SIMON J. LOCK

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

EDUCATION

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

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

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

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

PROFESSIONAL EXPERIENCE

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

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

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

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

AWARDS AND HONORS

UK Natural Environment Research Council 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–present
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

UK NERC Independent Research Fellowship 2021–2026
Title: The consequences of the Moon-forming impact for the chemistry of Earth
Role: Fellow
Amount: £606,491

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

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

Graduate students:

G. O. Hollyday, UC Davis. Co-advised with S. T. Stewart. 2016–2020
MS thesis title: *Educational visualization tools for conveying research: Jupyter notebooks on synestias*

Undergraduate students:

A. C. Pepper, UC Davis. Co-advised with S. T. Stewart. 2017–present
Project: *Giant impacts between rotating bodies in an Eulerian code*

PUBLIC ENGAGEMENT AND OUTREACH

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

Co-convener, American Geophysical Union fall meeting 2018

DI001. Accretion, differentiation and their longterm consequences for planetary evolution

Journal reviewer: Science Advances, JGR: Planets, Nature Geoscience, EPSL, 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 service

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

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.

INVITED TALKS AND SEMINARS

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

11. 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 Earth and Moon. *New views of the Moon II.* Accepted.

10. Ćuk, 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. 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

1. Chidester, B. A., **S. J. Lock**, Z. Rahman, K. Righter and A. J. Campbell. The lithophile element budget of Earth's core. In review.
2. 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. In revision.
3. **Lock, S. J.** A tectonically active early Earth driven by the tidal recession of the Moon. In prep.
4. **Lock, S. J.** and S. T. Stewart. Atmospheric loss by giant impacts: A stochastic process in planet formation. In prep.
5. 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

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

Student advisees underlined.

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. Ćuk. 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. Ćuk. 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. Ćuk. 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. Ćuk. 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.

20. Ćuk, M., D. Hamilton, **S. J. Lock** and S. T. Stewart. Tidal evolution of the Moon from a fast-spinning, high-obliquity Earth. *Lunar & Planet. Sci. Conf.* 47, Abs. 2489, 2016.

19. Jacobsen, S. B., M. I. Petaev, B. Boatwright, **S. J. Lock** and S. T. Stewart. A new model for lunar origin: Elemental and isotopic constraints. *Lunar & Planet. Sci. Conf.* 47, Abs. 2489, 2016.

18. **Lock, S. J.**, S. T. Stewart, M. I. Petaev, Z. M. Leinhardt, M. T. Mace, S. B. Jacobsen and M. Ćuk. Condensing the Moon from a MAD Earth. *AGU Fall Meeting*, Abs. V23D-07, 2015.

17. Stewart, S. T. and **S. J. Lock**. The thermal states of accreting planets: From Mars-like embryos to a MAD Earth. *AGU Fall Meeting*, Abs. MR21D-02, 2015.

16. Mallik, A., H. Fuqua, P. M. Bremner, S. Panovska, M. R. Diamond, **S. J. Lock**, Y. Nishikawa, H. Jimenez-Perez, A. Shahar, W. R. Panero, P. H. Lognonne and U. Faul. Origin and constraints on ilmenite-rich partial melt in the lunar lower mantle. *AGU Fall Meeting*, Abs. DI43A-2610, 2015.

15. Ćuk, M., D. Hamilton, **S. J. Lock** and S. T. Stewart. Tidal evolution of the Moon from a high-obliquity, high-angular-momentum Earth. *AAS, DPS Meeting*, 47, Abs. 309.01, 2015.

14. Stewart, S. T., **S. J. Lock**, Z. M. Leinhardt, M. Mace and M. Ćuk. The role of vaporization in high angular momentum Moon-forming giant impacts. *APS Shock Compression of Condensed Matter Meeting*, Abs. O3.003, 2015.

13. Stewart, S. T., **S. J. Lock** and S. Mukhopadhyay. How much of the mantle melts in a giant impact? *Lunar & Planet. Sci. Conf.* 46, Abs. 2263, 2015.

12. **Lock, S. J.**, S. T. Stewart, Z. M. Leinhardt, M. T. Mace and M. Ćuk. The post-impact state of the Moon-forming giant impact: Favorable aspects of high-angular momentum models. *Lunar & Planet. Sci. Conf.* 46, Abs. 2193, 2015.

11. **Lock, S. J.**, S. T. Stewart, Z. M. Leinhardt, M. T. Mace and M. Ćuk. The Earth-lunar disk connection: Favorable aspects of a high-angular momentum giant impact. *AGU Fall Meeting*, Abs. P51A-3900, 2014.

10. Mukhopadhyay, S., S. T. Stewart, **S. J. Lock**, R. Parai and J. M. Tucker. Late impacts and the origins of the atmospheres on the terrestrial planets. *AGU Fall Meeting*, Abs. DI53C-03, 2014.

9. Fuqua, H., P. M. Bremner, M. R. Diamond, G. Garapic, **S. J. Lock**, A. Mallik, Y. Nishikawa, S. Panovska, A. Shahar, P. H. Lognonne, W. R. Panero, U. Faul, M. P. Panning, H. Jimenez-Perez, N. C. Schmerr and Q. C. Williams. Consequences and resolution of lunar lower mantle partial melt. *AGU Fall Meeting*, Abs. P13D-3860, 2014.

8. Stewart, S. T., **S. J. Lock** and S. Mukhopadhyay. Partial atmospheric loss and partial mantle melting during the giant impact stage of planet formation. *AGU Fall Meeting*, Abs. P44A-06, 2014.

7. **Lock, S. J.**, S. T. Stewart and S. Mukhopadhyay. Was the atmosphere lost during the Moon-forming event? *ACCRETE International Interdisciplinary Workshop*, 2014.

6. Jacobson, S. A., A. Morbidelli, D. C. Rubie, D. P. O'Brien, S. N. Raymond, S. T. Stewart and **S. J. Lock**. Planet formation within the grand tack model. *Lunar & Planet. Sci. Conf.* 45, Abs. 2274, 2014.

5. **Lock, S. J.**, S. T. Stewart and S. Mukhopadhyay. Was the atmosphere lost during the Moon-forming giant impact? *Lunar & Planet. Sci. Conf.* 45, Abs. 2843, 2014.

4. Stewart, S. T., **S. J. Lock** and S. Mukhopadhyay. Atmospheric loss and volatile fractionation during giant impacts. *Lunar & Planet. Sci. Conf.* 45, Abs. 2869, 2014.

3. Mukhopadhyay, S., S. T. Stewart, **S. J. Lock**, R. Parai, M. K. Peto and J. M. Tucker. Sculpting the volatile content of the Earth through giant impact-induced atmospheric loss and magma oceans. *AGU Fall Meeting*, Abs. V24B-07, 2013.

2. **Lock, S. J.**, S. T. Stewart, S. Mukhopadhyay and J. M. Tucker. Constraints on the Earths impact history from the requirement for atmospheric loss. *The Royal Society satellite meeting: Origin of the moon - Challenges and prospects*, 2013.

1. **Lock, S. J.** and S. T. Stewart. Atmospheric loss during high angular momentum giant impacts *Lunar & Planet. Sci. Conf.* 44, Abs. 2608, 2013.