments in CITADEL vacuum chamber.
- Mapped and geomorphologically analyzed araneiforms on Mars in JMARS using the Murray Lab CTX Global Mosaic.

### Europa Clipper Project Science Affiliate

Pasadena, CA

Oct 2022–present

### HiRISE Team Affiliate

Pasadena, CA

Apr 2022–present

### Associate Research Fellow

BIRKBECK, UNIVERSITY OF LONDON

London, UK

Jan 2022–present

### Permanent Lecturer in Planetary Surfaces

BIRKBECK, UNIVERSITY OF LONDON

London, UK

Jan 2021–Dec 2021

- Contributed to teaching, supervision and research on planetary surfaces, developed new college program and courses in planetary science.

### Postdoctoral Research Associate

THE OPEN UNIVERSITY

Milton Keynes, UK

March 2021–July 2021

- Preparation of high vacuum laboratory experiments on simulated snowline planetary formation collisions of mm and cm-sized icy grains.

### Postdoctoral Researcher

UTOPIA-ARGYRE PERIGLACIAL WORKING GROUP

Remote

Sept 2020–Jan 2021

- Mapping and statistical analysis of putatively periglacial surface features on Mars using high resolution remote–sensing images.

### Postdoctoral Research Associate

PLANETARY SURFACES GROUP, NATURAL HISTORY MUSEUM

London, UK

Jul 2019–Jul 2020

- Analysed multi–wavelength remote–sensing datasets of the Martian surface to identify 6 possible source locations of Martian meteorites.

## NASA International Intern

Mountain View, California

NASA AMES

Jun-Aug 2015

- One of two Irish PhD students selected and funded to partake in the NASA International Internship Programme by the Irish Research Council.
- Built apparatus to measure respiration of snails following induced hibernation for long-haul spaceflight to Mars. Advisor: Dr. Yuri Griko.
- Investigated methods to monitor Enceladus' plume from Earth. Advisor: Dr. Chris McKay.

## Education

### Ph.D. in Planetary Science

Dublin, Ireland

TRINITY COLLEGE DUBLIN

2014–2019

- Thesis: An Investigation of the Role of Sublimating CO<sub>2</sub> as a Geomorphic Agent on Mars. Supervisors: Dr. Mary Bourke, Prof. Jim McElwaine.
- PI on successful Europlanet Grant proposal. Designed, curated and orchestrated EU Horizon 2020 - funded experiments at The Open University Mars Simulation Chamber investigating the interaction between sublimating CO<sub>2</sub> ice and Mars regolith analog samples.
- PI on successful Irish Research Council Government of Ireland Postgraduate Scholarship proposal to investigate active Martian surface processes via remote sensing and laboratory analogue work
- Designed and made a low-humidity chamber for dry ice interaction with regolith to test seasonally active feature surface formation on Mars. Study published in Nature Scientific Reports.
- Operated the Mars Simulation Chamber at the Open University to understand the interaction between sublimating CO<sub>2</sub> ice blocks and granular material under Mars polar pressure ranges. Study published in Nature Scientific Reports.

### B.Sc. Physics with Astronomy and Space Science

Dublin, Ireland

UNIVERSITY COLLEGE DUBLIN

2009-2013

- First Class Honours, GPA: 3.92

## Grants & Awards

2022	<b>CO-I: International Space Science Institute Team Award (2 years)</b> , Ice Beyond Earth: Laboratory Investigations of Planetary Ices	Bern, Switzerland
2022	<b>CO-I: International Space Science Institute Team Award (2 years)</b> , Ice Beyond Earth: Laboratory Investigations of Planetary Ices	Bern, Switzerland
2021	<b>CO-I: NASA ROSES Mars Data Analysis Research Grant (3 years)</b> , To perform analog Martian icy surface processes experiments and remote sensing data analysis.	Pasadena, CA
2018	<b>Planetary Science Institute Pierazzo International Student Travel Award</b> , Awarded to one non-U.S. student annually.	Texas, USA
2017	<b>PI: Europlanet European Union Horizon 2020 Award</b> , To design and perform quantitative laboratory experiments at the Open University Mars Simulation Chamber.	Milton Keynes, UK
2015	<b>PI: Irish Research Council Government of Ireland Postgraduate Scholarship (3 years)</b> , Funded PhD including travel and research expenses.	Dublin, Ireland
2015	<b>Irish Research Council NASA International Student Internship</b> , One of two Irish postgraduate students selected. Travel, accommodation, stipend and visa to complete internship at NASA Ames Research Center.	California, USA
2014	<b>Trinity Award Postgraduate Scholarship (1 year)</b> , One year of PhD funded.	Dublin, Ireland
2014	<b>Science Foundation Ireland Research Studentship (1 year)</b> , Research on stellar atmospheres funded.	Dublin, Ireland

## Select Publications

### Lake Stars as an Earth Analog for Europa's Manannán Crater Spider Feature

Nature Communications Earth and Environment

Mc KEOWN, L.E., LESAGE, E., SCULLY, J.E.C., LEONARD, E.J., PAPPALARDO, R.T., POTTER, M., TSAI, V.C., CHOUKROUN, M., GLOESENER, E., DINIEGA, S., HATCHER, N., MCBRYDE, D.

With Reviewers

### CO<sub>2</sub> Condensation and Sublimation on a Range of Substrates Under Simulated Mars Conditions

Icarus

Mc KEOWN, L.E., POSTON, M.P., DINIEGA, S., PORTYANKINA, G., HANSEN, C.J., AYE, K.-M., MISHRA, I., CAREY, E.M., SCULLY, J.E.C., PIQUEUX, S.

With Reviewers

### A Lab-scale Investigation of the Mars Kieffer Model

Planetary Science Journal

Mc KEOWN, L.E., POSTON, M.P., DINIEGA, S., PORTYANKINA, G., HANSEN, C.J., AYE, K.-M., CAREY, E.M., SCULLY, J.E.C., PIQUEUX, S., SHIRAIISHI, L.R., CRUZ, S.N.

2024

*Icarus*

HANSEN, C.J. ET AL (INCLUDING **Mc KEOWN**, L.E.)

2024

Planetary Science Journal

POSTON, M.J., BAKER, S.R., SCULLY, J.E.C., CAREY, E.M., **Mc KEOWN, L.E.**, CASTILLO-ROGEZ, J.C., RAYMOND, C.A

2024

*Icarus*

LANDIS, M. ET AL (INCLUDING **Mc KEOWN**, L.E.)

2024

Earth and Planetary Science Letters

**MC KEOWN**, L.E., DINIEGA, S. BOURKE, M.C., AND SCHWAMB, M.E.

2023

*JGR: Planets*

**Mc Keown**, L.E., DINIEGA, S. PORTYANKINA, G., AYE, K.M., HANSEN, C.J., PIQUEUX, S., SCULLY, J.E.C., POSTON, M.

2023

Nature Scientific Reports

**Mc KEOWN, L.E., MCELWAIN, J.N., BOURKE, M.C., SYLVEST, M.E., PATEL, M.R.**

2021

- Press coverage: [National Geographic](#), [Universe Today](#), [CNN](#), [The Independent](#), [Esquire](#) and 200+ news outlets worldwide

Nature Scientific Reports

**McKEOWN, L.E., BOURKE, M.C., McELWAIN, J.N.**

2017

- Press coverage: [The Planetary Society](#), [International Business Times](#) and 50+ news outlets worldwide

Earth and Space Science

HARRIS, J.K., **Mc KEOWN**, L.E., PARENTI, C., GRINDROD, P.M., TORNABENE, L.L.

2022

## Geomorphology

DINIEGA ET AL., INCL **Mc KEOWN**, L.E.

2021

*Icarus*

SOARE, R.J., PHILIPPE, M., CONWAY, S.J., WILLIAMS, J-P., **MC KEOWN**, L.E., GODIN, E., HAWKSWELL, J.

2020

*Icarus*

SOARE, R.J., CONWAY, S.J., WILLIAMS, J.P., GALLAGHER, C., **McKEOWN, L.E.**

2019

## Book Chapters

Elsevier

KOUTNIK, M., MC KEOWN, L.E., ET AL.

2024

Elsevier

SOARE, R., COSTARD, F., WILLIAMS, J.-P., GALLAGHER, C., HEPBURN, A.J., STILLMAN, D., KOUTNIK, M., CONWAY, S.J.,

PHILIPPE, M., BUTCHER, F.E.G., **Mc KEOWN**, L.E., GODIN, E.

## Select Invited Talks

### Spiders, Plumes and Other Weird and Wonderful Volatile Phase-Change Driven Features on Mars, Europa and in the Laboratory

McKEOWN, L.E.

- In person: University of Sheffield

Sheffield, UK

July, 2025

### Planetary Regolith/Volatile Interactions in the Laboratory: Insights for surface Processes Shaping Mars, Small Bodies and Europa

McKEOWN, L.E.

- In person: University of Central Florida

Florida, USA

April, 2024

### Plumes and Spiders in the Laboratory: Insights for surface Processes on Mars and Europa

McKEOWN, L.E.

- In person: Boise State University Department of Physics

Idaho, USA

March, 2024

### Spiders on Mars, Europa and in the Laboratory: Insights for Icy Planetary Surface Processes through Analog Experiments

McKEOWN, L.E.

- In person: Penn State University Department of Geosciences

Pennsylvania, USA

March, 2023

### Experiments on CO<sub>2</sub> Sublimation on Granular Substrate Under Mars Conditions

McKEOWN, L.E.

- Remote: UKI Europlanet Hub Science Meeting

London, UK

March, 2020

### A Review of Martian CO<sub>2</sub> Sublimation Processes and Their Field and Laboratory Analogs

McKEOWN, L.E., DINIEGA, S., PORTYANKINA, G., AYE, K.-M., HANSEN, C.J.

- In person: 7th International Conference on Mars Polar Science and Exploration

Ushuaia, Argentina

Jan 2020

## Additional Experience

### Founder and Art Teacher

BREWS & BRUSHSTROKES

- Set up own painting events company. Managed and taught at public and corporate art events.

Cambridge, UK

Aug 2019–Dec 2020

### Project Manager

TEXTILE TWO DIMENSIONAL, UNIVERSITY OF CAMBRIDGE

- Graphene ink startup at the University of Cambridge, funded by the Royal Academy of Engineering. Key client was Aston Martin.

Cambridge, UK

Apr 2019–Jul 2019

## Community Service

NASA Panel review (2025, 2022), Convenor at INQUA meeting in Dublin, Conference moderator and chair at Lunar and Planetary Science Conference, International Mars Polar Conference reviewed multiple times for journals such as JGR: Planets, Icarus, Geological Society London

## Community Leadership & Organisation

- 2024 **Organizer & Speaker**, Planetary Science Directorate Lab-Wide Icy Worlds Testbeds Townhall
- 2022 **Conference Co-organiser**, Martian Enigmas: from the Late Noachian Epoch to the Present
- 2019 **Co-convenor**, Quaternary Mars session, 20th International Union for Quaternary Research Congress

Jet Propulsion  
Laboratory  
Houston, Texas  
Dublin, Ireland

## Students Supervised

2023, 2022 **NASA JPL Internship Program Supervision**, F. Alas, J. Dao, C. Quinones-Martinez, J. Venkatraman  
2021-2022 **M.Sc. Supervision**, H. Kreider Research Thesis, University College London

Pasadena, CA  
London, UK

## Select Media Engagements & Outreach

- 2025 **The Planetary Society Planetary Radio: Spiders on Mars with Lauren Mc Keown**, Discussion on my experiences recreating Martian araneiform terrain in the lab
- 2022 **Feature in The Times**, Feature on my career in planetary science and starting my postdoc at NASA JPL
- 2021 **Mars Reconnaissance Orbiter HiRISE Science Nugget**, on Martian spider laboratory research
- 2020 **Panel Speaker: International Women's Day Museum Lates**, Natural History Museum
- 2019 **Keynote Speaker: Lost Lectures, 50th Anniversary Moon Landing Talk**, Natural History Museum

Online  
In Print and Online  
Arizona, USA  
London, UK  
London, UK