

Ceri Nunn

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Employment

2018 - present: Postdoctoral Researcher, Jet Propulsion Laboratory, Pasadena, CA, U.S.A.

2016 - 2018: Marie Skłodowska-Curie fellow, LMU, Munich, Germany

2015 - 2016: Postdoctoral Researcher, Durham University, U.K.

Education

2014: PhD University of Cambridge

2009: MSci University of Cambridge

2008: BA University of Cambridge

External Funding Record

2020: JPL A-team Funding - Penetrating Seismometers for the Moon (~\$30,000)
(led a JPL internal study on building a lunar seismic network with seismometers delivered by penetrators)

2019: NASA Roses - Planetary Data Archiving, Restoration, and Tools (*PDART*) (~\$100,000)

2018: International Space Science Institute Workshop, Beijing - Supported Young Scientist (~€1,000)

2017: International Space Science Institute Workshop, Bern - Supported Young Scientist (~€1,000)

2015: Marie Skłodowska-Curie individual fellowship (~€160,000)

2013: Cambridge Philosophical Society Research Studentship (£3000)

2011: Schlumberger Travel Bursary (£1000)

Mission Experience

2020 - ongoing: NASA InSight archivist of seismic data to the Planetary Data System

2020 - ongoing: Co-Investigator for NASA's Lunar Geophysical Network (a candidate for a New Frontiers 5 mission) and co-author of mission concept study.

Academic Service

Panel Reviewer: NASA Panel Reviewer, 2019

Co-supervisor: JPL Intern 'Measuring Scattering in the Lunar Crust', 2019

Supervising Master's Projects on 'Modelling scatter on the Moon with Salvus' and 'Stacking Deep Moonquakes', 2018, LMU, Munich

Co-convener: Interiors of Planets and Moons: Learning from Spacecraft Observations, Simulations, and in Situ Data, AGU 2020

Convener: Seismic Modeling and Inversion: Exploring the Earth's Interior, AGU 2015

Organiser and chair: Discussion: Applying Best Practices in Seismic Tomography, with panelists Fiona Ann Darbyshire, Gary Pavlis, Nick Rawlinson, Kazunori Yoshizawa, AGU 2015

Journal Reviews: Geophysical Journal International, Surveys in Geophysics, Nonlinear Processes in Geophysics, Geomatics, Natural Hazards and Risk, Earth and Space Science

Proposal Reviews: UK Space Agency's Aurora Science

Judge: Outstanding Student Presentation Award, AGU (judge in 2013-2020 and session coordinator in 2015)

Judge: Outstanding Student Poster and PICO, EGU, 2017, 2018

Publications

- 2021** **Nunn, C.**, Pike, W.T., Standley, I.M., Calcutt, S.B., Kedar, S., Panning, M.P., 2021. Standing on Apollo's Shoulders: A Microseismometer for the Moon. *Planet. Sci. J.* 2, 36. <https://doi.org/10.3847/PSJ/abd63b>
- 2020** **Nunn, C.**, Garcia, R.F., Nakamura, Y., Marusiak, A.G., Kawamura, T., Sun, D., Margerin, L., Weber, R., Drilleau, M., Wieczorek, M.A., Khan, A., Rivoldini, A., Lognonné, P., Zhu, P., 2020. Lunar Seismology: A Data and Instrumentation Review. *Space Sci Rev* 216, 89. <https://doi.org/10.1007/s11214-020-00709-3>
- 2020** Panning, M.P., Pike, W.T., Lognonné, P., Banerdt, W.B., Murdoch, N., Banfield, D., Charalambous, C., Kedar, S., Lorenz, R.D., Marusiak, A.G., McClean, J.B., **Nunn, C.**, Stähler, S.C., Stott, A.E., Warren, T., 2020. On-Deck Seismology: Lessons from InSight for Future Planetary Seismology. *J. Geophys. Res. Planets* 125. <https://doi.org/10.1029/2019JE006353>
- 2019** Garcia, Raphael F., Khan, A., Drilleau, M., Margerin, L., Kawamura, T., Sun, D., Wieczorek, M.A. **Nunn, C.**, Weber, R.C., Marusiak, A.G., Lognonné, P., Nakamura, Y., Peimin, Z., Lunar Seismology: An Update on Interior Structure Models. *Space Science Reviews* 215, no. 8., doi: 10.1007/s11214-019-0613-y
- 2018** Krischer, L., Aiman, Y.A., Bartholomäus, T., Donner, S., Driel, M. van, Duru, K., Garina, K., Gessele, K., Gunawan, T., Hable, S., Hadziioannou, C., Koymans, M., Leeman, J., Lindner, F., Ling, A., Megies, T., **Nunn, C.**, Rijal, A., Salvermoser, J., Soza, S.T., Tape, C., Taufiqurrahman, T., Vargas, D., Wassermann, J., Wölfl, F., Williams, M., Wollherr, S., Igel, H., 2018. seismo-live: An Educational Online Library of Jupyter Notebooks for

Seismology. *Seismological Research Letters* 89, 2413–2419.
<https://doi.org/10.1785/0220180167>

- 2014** **Nunn, C.**, Roecker, S. W., Priestley, K. F., Liang, X., Gilligan, A. Joint Inversion of Surface Waves and Teleseismic Body Waves Across the Tibetan Collision Zone: the Fate of Subducted Indian Lithosphere, *Geophys. J. Int*, 198, 1526–1542 (2014), doi: 10.1093/gji/ggu193
- 2014** **Nunn, C.**, Roecker, S. W., Tilmann, F. J., Priestley, K. F., Heyburn, R., Sandvol, E. A., Ni, J. F., Chen, Y. J., Zhao, W. and the INDEPTH IV and ASCENT Team, Imaging the lithosphere beneath NE Tibet: teleseismic P and S body wave tomography incorporating surface wave starting models, *Geophys. J. Int*, 196, 1724–1741 (2014), doi:10.1093/gji/ggt476
- 2014** Gilligan, A., Roecker, S. W., Priestley, K. F., **Nunn, C.**, Shear velocity model for the Kyrgyz Tien Shan from joint inversion of receiver function and surface wave data, *Geophys. J. Int*, 199, 480–498 (2014), doi: 10.1093/gji/ggu225

Invited Talks

- 2020** **Nunn, C.** Moonquakes: an introduction to what we know about the Moon from Lunar Seismology, Open Planetary Lunch Talks, <https://www.youtube.com/watch?v=sCT3IVvjaZk>
- 2018** **Nunn, C.**, Nakamura, Y., Igel, H., Apollo Passive Seismic Experiments: SEED format for lunar data, Institute of Geology and Geophysics, Chinese Academy of Sciences, 22 June 2018
- 2017** **Nunn, C.**, Julian, B.R., Foulger, G.R., Mhana, N., Seismic tomography of Mount Etna: No evidence for time-dependent changes during the 2002-3 flank eruption, TIDES (Time-DEpendent Seismology) Training School: Seismic Tomography: Theory, Inversion, Uncertainties, University of Oxford, invited talk and attendance at training workshop

Conferences and Training Schools

- 2021**
- 2020** MoonShake: a Future Lunar Seismic Network delivered by Penetrators, AGU Fall Meeting 2020, virtual, e-lightning talk
- 2020** Improving the Accessibility of the Apollo Seismic Data: Archiving at IRIS and the PDS, LPSC 51, 2020, <https://www.hou.usra.edu/meetings/lpsc2020/pdf/2269.pdf>, proceedings only
- 2019** Standing on Apollo's Shoulders: MEMS seismometers for the Lunar Geophysical Network, AGU Fall Meeting 2019, eLightning talk

- 2019** Scoping MEMS seismometers for the Moon, EGU, Vienna, 2019, talk
- 2019** Scoping MEMS seismometers for the Moon, <https://www.hou.usra.edu/meetings/lpsc2019/pdf/2223.pdf>, LPSC 50, The Woodlands, TX, poster
- 2018** Artificial Impacts and Meteoroid Strikes on the Moon: Observations from seismic data with insights from synthetic models, AGU Fall Meeting 2018, Washington DC, poster
- 2018** Workshop: An International Reference for Seismological Data Sets and Internal Structure Models of the Moon, International Space Science Institute, Beijing, China, 18-22 June 2018, working group to prepare papers and reference data for the Moon
- 2017** **Nunn, C.**, Nakamura, Y. and Igel, H. Apollo Passive Seismic Experiments: lunar data in SEED Format, AGU Fall Meeting 2017, New Orleans, poster
- 2017** **Nunn, C.**, Nakamura, Y. and Igel, H. Apollo Passive Seismic Experiments: lunar data in SEED Format, AGU Fall Meeting 2017, New Orleans, poster
- 2017** Workshop: An International Reference for Seismological Data Sets and Internal Structure Models of the Moon, International Space Science Institute, Bern, Switzerland, 23-27 October 2017, working group to prepare papers and reference data for the Moon
- 2017** **Nunn, C.**, Nakamura, Y. and Igel, H. Apollo Passive Seismic Experiments: lunar data in SEED Format, AG Seismologie 2017, Bad Breisig, poster
- 2017** **Nunn, C.** and Igel, H., Lunar Structure from Coda Wave Interferometry, EGU 2017, PICO (interactive presentation)
- 2016** **Nunn, C.** and Igel, H., Lunar Structure from Coda Wave Interferometry, AGU Fall Meeting 2016, poster
- 2016** **Nunn, C.** and Igel, H. Lunar Structure from Coda Wave Interferometry, AG Seismologie 2016, Bad Salzschlirf, poster
- 2015** **Nunn, C.**, Julian, B.R, Foulger, G.R. Patanè, D., Ibáñez, J.M., Briole, P., Mhana, N. and the MED-SUV Team, Mount Etna: 3-D and 4-D structure using seismic tomography, AGU Fall Meeting 2015, San Francisco, abstract #S23D-2779, poster
- 2013** **Nunn, C.**, Roecker, S. W., Priestley, K. F., Liang , X., Heyburn, R., A joint inversion of surface waves and teleseismic body waves across the Tibetan collision zone, AGU Fall Meeting 2013, San Francisco, abstract #S33A-2394, poster
- 2012** **Nunn, C.**, Roecker, S. W., Tilmann, F. J., Priestley, K. F., Heyburn, R., Mechie, J., Sandvol, E. A., Ni, J. F., Chen, Y. J., Zhao, W., Velocity structure of the NE Tibetan Plateau: P and S body wave tomographic model of the northeastern

Tibetan Plateau and its margins with additional constraints from surface wave tomography, AGU Fall Meeting 2012, San Francisco, abstract #T54B-05, talk

- 2011** **Nunn, C.**, Tilmann, F. J., Roecker, S. W., Priestley, K. F., Heyburn, R., Mechie, J., Sandvol, E. A., Ni, J. F., Chen, Y. J., Zhao, W., and the INDEPTH IV and ASCENT Team, P- and S-wave tomographic structure of NE Tibet, AGU Fall Meeting 2011, San Francisco, abstract #T43A-2302, poster
- 2011** **Nunn, C.**, Tilmann, F. J., Roecker, S. W., Priestley, K. F., Heyburn, R., Mechie, J., Sandvol, E. A., Ni, J. F., Chen, Y. J., Zhao, W., and the INDEPTH IV and ASCENT Team, P- and S-wave tomographic structure of NE Tibet, UKSEDI: Study of the Earth's Deep Interior meeting, Royal Astronomical Society, London, November 2011, poster
- 2011** **Nunn, C.**, Tilmann, F. J., Roecker, S. W., Priestley, K. F., Heyburn, R. and the INDEPTH IV and ASCENT Team, P-wave tomographic structure of NE Tibet, EGU, Vienna, 2011, poster

NRC Planetary Science and Astrobiology Decadal Survey

- 2020** **Nunn, C.**, Calcutt, S., Clark, P.E., Eubanks, T.M., Kedar, S., Panning, M.P., Pike, W.T., Radley, C.F., Standley, I.M., Sutin, B.M., Zimmerman, W.F., 2020. MoonShake: a future Lunar Seismic Network Delivered by Penetrators (A White Paper for the National Research Council's Planetary Science and Astrobiology Decadal Survey).
- 2020** Neal, C., Weber, R.C., Amato, M., J., Seas, A., Science Team [including **Nunn, C.**], Engineering Team, 2020. The Lunar Geophysical Network (Planetary Missions Concept Studies Report), Submitted in response to: NNH18ZDA001N-PMCS.
- 2020** Gulick, S.P., Kawamura, T., **Nunn, C.**, Neal, C.R., Christeson, G.L., Tsuji, T., Schmerr, N., Garcia, R.F., Lognonné, P., 2020, Active Seismic Subsurface Exploration on Artemis III: Exploration and Science Goals (A White Paper for the National Research Council's Planetary Science and Astrobiology Decadal Survey)
- 2020** Neal, C.R., Dell'Agnello, S., Grimm, R., Gulick, S.P.S., James, P., Lognonné, P., **Nunn, C.**, Panning, M.P., Petro, N., Schmerr, N., Watters, T., Zacny, K., 2020, Enabling Elements for Artemis Surface Science (A White Paper for the National Research Council's Planetary Science and Astrobiology Decadal Survey)
- 2020** Panning, M.P., Weber, R.C., Kedar, S., Bugby, D.C., Calcutt, S., Currie, D., Dell'Agnello, S., Elliott J., Grimm R., Gulick⁷, S.P.S., Fuqua Haviland, H. He, Y., Johnson, C.L., Kawamura, T., Lognonné, P., Nagihara, S., Neal, C.R., **Nunn, C.**, Pike, W.T., Standley, I.M., Walsh, W., Wieczorek, M., 2020, Building a lunar network using a long-lived, human-deployed Lunar Geophysical Package (LGP) (A White Paper for the National Research Council's Planetary Science and Astrobiology Decadal Survey)

Outreach Activities

Aug 2020: [Moonquakes and marsquakes: How we peer inside other worlds](#), by [Horizon Magazine](#)

Nov 2018: [Old Lunar Data Gets New Life. With Help From Seismologists](#), by Michael Durmiak, Spectrum

June 2016: How to make a mountain (for pupils aged 10-11 years)
The Moon (for pupils aged 9-10 years)
Talks at Cherry Hinton Primary School, Cambridge, UK

8 June 2015: Darwin: the great geologist behind the Origin of Species
The Conversation
<http://theconversation.com/revealed-the-great-geologist-behind-the-origin-of-species-42783>

October 2015: The structure of Mount Etna
Talk for the North Eastern Geological Society
<http://www.northern-england-geology.co.uk/negs-newsletter-dec-2015.pdf>

Software Products

<https://github.com/cerinunn/pdart>

Planetary Data Archiving, Restoration, and Tools (PDART) for the Apollo missions

<https://github.com/cerinunn/apollo-shoulders>

Standing on Apollo's Shoulders: a Microseismometer for the Moon - Electronic Supplement

Fieldwork:

2007: Mapping of the Loch Ba Ring Dyke, Isle of Mull, Scotland (35 days fieldwork).

IT Skills

ObsPy, SAC

Programming in Python, Fortran, Java, VB; scripting in Bash and AWK

Environments: Mac, Linux, UNIX and Windows

Cluster computing

High quality figures and animations in Python (matplotlib, cartopy, basemap), GMT, IDL, Inkscape

SQL databases (Oracle, MySQL, SQL Server)

Sun Certified Java Programmer (2002)

Oracle Certified Professional, Oracle Forms Developer (1999)

Teaching:

LMU, Munich

Spring 2016, Spring 2017: Geophysical Data Acquisition (lectures, practicals, developing practicals, writing exam material)

Nov 2016: Contributor to SeismoLive (http://krischer.github.io/seismo_live/)

July 2016: Oral Examiner - MSc Seismology

University of Cambridge

2010 – 2011: Teaching Assistant - Continental Tectonics and Mountains (3rd year Geology BA or Geology MSci)

2009 – 2010 Teaching Assistant - Physics of the Earth as a Planet (4th year Physics MSci)

2010 Teaching Assistant in revision classes for 1A (1st year Geology BA)

Career Breaks

Jul 2014 - Jan 2015: Career break with my youngest daughter.

Jan 2012 - Jul 2012: Maternity Leave, 3 months full-time, 3 months part-time.

Early Career (highlights)

2003 - 2005: Corelogic, London

Project Team Leader

1997 - 2003: Iteba, London

Team Leader and Software Developer

1992 - 1995: University of Sussex
Social Psychology (B.A. Hons)