

# SIMON J. LOCK

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orcid.org/0000-0001-5365-9616

**Research interests** | The formation, structure, and evolution of terrestrial and giant planets.  
The history of Earth and how it became habitable.

## EDUCATION

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| <b>Ph.D.</b> Department of Earth and Planetary Sciences,<br>Harvard University, Cambridge, MA<br>Thesis title: <i>The formation, structure and evolution of terrestrial planets.</i> | 2018 |
| <b>M.A.</b> Department of Earth and Planetary Sciences,<br>Harvard University, Cambridge, MA   | 2014 |
| <b>MSci. (1st Class)</b> Natural Sciences (Experimental and Theoretical Physics),<br>University of Cambridge, Cambridge, UK  | 2012 |
| <b>B.A. (Hons, 1st Class)</b> Natural Sciences (Experimental and Theoretical Physics),<br>University of Cambridge, Cambridge, UK   | 2012 |

## PROFESSIONAL EXPERIENCE

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| <b>NERC Independent Research Fellow.</b><br>School of Earth Sciences, University of Bristol, UK   | 2021–present |
| <b>Planetary Science Option Postdoctoral Scholar.</b><br>Division of Geological and Planetary Sciences,<br>California Institute of Technology, Pasadena, CA | 2018–2021    |
| <b>Graduate Student Fellow.</b> Department of Earth and Planetary Sciences,<br>Harvard University, Cambridge, MA  | 2012–2018    |
| <b>Masters and Undergraduate Student.</b> Natural Sciences<br>University of Cambridge, Cambridge, UK  | 2008–2012    |
| <b>SURF Fellow.</b> Division of Geological and Planetary Sciences,<br>California Institute of Technology, Pasadena, CA                                      | 2011         |

## AWARDS AND HONORS

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| UK Natural Environment Research Council (NERC) Independent Research Fellowship   | 2021-2026   |
| Pellas-Ryder Award, jointly awarded by the Meteoritical Society and the<br>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        |
| 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

## RESEARCH FUNDING

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| 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   |           |

## TEACHING EXPERIENCE

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|---|--------------|
| Leader, <i>The Physics of Planetary Impacts</i> , University of Bristol (unofficial course)           | 2022–present |
| Guest lecturer, <i>PHYS106: Stars &amp; Planets</i> , University of Bristol                           | 2022         |
| Guest lecturer, <i>460-506: Structure &amp; 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         |
| 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

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(post-)Graduate students:

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| Taylor, L., PhD, University of Bristol. Co-advised with Z. M. Leinhardt.                                     | 2022–present |
| Roche, M. J., PhD, University of Bristol. Co-advised with Z. M. Leinhardt.                                   | 2022–present |
| Hollyday, G. O., UC Davis. Co-advised with S. T. Stewart.  | 2016–2020    |
| MS thesis: <i>Educational visualization tools for conveying research:<br/>Jupyter notebooks on synestias</i> |              |

Undergraduate students:

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| Tanna, P., University of Cambridge.  | 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. Co-advised with 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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| Advisor on BBC Studios documentary series on the Moon  | 2023         |
| Led activities as part of the Access to Bristol scheme   | 2022 & 2023  |
| 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   |              |
| Co-convenor of Union session, American Geophysical Union fall meeting<br><i>U016. The formation and early evolution of the Earth and the Moon</i>        | 2022         |
| Co-convenor, American Geophysical Union fall meeting<br><i>DI001. Accretion, differentiation and their longterm consequences for planetary evolution</i> | 2018         |
| 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  |              |
| 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 ( <sup>3</sup> 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

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| 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

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

## INVITED TALKS AND SEMINARS

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- 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

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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 Earth and Moon. *New views of the Moon II*. Accepted.
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. 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. Čuk, M., **S. J. Lock**, S. T. Stewart and D. Hamilton. Tidal evolution of the Earth-Moon system with a high initial obliquity. *Planetary Science Journal. 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

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Student advisees underlined.

1. **Lock, S. J.** A tectonically active early Earth driven by the tidal recession of the Moon. In review.
2. 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. R. Smith. The afterglow

of a planetary collision and transit of the resultant debris cloud. *Nature*. In review. Preprint will shortly be available on Research Square.

3. **Lock, S. J.**, and S. T. Stewart. The effect of pre-impact surface conditions on the efficiency of atmospheric loss in giant impacts. In submission.
4. Stewart, S. T., P. J. Carter, E. J. Davies, **S. J. Lock**, 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

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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

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Student advisees underlined.

62. **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, 2023.
61. 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.
60. 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.
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*, 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.
41. **Lock, S. J.**, S. T. Stewart, P. J. Carter, E. J. Davies, M. I. Petaev and S. B. Jacobsen. Size distribution of chondrules set by droplet breakup and coupling during vaporizing collisions in the nebula. *Lunar & Planet. Sci. Conf.* 50, Abs. 1783, 2019.
40. Stewart, S. T., P. J. Carter, E. J. Davies, **S. J. Lock**, R. G. Kraus, S. Root, M. I. Petaev and S. B. Jacobsen. Impact vapor plume expansion and hydrodynamic collapse in the solar nebula. *Lunar & Planet. Sci. Conf.* 50, Abs. 1250, 2019.
39. **Lock, S. J.**, S. T. Stewart, M. I. Petaev and S. B. Jacobsen. A terrestrial synestia: A new environment for formation of the Moon. *Lunar & Planet. Sci. Conf.* 50, Abs. 1784, 2019.
38. Chidester, B. A., A. J. Campbell, **S. J. Lock** and S. T. Stewart. Constraining the conditions of the Moon-forming giant impact with metal-silicate partitioning of lithophile elements. *AGU Fall Meeting*, Abs. DI11B-0023, 2018.
37. **Lock, S. J.**, S. T. Stewart and M. Čuk. Earth after the Moon forming giant impact: Accounting for all the energy *Lunar & Planet. Sci. Conf.* 49, Abs. 1616, 2018.
36. Carter, P. J., **S. J. Lock** and S. T. Stewart. The energy budgets of giant impacts. *Lunar & Planet. Sci. Conf.* 49, Abs. 2713, 2018.
35. Stewart, S. T., **S. J. Lock** and R. Caracas. Raining a magma ocean: Thermodynamics of rocky planets after giant impacts. *Lunar & Planet. Sci. Conf.* 49, Abs. 1708, 2018.

34. **Lock, S. J.**, S. T. Stewart and S. Mukhopadhyay. The last stage of Earth's formation: Increasing the pressure. *AGU Fall Meeting*, Abs. P53F-07, 2017.
33. Stewart, S. T., **S. J. Lock** and R. Caracas. Raining a magma ocean: Thermodynamics of rocky planets after a giant impact. *AGU Fall Meeting*, Abs. MR34B-01, 2017.
32. Hollyday, G. O., S. T. Stewart, Z. M. Leinhardt, P. J. Carter and **S. J. Lock**. Lunar accretion after a high-energy, high-angular momentum giant impact. *ACCRETE International Interdisciplinary Workshop*, 2017.
31. **Lock, S. J.**, S. T. Stewart, M. I. Petaev, Z. M. Leinhardt, M. T. Mace, S. B. Jacobsen and M. Čuk. A new model for lunar origin: Equilibration with Earth beyond the corotation limit. *ACCRETE International Interdisciplinary Workshop*, 2017.
30. **Lock, S. J.**, S. T. Stewart and S. Mukhopadhyay. Preservation of primordial chemical signatures in Earth's mantle by pressure induced freezing after a giant impact. *Lunar & Planet. Sci. Conf.* 48, Abs. 2390, 2017.
29. Hollyday, G. O., S. T. Stewart, Z. M. Leinhardt, P. J. Carter and **S. J. Lock**. Lunar accretion after a high-energy, high-angular momentum giant impact. *Lunar & Planet. Sci. Conf.* 48, Abs. 2606, 2017.
28. **Lock, S. J.**, S. T. Stewart and S. Mukhopadhyay. Preservation of primordial mantle in the aftermath of a giant impact. *AGU Fall Meeting*, Abs. DI33A-01, 2016.
27. Stewart, S. T., **S. J. Lock**, M. I. Petaev, Z. M. Leinhardt, M. T. Mace, S. B. Jacobsen and M. Čuk. Accretion of the Moon after a high-energy, high-angular momentum giant impact. *AGU Fall Meeting*, Abs. V41D-01, 2016.
26. Bremner, P. M., H. Fuqua, A. Mallik, M. R. Diamond, **S. J. Lock**, S. Panovska, Y. Nishikawa, H. Jimenez-Perez, A. Shahar, W. R. Panero, P. H. Lognonne and U. Faul. Constraints on lunar structure from combined geochemical, mineralogical, and geophysical modeling. *AGU Fall Meeting*, Abs. DI34A-07, 2016.
25. **Lock, S. J.**, S. T. Stewart, M. I. Petaev, Z. M. Leinhardt, M. T. Mace, S. B. Jacobsen and M. Čuk. A new model for lunar origin: Equilibration with Earth beyond the hot spin stability limit. *Lunar & Planet. Sci. Conf.* 47, Abs. 2881, 2016.
24. **Lock, S. J.** and S. T. Stewart. A hot spin stability limit for terrestrial planets. *Lunar & Planet. Sci. Conf.* 47, Abs. 2856, 2016.
23. Huang, S., M. I. Petaev, W. Wang, **S. J. Lock**, Z. Wu, S. T. Stewart and S. B. Jacobsen. Lunar origin beyond the hot spin stability limit: Stable isotopic fractionation. *Lunar & Planet. Sci. Conf.* 47, Abs. 2261, 2016.
22. Petaev, M. I., S. B. Jacobsen, S. Huang, **S. J. Lock** and S. T. Stewart. Testing models of the Moon's origin, III: Phase diagram of a proto-Lunar disk and condensation of trace elements. *Lunar & Planet. Sci. Conf.* 47, Abs. 2468, 2016.
21. Stewart, S. T., **S. J. Lock**, M. I. Petaev, S. B. Jacobsen, G. Sarid, Z. M. Leinhardt, S. Mukhopadhyay and M. Humayun. Mercury impact origin hypothesis survives the volatile crisis: Implications for terrestrial planet formation. *Lunar & Planet. Sci. Conf.* 47, Abs. 2954, 2016.
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