

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
Planetary Division of the Geological Society of America 2019

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

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| 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

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| UK NERC Independent Research Fellowship Title: The consequences of the Moon-forming impact for the chemistry of Earth Role: PI, Fellow Amount: £758,114 | 2021–2026 |
| US NSF Geophysics/Petrology and Geochemistry 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 | 2020–2022 |
| Planetary Science Option Postdoctoral Fellowship, California Institute of Technology Title: The formation and deformation of Earth's earliest crust Role: Postdoctoral Fellow Amount: \$58,000 | 2018–2022 |
| NASA Earth and Space Science Fellowship Title: Atmospheric loss during high angular momentum giant impacts Role: Graduate student researcher Amount: \$90,000 | 2013–2016 |

OTHER FUNDING

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

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| JWST Cycle 3 When worlds collide: formation and evolution of a synestia Role: coI Amount: 16.8 hrs (9 hrs science time) | 2024–2025 |
| JWST Director's Discretionary Time When worlds collide: formation and evolution of a synestia Role: coI Amount: 8.6 hrs (4.8 hrs science time) | 2023–2024 |

TEACHING EXPERIENCE

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| Guest lecturer, <i>EASC30053: Global Tectonics and Global Geodynamics</i> , University of Bristol | 2024 |
| Co-Instructor, <i>EASCM0061: Frontiers in Earth Science</i> , University of Bristol (20 CP) | 2023 |
| Leader, <i>The Physics of Planetary Impacts</i> , University of Bristol (unofficial course) | 2022–present |
| Guest lecturer, <i>PHYS106: Stars & Planets</i> , University of Bristol | 2022 |
| Guest lecturer, <i>460-506: Structure & Formation of Terrestrial Planets</i> , Rutgers University | 2020 |
| Guest lecturer, <i>ASTR-330MN-01: Topics in Astrophysics: 'Moon'</i> , Mount Holyoke College | 2017 |
| Guest lecturer, <i>GEL36: The solar system</i> , UC Davis | 2017 |
| Co-instructor & developer, <i>GEL251: Thermodynamics of the Earth and planets</i> , UC Davis | 2015 |

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| Teaching fellow, <i>SPU30: Life as a planetary phenomenon</i> , Harvard University | 2014 |
| Teaching fellow, <i>SPU14: How to build a habitable planet</i> , Harvard University | 2013 |

ADVISING EXPERIENCE

(post-)Graduate students:

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| Gaikwad, N., MSc, University of Bristol. Secondary supervisor: P. J. Carter | 2024–present |
| Joiret, S., PhD, Universit de Bordeaux. Visiting student at University of Bristol. | 2024–present |
| 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: <i>Educational visualization tools for conveying research: Jupyter notebooks on synestias</i> | |

Undergraduate students:

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

PUBLIC ENGAGEMENT AND OUTREACH

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| 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: <i>Making planetary impacts accessible to the visually impaired</i> | 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

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| Academic service | |
| Organiser of breakout session, Rocky Worlds III conference | 2024 |
| <i>Origin and evolution of atmospheres</i> | |
| Co-convener and chair, American Geophysical Union fall meeting | 2023 |
| <i>D143A. Exploring Earth’s evolution: The Hadean through the present</i> | |
| Co-convener of Union session, American Geophysical Union fall meeting | 2022 |
| <i>U016. The formation and early evolution of the Earth and the Moon</i> | |
| 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 (³CPE) 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

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 Pomona, 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 publish fewer, more detailed papers, and the rate of publishing is therefore typically slower than 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*, accepted.
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. Hamsch, 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. Čuk, **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. *Geochemistry, 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. Auermann, 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. Čuk, 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. Čuk. 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. Čuk. 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. Čuk, 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. **Lock, S. J.** A tectonically active early Earth driven by the tidal recession of the Moon. Submitted.
2. 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.
3. Tanna, P., **S. J. Lock**, S. T. Hodgkin, and A. Bonsor. Can we detect moon-forming impacts in other star systems? In prep.
4. Kleine, I. and **S. J. Lock**. An automated method for identification of synestias. In prep.
5. Postema, A. N., **S. J. Lock**, and S. T. Stewart. Thermal effects of collisions during rocky planet accretion. In prep.
6. 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. 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.

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.
42. Stewart, S. T., P. J. Carter, E. J. Davies, **S. J. Lock**, R. G. Kraus, S. Root, M. I. Petaev and S. B. Jacobsen. Collapsing impact vapor plume model for chondrule and chondrite formation. *Lunar & Planet. Sci. Conf.* 50, Abs. 1251, 2019.
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