

Rishav Mallick

NASA Postdoctoral Fellow

Jet Propulsion Laboratory, Pasadena, USA

Email: rishav.mallick@jpl.nasa.gov

EDUCATION

PhD, <i>Nanyang Technological University (NTU), Singapore</i>	2016-2021
M.Tech, <i>Indian Institute of Science (IISc), Bangalore</i>	2013-2015
B.Tech, <i>National Institute of Technology Karnataka (NITK), Surathkal</i>	2009-2013

PROFESSIONAL EXPERIENCE

NASA Postdoctoral Fellow at <i>JPL</i>	2023-present
Visiting Scientist at <i>Caltech Seismolab</i>	2023-present
Texaco Prize Postdoctoral Fellow at <i>Caltech</i>	2021-2023
Research Associate at <i>NTU</i>	2021
Visiting Scholar at <i>UC Berkeley</i>	2019-2020
Graduate Student Researcher at <i>NTU</i>	2016-2021
Teaching Assistant at <i>IISc</i>	2015-2016

RESEARCH INTERESTS

Geodetic imaging of lithosphere deformation, numerical modelling of the earthquake cycle, fault mechanics, rheology and constitutive relations, inverse problems and uncertainty analysis, earthquake source seismology, plate tectonics

PUBLICATIONS

19. Lindsey, E. O., Wang, Y., Aung, L. T., Chong, J., Qiu, Q., **Mallick, R.**, Feng, L., et al. (2023). Active subduction and strain partitioning in western Myanmar revealed by a dense survey GNSS network. accepted at *Earth and Planetary Science Letters*
18. **Mallick, R.**, Simons, M.; Limits on inferring rheology and heterogeneity in rheological parameters from the post-earthquake period using geodetic observations; *in review at GJI*
17. **Mallick, R.**, Lambert, V.R., Meade, B.J. (2022); On the choice and implications of lithospheric rheologies that maintain mechanical consistency over the entire earthquake cycle; *Journal of Geophysical Research: Solid Earth*, 127, e2022JB024683. <https://doi.org/10.1029/2022JB024683>

16. Meade, B.J., **Mallick, R.**, Carrero-Mustelier, E. (2022); Kinematic representations of linear and power-law deformation through the earthquake cycle; *Geophysical Research Letters*, 49, e2022GL100266. <https://doi.org/10.1029/2022GL100266>
15. Pan, Y., Ding, H., Li, J., Shum, C. K., **Mallick, R.**, Jiao, J., Li, M., Zhang, Y. (2022); Transient hydrology-induced elastic deformation and land subsidence in Australia constrained by contemporary geodetic measurements. *Earth and Planetary Science Letters*, 588, 117556. <https://doi.org/10.1016/j.epsl.2022.117556>
14. **Mallick, R.**, Bürgmann, R., Johnson, K.M., Hubbard, J.A. (2021); A unified framework for earthquake sequences and the growth of geological structure in fold-thrust belts. *Journal of Geophysical Research: Solid Earth*, 126, e2021JB022045. <https://doi.org/10.1029/2021JB022045>
13. **Mallick, R.**, Meltzner, A. J., Tsang, L. L. H., Lindsey, E. O., Feng, L., and Hill, E. M. (2021); Long-lived shallow slow-slip events on the Sunda megathrust. *Nature Geoscience*. <https://doi.org/10.1038/s41561-021-00727-y>
12. Lindsey, E., **Mallick, R.**, Hubbard, J., Bradley, K., Almeida, R., Moore, J. D. P., Bürgmann, R., Hill, E. M. (2021); Slip rate deficit and earthquake potential on shallow megathrust. *Nature Geoscience*. <https://doi.org/10.1038/s41561-021-00736-x>
11. Pan, Y., Hammond, W., Ding, H., **Mallick, R.**, Jiang, W., Xu, X., Shum, C. K., Shen, W. (2021); GPS Imaging of vertical bedrock displacements: Quantification of two-dimensional vertical crustal deformation in China. *Journal of Geophysical Research: Solid Earth*. 126(4), 1-20, <https://doi.org/10.1029/2020JB020951>
10. Morgan, P., Meltzner, A.J., Feng, L., **Mallick, R.**, Hill, E.M. (2020); Diverse slip behavior of the Banyak Islands sub-segment of the Sunda megathrust in Sumatra, Indonesia. *Journal of Geophysical Research: Solid Earth*. 125, <https://doi.org/10.1029/2020JB020011>
9. **Mallick, R.**, Hubbard, J. A., Lindsey, E. O., Bradley, K. E., Moore, J. D. P., Ahsan, A., et al. (2020). Subduction initiation and the rise of the Shillong Plateau. *Earth and Planetary Science Letters*, 543, 116351. <https://doi.org/10.1016/j.epsl.2020.116351>
8. Bradley, K., **Mallick, R.**, Andikagumi, H., Hubbard, J., Meilianda, E., Switzer, A., Du, N., Brocard, G., Alfian, D., Benazir, B., Feng, G., Yun, S., Majewski, J., Wei, S., Hill, E.M. (2019). Earthquake-triggered 2018 Palu Valley landslides enabled by wet rice cultivation. *Nature Geoscience*. 12, 935–939. <https://doi.org/10.1038/s41561-019-0444-1>
7. **Mallick, R.**, Lindsey, E.O., Feng, L., Hubbard, J., Banerjee, P., Hill, E.M., (2019). Active convergence of the India-Burma-Sunda plates revealed by a new continuous GPS network. *Journal of Geophysical Research: Solid Earth*. 124, 3155– 3171. <https://doi.org/10.1029/2018JB016480>

6. Lindsey, E. O., Almeida, R., **Mallick, R.**, Hubbard, J., Bradley, K., Tsang, L. L. H., et al. (2018). Structural Control on Down-dip Locking Extent of the Himalayan Megathrust. *Journal of Geophysical Research: Solid Earth*, 123(6), 5265–5278. <https://doi.org/10.1029/2018JB015868>
5. Almeida, R., Lindsey, E. O., Bradley, K., Hubbard, J., **Mallick, R.**, Hill, E. M. (2018). Can the Up-Dip Limit of Frictional Locking on Megathrusts be Detected Geodetically? Quantifying the Effect of Stress Shadows on Near-Trench Coupling. *Geophysical Research Letters*. <https://doi.org/10.1029/2018GL077785>
4. **Mallick, R.**, Parameswaran, R. M., Rajendran, K. (2017). The 2005 and 2010 Earthquakes on the Sumatra–Andaman Trench: Evidence for Post-2004 Megathrust Intraplate Rejuvenation. *Bulletin of the Seismological Society of America*, 107(3). <https://doi.org/10.1785/0120160147>
3. **Mallick, R.**, & Rajendran, K. (2016). The 2014 M_w 6.1 Bay of Bengal, Indian Ocean, Earthquake: A Possible Association with the 85° E Ridge. *Bulletin of the Seismological Society of America*, 106(2), 408–417. <https://doi.org/10.1785/0120150308>
2. Parameswaran, R. M., Natarajan, T., Rajendran, K., Rajendran, C. P., **Mallick, R.**, Wood, M., Lekhak, H. C. (2015). Seismotectonics of the April–May 2015 Nepal earthquakes: An assessment based on the aftershock patterns, surface effects and deformational characteristics. *Journal of Asian Earth Sciences*, 111, 161–174. <https://doi.org/10.1016/j.jseaes.2015.07.030>
1. Kurtarkar, S. R., Saraswat, R., Nigam, R., Banerjee, B., **Mallick, R.**, Naik, D. K., Singh, D. P. (2015). Assessing the effect of calcein incorporation on physiological processes of benthic foraminifera. *Marine Micropaleontology*, 114, 36–45. <https://doi.org/10.1016/j.marmicro.2014.10.001>

SYNERGISTIC ACTIVITIES

- Reviewer for *JGR: Solid-Earth*, *Geophysical Research Letters*, *Geology*, *Earth and Planetary Science Letters*, *Scientific Reports*, *Tectonics*, *Frontiers in Earth Science*, *Tectonophysics*, *International Journal of Earth Science*, *Pure and Applied Geophysics*, *Journal of Geodesy*, *Journal of Geodynamics*
- Seminar coordinator for *Caltech Seismolab brown bag* seminar series
- Primary Convenor for *AGU 2019 Tectonophysics session (Geodetic Observations of the Growth of Geological Structures)*
- Graduate student representative at *Asian School of the Environment, NTU* (2019-2020)
- Tectonic Geodesy training workshop for graduate students and staff at *Myanmar Survey Department* (2018)

SELECTED PRESS COVERAGE

- *Eos.org*: Faulting and folding signals in seismic data, (December 2021).

- *Temblor.net*: An overlooked hazard can cause damage weeks after an earthquake strikes, (October 2021).
- *Temblor.net*: A better way to forecast megathrust earthquakes and subsequent tsunami events, (June 2021).
- *National Geographic*: An earthquake lasted 32 years, and scientists want to know how, (June 2021).
- *Scientific American*: The Longest Known Earthquake Lasted 32 Years, (May 2021).
- *Forbes*: Earthquake And Tsunami Hazards Along Coasts Might Be Higher Than Expected, (May 2021).
- *Phys.org*: Study of ancient corals in Indonesia reveal slowest earthquake ever recorded, (May 2021).
- *Nature Geoscience* (News and Views): Unrushed megathrusts, (May 2021).
- *Phys.org*: Rice irrigation worsened landslides in deadliest earthquake of 2018, (October 2019).
- *Nature Geoscience* (News and Views): Irrigation and the Palu landslides, (October 2019).

TEACHING EXPERIENCE

Course developer and instructor	<i>Applying principles of continuum mechanics for geophysical problems</i> (Graduate)	NTU, Singapore (2021)
Teaching Assistant	<i>Introduction to Scientific Writing</i> (Undergrad)	NTU, Singapore (2020)
Teaching Assistant	<i>Fundamentals of Data Science in Earth and Environmental Systems Science</i> (Undergrad/Grad)	NTU, Singapore (2019)
Teaching Assistant	<i>Computational Earth System Science</i> (Undergrad)	NTU, Singapore (2018)
Teaching Assistant	<i>Solid Earth</i> (Undergrad)	NTU, Singapore (2018)
Teaching Assistant	<i>Introduction to Solid Earth</i> (Undergrad)	IISc, Bangalore (2016)
Teaching Assistant	<i>Introduction to Earth and Environmental Science</i> (Undergrad)	IISc, Bangalore (2015)

SELECTED PRESENTATIONS

11. Understanding how lithospheric rheology modulates earthquake cycle dynamics and to what extent can rheological parameters be constrained by geodetic observations. *USGS Seminar Series*, 2023

10. Understanding lithosphere deformation by bridging timescales from earthquakes to geology. *UC Santa Cruz*, 2022
9. On the choice and implications of rheologies that maintain kinematic and dynamic consistency over the entire earthquake cycle. *AGU Fall Meeting 2021*
8. From kinematic descriptions to dynamic perspectives of tectonics. *Caltech*, 2020
7. Decoding the earthquake cycle and geological processes from geodetic observations. *UC Berkeley*, 2020
6. Long-lived transient slip events recorded in paleogeodetic data from Sumatra. *SZAD Eugene*, 2019
5. From plate motion to interseismic coupling on plate boundaries. *Indian Institute of Science Bangalore*, 2019
4. Interseismic deformation and the stress shadow. *Géosciences Azur, CNRS, Valbonne*, 2018
3. Breakup of the Indian craton and rise of the Shillong Plateau. *AGU Fall Meeting 2018*
2. Probing the earthquake cycle with satellite geodesy and numerical simulations. *Indian Institute of Science Bangalore*, 2017
1. Interseismic deformation due to oblique India-Sunda Collision: Implications for the Arakan Sleeping Giant. *AGU Fall Meeting 2017*

GRANTS and AWARDS

Texaco Prize Postdoctoral Fellowship, Caltech	2021
Stephen Riady Geoscience Scholars Fund	2019
Research Fellowship: Earth Observatory of Singapore, Nanyang Technological University	2016
Gold Medalist (Center for Earth Science), Indian Institute of Science	2016
Best Student Poster Award for Interdisciplinary Geosciences at AOGS (Asia Oceania Geosciences Summit)	2015
Indian Academy of Science Summer Research Fellowship	2012