SIMON J. LOCK

School of Earth Sciences
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Key interests

The formation, structure, and evolution of terrestrial and giant planets.
The history of Earth and how it became habitable.
Improving inclusivity and equity through service and public engagement.

EDUCATION

Ph.D. Department of Earth and Planetary Sciences, 2018
Harvard University, Cambridge, MA
Thesis title: *The formation, structure and evolution of terrestrial planets.*

M.A. Department of Earth and Planetary Sciences, 2014
Harvard University, Cambridge, MA

MSci. (1st Class) Natural Sciences (Experimental and Theoretical Physics), 2012
University of Cambridge, Cambridge, UK

B.A. (Hons, 1st Class) Natural Sciences (Experimental and Theoretical Physics), 2012
University of Cambridge, Cambridge, UK

PROFESSIONAL EXPERIENCE

NERC Independent Research Fellow. 2021–present
School of Earth Sciences, University of Bristol, UK

Planetary Science Option Postdoctoral Scholar. 2018–2021
Division of Geological and Planetary Sciences,
California Institute of Technology, Pasadena, CA

Graduate Student Fellow. Department of Earth and Planetary Sciences, 2012–2018
Harvard University, Cambridge, MA

Masters and Undergraduate Student. Natural Sciences 2008–2012
University of Cambridge, Cambridge, UK

SURF Fellow. Division of Geological and Planetary Sciences, 2011
California Institute of Technology, Pasadena, CA

AWARDS AND HONORS

UK Natural Environment Research Council (NERC) Independent Research Fellowship 2021-2026
Pellas-Ryder Award, jointly awarded by the Meteoritical Society and the 2019
Planetary Division of the Geological Society of America
Planetary Science Option Postdoctoral Fellowship, California Institute of Technology 2018–2021
NASA Earth and Space Science Fellowship 2013–2016
University Certificate of Distinction in Teaching, Harvard University 2013 & 2014
Dirac Prize, St. John's College, University of Cambridge 2012
Morton Prize, St. John's College, University of Cambridge 2012

United Steel Companies Scholarship, St. John's College, University of Cambridge 2011 & 2012
Elected a member of 'The Foundation of the College of St. John the Evangelist in the University of Cambridge' in recognition of academic excellence 2011

FUNDING FOR RESEARCH

UK NERC Independent Research Fellowship 2021–2026
Title: The consequences of the Moon-forming impact for the chemistry of Earth
Role: PI, Fellow
Amount: £758,114

US NSF Geophysics/Petrology and Geochemistry 2020–2022
Title: The effect of rotational evolution on the surface and interior of the early Earth
Role: Postdoc; science lead. (PI: P. D. Asimow; Co-I: M. Gurnis)
Amount: $300,000

Planetary Science Option Postdoctoral Fellowship, California Institute of Technology 2018-2022
Title: The formation and deformation of Earth's earliest crust
Role: Postdoctoral Fellow
Amount: $58,000

NASA Earth and Space Science Fellowship 2013-2016
Title: Atmospheric loss during high angular momentum giant impacts
Role: Graduate student researcher
Amount: $90,000

OTHER FUNDING

STFC University of Bristol Impact Accelerator Account (sub-award) 2025
Title: Commercialising the feel the impact project: Production of a Moon book and educational toys
Role: PI
Amount: £14,090

STFC University of Bristol Impact Accelerator Account (sub-award) 2023–2024
Title: Making planetary impacts accessible to the visually impaired
Role: PI
Amount: £5,500

COMPETITIVELY ALLOCATED FACILITY TIME

JWST Cycle 3 2024-2025
When worlds collide: formation and evolution of a synestia
Role: coI
Amount: 16.8 hrs (9 hrs science time)

JWST Director's Discretionary Time 2023-2024
When worlds collide: formation and evolution of a synestia
Role: coI
Amount: 8.6 hrs (4.8 hrs science time)

TEACHING EXPERIENCE

Guest lecturer, *EASC30053: Global Tectonics and Global Geodynamics*, University of Bristol 2024
Co-Instructor, *EASCM0061: Frontiers in Earth Science*, University of Bristol (20 CP) 2023
Leader, *The Physics of Planetary Impacts*, University of Bristol (unofficial course) 2022-present

Guest lecturer, *PHYS106: Stars & Planets*, University of Bristol 2022
Guest lecturer, *460-506: Structure & Formation of Terrestrial Planets*, Rutgers University 2020
Guest lecturer, *ASTR-330MN-01: Topics in Astrophysics: 'Moon'*, Mount Holyoke College 2017
Guest lecturer, *GEL36: The solar system*, UC Davis 2017
Co-instructor & developer, *GEL251: Thermodynamics of the Earth and planets*, UC Davis 2015
Teaching fellow, *SPU30: Life as a planetary phenomenon*, Harvard University 2014
Teaching fellow, *SPU14: How to build a habitable planet*, Harvard University 2013

ADVISING EXPERIENCE

(post-)Graduate students:

Gaikwad, N., MSc, University of Bristol. Secondary supervisor: P. J. Carter 2024
Joiret, S., PhD, Universit de Bordeaux. Visiting student at University of Bristol. 2024
Taylor, L., PhD, University of Bristol. Primary supervisor: Z. M. Leinhardt. 2022–present
Roche, M. J., PhD, University of Bristol. Secondary supervisor: Z. M. Leinhardt. 2022–present
Hollyday, G. O., UC Davis. Primary supervisor: S. T. Stewart. 2016–2020
MS thesis: *Educational visualization tools for conveying research: Jupyter notebooks on synestias*

Undergraduate students:

Forshaw, J., University of Bristol. Primary supervisor: O. Lord. 2024–present
Tanna, P., University of Cambridge. Primary supervisor: A. Bonsor. 2022–present
MSci thesis: *Can we detect moon forming impacts in other star systems?*
Klein, I. A., University of Bristol. 2022–present
Project: *Identification of post-impact bodies beyond the corotation limit*
Pepper, A. C., UC Davis. Secondary supervisor: S. T. Stewart. 2017–2021
Project: *Giant impacts between rotating bodies in an Eulerian code*

PUBLIC ENGAGEMENT AND OUTREACH

Organized activities at Festival of Nature, a regional science engagement event 2024
Featured on The Sky at Night (BBC) 2024
Interviewee and advisor on Radiolab episode 'The Moon Itself' 2024
PI of STFCC IAA: *Making planetary impacts accessible to the visually impaired* 2023–2024
Advisor on BBC Studios documentary series on the Moon 2023
Led activities as part of the Access to Bristol scheme 2022–present
Participant in Skype A Scientist, a program which matches schools to scientists who lead class discussions about science and what it is like to be a scientist 2020–present
Helped develop tools for cinematic visualisation (Aleo, Lock et al., 2020) 2020
Interviewee on Blue Dot, North State Public Radio 2019
Invited speaker at 'Astronomy on Tap', Pasadena 2019
Advisor for new show 'Imagine the Moon' at Adler Planetarium, Chicago, IL 2018
Advisor for 'Strip the Cosmos' documentary on the Discovery Channel 2018
Talk to Stockton Astronomical Society 2018
Author of popular science articles (see Other Publications) 2017–present
Lead role in organizing activities for UC Davis Picnic Day, a university-wide open day 2016–2018
Press interviews and consultations (e.g., New Scientist, National Geographic, Quanta) 2016–present

SERVICE

Academic service
Organiser of breakout session, Rocky Worlds III conference 2024

Origin and evolution of atmospheres

Co-convener and chair, American Geophysical Union fall meeting 2023
D143A. Exploring Earth's evolution: The Hadean through the present

Co-convener of Union session, American Geophysical Union fall meeting 2022
U016. The formation and early evolution of the Earth and the Moon

Co-convener, American Geophysical Union fall meeting 2018
DI001. Accretion, differentiation and their longterm consequences for planetary evolution

Journal reviewer: e.g., Sci. Adv., JGR: Planets, Nature Geo., EPSL, Icarus, PSJ 2017–present

NASA review panel panelist

NASA review panel non-panelist reviewer

External grant reviewer for the Swiss National Science Foundation

NSF ad hoc reviewer

Departmental/University service

Member of hiring committee for new research associate, University of Bristol 2024

School Research Concordat Champion, University of Bristol 2023–present

Co-organized 'Publishing your first paper' workshop, School of Earth Sciences, University of Bristol 2023

Member of Advanced Computing Research Centre (ACRC) High Performance Computing (HPC) User Group, University of Bristol 2023–present

Member of the Staff Disability Forum, University of Bristol 2023–present

Co-led discussion on review writing for PhD Students, University of Bristol 2022

Restarted and organised early career researchers (ERC) coffee School of Earth Sciences, University of Bristol 2022–present

Founder and organizer of the Planets Discussion Group, University of Bristol 2022–present

Member of the Caltech GPS Local Scholars Committee on Diversity 2020–2021

Caltech Center for Comparative Planetary Evolution (^{3}CPE) postdoc retreat committee 2020

Department colloquium events coordinator, UC Davis 2014–2016

EPS Day coordinator, Harvard University 2013–2014

Graduate student visit organizer, Harvard University 2012–2013

PROFESSIONAL MEMBERSHIPS

American Geophysical Union 2014–present

Association of Women Geoscientists 2018–present

European Association of Geochemistry 2019–present

Institute of Physics, UK 2007–present

OTHER SKILLS

Fluent or highly competent in several programming and scripting languages including: C, C++, Fortran, Python, MATLAB, Julia, Bash, and C Shell.

Highly skilled and experienced in scientific communication. Participated in multiple courses on media engagement, scientific communication, and public outreach.

INVITED TALKS AND SEMINARS

American Geophysical Union Fall Meeting, 2024. *When Worlds (probably) Collide: An exoplanet collision remnant observed around ASASSN-21qj.*

Imperial College London, Department of Earth Science and Engineering seminar, 2024. *Atmospheric loss in giant impacts depends on pre-impact surface conditions.*

University of Oxford, Department of Earth Sciences seminar, 2023. *Atmospheric loss in giant impacts: The effect of pre-impact surface conditions.*

Origin of Solar Systems (Gordon Research Conference), 2023. *Origin of volatiles on terrestrial planets: Will they stay, or will they go?*

University of Manchester, Department of Earth and Environmental Sciences Seminar, 2022. *Earth in the Emergency Room: Recovery of Earth after the Moon-forming giant impact.*

Rocky Worlds Discussions Series talk, 2022. *Impact-driven atmospheric loss from terrestrial planets.*

University of Cambridge, Department of Earth Sciences Seminar, 2022. *Crust formation and deformation on the rapidly rotating early Earth.*

Geological Society 'Earth and the Early Moon' meeting, 2021. *A tectonically active early Earth driven by the tidal recession of the Moon.*

University of Oslo, The Center for Earth Evolution and Dynamics (CEED) seminar, 2021. *Recovery of Earth after the Moon-forming giant impact.*

Taiwan Space Union, Mini-Moon seminar series, 2021. *The synestia story.*

Washington University in St. Louis, Department Colloquium, 2020. *The formation of the Earth and Moon.*

University of California, Santa Cruz, Center for the Origin, Dynamics and Evolution of Planets Seminar, 2020. *The origin of the Moon within a terrestrial synestia.*

Cal Poly Ponoma, Physics and Astronomy Department Seminar, 2019. *The origin of the Moon within a terrestrial synestia.*

Moon Workshop, American University of Beirut, 2019. *A review lecture on the formation of the Moon* and *The origin of the Moon within a terrestrial synestia.*

University of Arizona, Lunar and Planetary Laboratory Colloquium, 2019. *The origin of the Moon within a terrestrial synestia.*

University of California, Los Angeles, Geochemistry Seminar, 2019. *Giant impacts stochastically change the internal pressures of terrestrial planets.*

Carnegie Institute, Geophysical Laboratory, 2019. *The origin of the Moon within a terrestrial synestia.*

Weizmann Institute of Science, Department of Earth and Planetary Sciences, 2019. *The origin of the Moon within a terrestrial synestia.*

Lunar and Planetary Institute, 2018. *The origin of the Moon within a terrestrial synestia.*

ISSI workshop 'Reading Terrestrial Planet Evolution in Isotopes and Element Measurements', 2018. *Origin of the Moon, including isotopic constraints on its origin.*

The University of Chicago, Geophysical Sciences Department, 2018. *Recovery of the Earth after the Moon-forming giant impact.*

University of Cambridge, Bullard Laboratories Seminar, 2017. *The last stage of Earth's formation: Increasing the pressure.*

University of Cambridge, Institute of Astronomy, 2017. *A new exhibit in the planetary zoo: Hot, rotating rocky planets.*

ACCRETE International Interdisciplinary Workshop, 2017. *A new model for lunar origin: Equilibration with Earth beyond the corotation limit.*

American Geophysical Union Fall Meeting, 2016. *Preservation of primordial mantle in the aftermath of a giant impact.*

University of California, Berkeley, CIPS Seminar, 2016. *A new exhibit in the planetary zoo: Hot, rotating rocky planets.*

University of Bristol, Astrophysics Seminar, 2016. *A new model for lunar origin: Equilibration with Earth beyond the hot spin stability limit.*

American Geophysical Union Fall Meeting, 2015. *Condensing the Moon from a MAD Earth.*

The University of Chicago, Geophysical Sciences Department Colloquium, 2015. *Condensing the Moon from a MAD Earth.*

PEER-REVIEWED PUBLICATIONS

Note on publication and authorship: In planetary sciences, it is common to publisher fewer, more detailed papers, and the rate of publishing is therefore typically slower that in some related fields, such as

astrophysics. Typically, authors are listed in order of contribution to the work except in the case of co-first authorship (marked with an asterisk) which is becoming increasingly common. Sometimes a senior author or group leader who took a mostly advising role will be listed last. As the field is highly multidisciplinary, there are a number of highly ranked, sub-field specific journals – including *JGR: Planets*, *ApJ*, and *The Planetary Science Journal* – in which high-impact papers are generally published.

Student advisees underlined.

16. Dou, J., P. J. Carter, **S. J. Lock** and Z. M. Leinhardt. Exploring the catastrophic regime: Thermodynamics and fragmentation in head-on planetary collisions. *Monthly Notices of the Royal Astronomical Society* 534, 758-782, doi: 10.1093/mnras/stae2134, 2024.

15. **Lock, S. J.**, and S. T. Stewart. Atmospheric loss in giant impacts depends on pre-impact surface conditions. *The Planetary Science Journal* 5, 28, doi: 10.3847/PSJ/ad0b16, 2024.

14. Kenworthy*, M., **S. J. Lock***, G. Kennedy*, R. van Capelleveen*, E. Mamajek*, L. Carone*, F.-J. Hambsch, J. Masiero, A. Mainzer, J. D. Kirkpatrick, E. Gomez, Z. M. Leinhardt, J. Dou, P. Tanna, A. Sainio, H. Barker, S. Charbonnel, O. Garde, P. Le Dû, L. Mulato, T. Petit and M. Rizzo Smith. A planetary collision afterglow and transit of the resultant debris cloud. *Nature* 622, 251254, doi: 10.1038/s41586-023-06573-9251254, 2023. *These authors contributed equally to this work.

13. Canup, R. M., K. Righter, N. Dauphas, K. Pahlevan, M. Ćuk, **S. J. Lock**, S. T. Stewart, J. Salmon, R. Rufu, M. Nakajima and T. Magna. Origin of the Moon. *Reviews in Mineralogy and Geochemistry* 89 (1), 53102, doi: 10.2138/rmg.2023.89.02, 2023. Part of the *New views of the Moon II* volume.

12. Chidester*, B. A., **S. J. Lock***, K. E. Swadba, Z. Rahman, K. Righter and A. J. Campbell. The lithophile element budget of Earth's core. *Geochemisty, Geophysics, Geosystems* 23, e2021GC009986, doi: 10.1029/2021GC009986, 2022. *B. A. Chidester and S. J. Lock are co-first authors.

11. Daher H., B. K. Arbic, J. G. Williams, J. K. Ansong, D. H. Boggs, M. Müller, M. Schindelegger, J. Austermann, B. D. Cornuelle, E. B. Crawford, O. B. Fringer, H. C. P. Lau, **S. J. Lock**, A. C. Maloof, D. Menemenlis, J. X. Mitrovica, J. A. M. Green and M. Huber. Long-term Earth-Moon evolution with high-level orbit and ocean tide models. *JGR: Planets* 126, e2021JE006875, doi: 10.1029/2021je006875, 2021.

10. Ćuk, M., **S. J. Lock**, S. T. Stewart and D. Hamilton. Tidal evolution of the Earth-Moon system with a high initial obliquity. *The Planetary Science Journal* 2, 147, doi: 10.3847/PSJ/ac12d1, 2021.

9. Stewart, S. T., E. J. Davies, M. S. Duncan, **S. J. Lock**, S. Root, J. P. Townsend, R. G. Kraus, R. Caracas and S. B. Jacobsen. The shock physics of giant impacts: Key requirements for the equations of state. *AIP Conference Proceedings* 2272, 080003, doi: 10.1063/12.0000946, 2020.

8. Aleo, P. D., **S. J. Lock**, D. J. Cox, S. A. Levy, J. P. Naiman, A. J. Christensen, K. Borkiewicz, and R. Patterson. Clustering-informed cinematic astrophysical data visualization with application to the Moon-forming terrestrial synestia. *Astronomy and Computing* 33, 100424, doi: 10.1016/j.ascom.2020.100424, 2020.

7. **Lock, S. J.**, K. R. Bermingham, R. Parai and M. Boyet. Geochemical constraints on the origin of the Moon and preservation of ancient terrestrial heterogeneities. *Space Science Reviews* 216, 109, doi: 10.1007/s11214-020-00729-z, 2020.

6. Carter, P. J., **S. J. Lock** and S. T. Stewart. The energy budgets of giant impacts. *JGR: Planets* 125, e2019JE006042, doi: 10.1029/2019JE006042, 2020.

5. **Lock, S. J.**, S. T. Stewart and M. Ćuk. The energy budget and figure of Earth during recovery from the Moon-forming giant impact. *EPSL* 530, pp 115885, doi: 10.1016/J.EPSL.2019.115885, 2020.

4. **Lock, S. J.** and S. T. Stewart. Giant impacts stochastically change the internal pressures of terrestrial planets. *Science Advances* 5, eaav3746, doi: 10.1126/sciadv.aav3746, 2019.

3. **Lock, S. J.**, S. T. Stewart, M. I. Petaev, Z. M. Leinhardt, M. T. Mace, S. B. Jacobsen and M. Ćuk. The origin of the Moon within a terrestrial synestia. *JGR: Planets* 123, pp 910-951, doi: 10.1002/2017JE005333, 2018.

2. **Lock, S. J.** and S. T. Stewart. The structure of terrestrial bodies: Impact heating, corotation limits and synestias. *JGR: Planets* 122, pp 950-982, doi:10.1002/2016JE005239, 2017.

1. Ćuk, M., D. Hamilton, **S. J. Lock**, and S. T. Stewart. Tidal evolution of the Moon from a high-obliquity, high-angular-momentum Earth. *Nature* 539, pp 402-406, doi:10.1038/nature19846, 2016.

IN PROGRESS

Student advisees underlined.

1. Stewart, S. T., **S. J. Lock**, P. J. Carter, E. J. Davies, R. G. Kraus, S. Root, M. I. Petaev and S. B. Jacobsen. Planetesimal impact vapor plumes and nebular shocks form chondritic mixtures. In review.

2. **Lock, S. J.** A tectonically active early Earth driven by the tidal recession of the Moon. Submitted.

3. Joiret, S., G. Avice, L. Ferrière, Z. M. Leinhardt, **S. J. Lock**, A. Mechineau, and S. N. Raymond. Asteroids fail to retain cometary impact signatures. Submitted.

4. Roche, M. J., **S. J. Lock**, J. Dou, P. J. Carter, J. A. Kegerreis, and Z. M. Leinhardt. Atmospheric loss during giant impacts: An improved scaling law for loss mechanics, planet masses, impact velocities, and angles. In prep.

5. Tanna, P., **S. J. Lock**, S. T. Hodgkin, and A. Bonsor. Can we detect moon-forming impacts in other star systems? In prep.

6. Kleine, I. and **S. J. Lock**. An automated method for identification of synestias. In prep.

7. Postema, A. N., **S. J. Lock**, and S. T. Stewart. Thermal effects of collisions during rocky planet accretion. In prep.

OTHER PUBLICATIONS

6. **Lock, S. J.**, M. Kenworthy, and Z. M. Leinhardt. The afterglow of an explosive collision between giant planets may have been detected in a far-off star system. *The Conversation*, 2023.

5. **Lock, S. J.** HERCULESv1_user: HERCULES planetary structure code (Version v1.0.0). *Zenodo*, http://doi.org/10.5281/zenodo.3509365, 2019.

4. Stewart, S. T., E. J. Davies, M. S. Duncan, **S. J. Lock**, S. Root, J. P. Townsend, and S. B. Jacobsen. Equation of State Model Forsterite-ANEOS-SLVTv1.0G1: Documentation and Comparisons (Version v1.0.0). *Zenodo*, http://doi.org/10.5281/zenodo.3478631, 2019

3. **Lock, S. J.** and S. T. Stewart. Origin Story. *Scientific American*, CCCXX, 7, 2019.

2. **Lock, S. J.** Making the Moon: The legacy of Apollo. *The Geographer*, Summer issue, 2019.

1. **Lock, S. J.** A new theory of how the Moon formed. *Scientific American*, 2017.

CONFERENCE PROCEEDINGS

Note on conference attendance: As my work is highly multidisciplinary, my colleagues and I present work at a range of high-profile conferences in different fields, as well as planetary-science specific conferences (e.g., *Lunar and Planetary Science Conference*). Examples of field-specific conferences include

Goldschmidt (geochemistry), the *American Geophysical Union Fall Meeting* (geophysics), and the *American Astronomical Society* (astrophysics). Small workshops that focus on specific questions or topics are also common (e.g., the *ACCRETE workshop*).

Student advisees underlined.

73. **Lock, S. J.**, R. van Capelleveen, M. Kenworthy, M. Temmink, N. Crouzet, D. Gonzlez Picos, G. Kennedy, L. Carone, E. Mamajek, C. Melis, F-J Hambsch, J. Masiero, A. Mainzer, J. Kirkpatrick, E. Gomez, Z. M. Leinhardt, J. Dou, P. Tanna, A. Sainio, H. Barker, S. Charbonnel, O. Garde, P. Le Dû, L. Mulato, T. Petit, and M. Rizzo Smith. When Worlds (probably) Collide: An exoplanet collision remnant observed around ASASSN-21qj (invited). *American Geophysical Union Fall Meeting*, P13C-3088, 2024.

72. Postema, A., S. T. Stewart, and **S. J. Lock**. Thermal and Rotational Effects of Collisions During Rocky Planet Accretion. *American Geophysical Union Fall Meeting*, P44B-01, 2024.

71. Kenworthy, M., R. van Capelleveen, G. Kennedy, **S. J. Lock**, L. Carone, E. Mamajek, E. Gomez, Z. M. Leinhardt, J. Dou, F.-J. Hambsch, J. Masiero, A. Mainzer, J. S. Kirkpatrick, P. Tanna, M. Rizzo Smith, A. Sainio, H. Barker, S. Charbonnel, O. Garde, P. Le Dû, L. Mulato and T. Petit. When Worlds (probably) Collide: An exoplanet collision remnant around ASASSN-21qj. *Exoplanet 5*, Abs. 685, 2024.

70. Roche, M. J., **S. J. Lock**, J. Dou, J. A. Kegerreis, and Z. M. Leinhardt. Atmospheric loss during giant impacts: An improved scaling law for loss mechanics, planet masses, impact velocities, and angles. *Earth and Planets Origin and Evolution Workshop*, 2024.

69. Stewart, S. T., P. J. Carter, **S. J. Lock**, E. J. Davies, R. G. Kraus, S. Root, M. I. Petaev and S. B. Jacobsen. The formation of chondrites by vaporizing collisions between planetesimals. Earth and Planets Origin and Evolution Workshop, 2024.

68. Postema, A. N., S. T. Stewart, and **S. J. Lock**. Thermal effects of collisions during rocky planet accretion. *Rochester Impact Workshop*, 2024.

67. Taylor, L., **S. J. Lock**, D. Grant, J., and Z. M. Leinhardt. Constraining the role of giant impacts in planet formation using transit observations of post-impact bodies. *Rocky Worlds Conference III*, 2024.

66. Roche, M. J., **S. J. Lock**, J. Dou, and Z. M. Leinhardt. Quantifying the effect of atmospheric properties on atmospheric loss during planetary collisions using 3D impact simulations. *Rocky Worlds Conference III*, 2024.

65. **Lock, S. J.**, Roche, M. J., J. Dou, S. T. Stewart, and Z. M. Leinhardt. The effect of pre-impact surface conditions on the efficiency of atmospheric loss in giant impacts. *American Geophysical Union Fall Meeting*, DI43B-0036, 2023.

64. **Lock, S. J.**, S. T. Stewart, and M. J. Roche. Atmospheric loss in giant impacts depends on pre-impact surface conditions. *Goldschmidt Conf.*, Abs. 19972, doi: 10.7185/gold2023.19972, 2023.

63. **Lock, S. J.**, S. T. Stewart, and M. J. Roche. Origin of volatiles on terrestrial planets: Will they stay, or will they go? *Gordon Research Conference: Origins of Solar Systems*, 2023.

62. **Lock, S. J.**, and S. T. Stewart. The effect of pre-impact surface conditions on the efficiency of atmospheric loss in giant impacts. *Gordon Research Conference: Origins of Solar Systems*, 2023.

61. Taylor, L., **S. J. Lock**, D. Grant, J. Dou, Z. M. Leinhardt, and H. R. Wakeford. Using transit observations to detect and characterise planetary bodies in the aftermath of giant impacts. *Gordon Research Conference: Origins of Solar Systems*, 2023.

60. Roche, M. J., **S. J. Lock**, J. Dou, and Z. M. Leinhardt. The effect of atmospheric properties on atmospheric loss during giant impacts. *Gordon Research Conference: Origins of Solar Systems*, 2023.

59. **Lock, S. J.** and S. T. Stewart. The effect of pre-impact surface conditions on the efficiency of atmospheric loss in giant impacts. *Lunar & Planet. Sci. Conf.* 54, Abs. 2290, 2023.

58. **Lock, S. J.** and S. T. Stewart. The effect of pre-impact surface conditions on the efficiency of atmospheric loss in giant impacts. *American Geophysical Union Fall Meeting*, DI34A-03, 2022.

57. **Lock, S. J.** and S. T. Stewart. The effect of pre-impact surface conditions on the efficiency of atmospheric loss in giant impacts. *UK Exoplanet Meeting*, 2022.

56. **Lock, S. J.** and S. T. Stewart. The effect of pre-impact surface conditions on the efficiency of giant impact atmospheric loss. *British Planetary Science Conference*, 2022.

55. **Lock, S. J.** and P. D. Asimow. A tectonically active early Earth driven by the tidal recession of the Moon. *Geological Society 'Earth and the Early Moon' meeting*, 2021.

54. **Lock, S. J.** and P. D. Asimow. A tectonically active early Earth driven by the tidal recession of the Moon. *AGU Fall Meeting*, Abs. DI022-01, 2020.

53. Chidester B. A., **S. J. Lock** and S. T. Stewart. Planetary differentiation in the aftermath of giant impacts. *AGU Fall Meeting*, Abs. DI021-06, 2020.

52. Chidester B. A., **S. J. Lock**, M. Millot and S. T. Stewart. Metal–silicate equilibration in the aftermath of giant impacts. *Goldschmidt Conf.*, Abs. 416, 2020.

51. **Lock, S. J.** and P. D. Asimow. A tectonically active early Earth driven by the tidal recession of the Moon. *Lunar & Planet. Sci. Conf.* 51, Abs. 1848, 2020.

50. Arbic B. K., H. Daher, J. G. Williams, J. K. Ansong, D. H. Boggs, M. Müller, M. Schindelegger, A. Adcroft, J. Austermann, B. D. Cornuelle, E. Crawford, O. B. Fringer, H. C-P. Lau, **S. J. Lock**, A. C. Maloof, D. Menemenlis, J. X. Mitrovica, M. Green and M. Huber. 4.5 billion years of Earth-Moon evolution from high-level ocean tide and orbital dynamics models: First results. *AGU Ocean Science Meeting*, PL51A-02, 2020.

49. Stewart, S. T., E. J. Davies, M. Duncan **S. J. Lock**, S. Root, J. Townsend, R. G. Kraus, R. Caracas, S. B. Jacobsen and Z. Li. Integrative approaches to building planet Earth: New wide-ranging equations of state. *AGU Fall Meeting*, Abs. P43D-3500, 2019.

48. **Lock, S. J.**, S. T. Stewart, B. A. Chidester and P. D. Asimow. Giant impacts stochastically change the internal pressures of terrestrial planets. *Goldschmidt Conf.*, Abs. 2041, 2019.

47. Chidester, B. A., **S. J. Lock** and S. T. Stewart. Exploring the conditions of metal-silicate equilibration during and after giant impacts. *Goldschmidt Conf.*, Abs. 597, 2019.

46. Stewart, S. T., E. J. Davies, M. Duncan **S. J. Lock**, S. Root, J. Townsend, R. Caracas, R. G. Kraus and S. B. Jacobsen. Shock physics of giant impacts: Transforming rocky planets into supercritical synestias. *APS: SCCM* 21, Abs S6.00004, 2019.

45. Pepper, A. C., **S. J. Lock**, E. J. Davies and S. T. Stewart. Giant impacts between rotating bodies in an Eulerian code. *Lunar & Planet. Sci. Conf.* 50, Abs. 3228, 2019.

44. Carter, P. J., E. J. Davies, **S. J. Lock** and S. T. Stewart. Collapsing impact vapor plumes: A new planetesimal formation environment. *Lunar & Planet. Sci. Conf.* 50, Abs. 1247, 2019.

43. Carter, P. J., E. J. Davies, **S. J. Lock** and S. T. Stewart. High collision velocities between planetesimals during planet growth and migration. *Lunar & Planet. Sci. Conf.* 50, Abs. 1246, 2019.

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