

# Ross Parnell–Turner

Associate Professor

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## Research Interests

My research in marine geophysics addresses the origins and evolution of oceanic crust, investigating magmatism, faulting, and hydrothermal processes at mid-ocean ridges. I use techniques including earthquake seismology, scientific ocean drilling, robotic and human-occupied submersible vehicle surveys and numerical modeling.

## Education

- 2010–2014     **PhD, Geophysics, University of Cambridge, UK**  
Dissertation: *Observations of Transient Mantle Convection in the North Atlantic Ocean.*
- 2002–2006     **MESc (First Class Honors), Earth Sciences, University of Oxford, UK**  
Dissertation: *Flexurally Driven Uplift of the Sierra Nevada, Western USA.*

## Employment History

- 2023–     **Associate Professor, University of California, San Diego, CA, USA**
- 2018–2023     **Assistant Professor, University of California, San Diego, CA, USA**  
*Scripps Institution of Oceanography; Institute of Geophysics & Planetary Physics*
- 2015–2018     **Postdoctoral Investigator, Woods Hole Oceanographic Institution, MA, USA**  
*Department of Geology & Geophysics*
- 2014–2015     **Postdoctoral Research Associate, University of Cambridge, UK**  
*Basins Group, Bullard Laboratories*
- 2006–2010     **Geoscientist, BP plc**  
*Exploration and development in Algeria, Trinidad & Tobago, West of Shetland, and North Sea*

## Research Funding

- 2023–2028     NSF OCE-2238290: ‘CAREER: Mantle convection and oceanic gateways in the North Atlantic’ (PI): \$952,732
- 2022–2025     NSF OCE-2128301: ‘Towards quantifying eruptive timing of volcanic eruptions’ (Co-PI): \$398,975
- 2021–2024     NSF OCE-2104437: ‘Detachment Fault Cycle at the Mid-Cayman Spreading Center’ (PI): \$448,473
- 2021–2022     NSF OCE-2011694: ‘Early Career Coring Principal Investigator Training Cruise’ (PI): \$20,678
- 2020–2023     NSF OCE-1948936: ‘Monitoring hydrothermal fluids at the East Pacific Rise’ (PI): \$202,417
- 2018–2021     NSF OCE-1839727: ‘Along-Axis Continuity of Detachment Faults’ (PI): \$95,378
- 2018–2021     NSF OCE-1754419: ‘Sediment Imaging with AUVs’ (PI): \$98,930

## Selected Awards

- 2023     Graduate Teaching Award, Scripps Institution of Oceanography
- 2012     Outstanding Student Paper Award, American Geophysical Union Fall Meeting (Earth’s Interior)
- 2011     Outstanding Student Paper Award, American Geophysical Union Fall Meeting (Tectonophysics)
- 2004     Open Academic Scholarship, St Edmund Hall, University of Oxford

## Publications (\*student advisee first author)

31. Tucholke, B., **R. Parnell-Turner**, and D. K. Smith (2023). The Global Spectrum of Seafloor Morphology on Mid-Ocean Ridge Flanks Related to Magma Supply. *Journal of Geophysical Research: Solid Earth*. doi:10.1029/2023JB027367
30. Gong, J., W. Fan, and **R. Parnell-Turner** (2023). Interplay between faulting, rifting, and rotation at the Discovery transform fault system, East Pacific Rise. *Geochemistry, Geophysics, Geosystems*. doi:10.1029/2023GC011043
29. \*Berrios-Rivera, N., J. S. Gee, **R. Parnell-Turner**, S. Maher, J.-N. Wu, D. J. Fornari, M. Tivey, T. Barreyre, and J. M. McDermott (2023). Significance of short-wavelength magnetic anomaly low along the East Pacific Rise axis. *Geochemistry, Geophysics, Geosystems*. doi:10.1029/2023GC010875
28. \*Wu, J.-N., **R. Parnell-Turner**, D. J. Fornari, N. Berrios-Rivera, T. Barreyre, and J. M. McDermott (2023). The Role of On- and off-Axis Faults and Fissures during Eruption Cycles and Crustal Accretion at 9°50'N, East Pacific Rise. *Geochemistry, Geophysics, Geosystems*. doi:10.1029/2022GC010794
27. Zheng, T., J. Lin, H. Schouten, D. K. Smith, E. Klein, and **R. Parnell-Turner** (2023). Gravity Anomalies and Implications for Shallow Mantle Processes of the Western Cocos-Nazca Spreading Center, *Geophysical Research Letters*. doi:10.1029/2022GL102133
26. \*Fabbrizzi, A., **Parnell-Turner, R.**, Gregg, P. M., Fornari, D.J., Perfit, M.R., Wanless V.D., and Anderson, M. (2022). Relative Timing of Off-axis Volcanism from Sediment Thickness Estimates on the 8°20'N Seamount Chain, East Pacific Rise *Geochemistry, Geophysics, Geosystems*. doi:10.1029/2022GC010335
25. **Parnell-Turner, R.**, Smith, D.K., and Dziak, R.P. (2022). Hydroacoustic Monitoring of Seafloor Spreading and Transform Faulting in the Equatorial Atlantic Ocean *Journal of Geophysical Research - Solid Earth*. doi:10.1029/2022JB024008
24. McDermott, J. M., **Parnell-Turner, R.**, Barreyre, T., Herrera, S., Downing, C., Pittoors, N., Pehr, K., Vohsen, S.A., Dowd, W.S., Wu, J.-N., Marjanovic, M., and Fornari, D. J. (2022). Discovery of Active Off-Axis Hydrothermal Vents at 9°54'N East Pacific Rise, *Proceedings of the National Academy of Sciences*. doi:10.1073/pnas.2205602119
23. \*Wu, J.-N., **Parnell-Turner, R.**, Fornari, D. J., Kurras, G., Berrios-Rivera, N., Barreyre, T., and McDermott, J. M. (2022). Extent and Volume of Lava Flows erupted at 9°50'N, East Pacific Rise in 2005–2006, Using Repeat Autonomous Underwater Vehicle Surveys, *Geochemistry, Geophysics, Geosystems*. doi:10.1029/2021GC010213
22. Barreyre, T., **Parnell-Turner, R.**, Wu, J.-N. and Fornari, D. J. (2022). Tracking crustal permeability and hydrothermal response during seafloor eruptions at the East Pacific Rise, 9°50'N, *Geophysical Research Letters*. doi:10.1029/2021GL095459
21. **Parnell-Turner, R.**, Briaies, A., LeVay, L., and Expedition 395 Scientists (2022). Expedition 395C Preliminary Report: Reykjanes Mantle Convection and Climate: Crustal Objectives. *International Ocean Discovery Program*. <https://doi.org/10.14379/iodp.pr.395C.2022>
20. Gong, J., W. Fan, and **Parnell-Turner, R.** (2022). Microseismicity indicates atypical small-scale plate rotation at the Quebrada transform fault system, East Pacific Rise, *Geophysical Research Letters*. doi:10.1029/2021GL097000
19. **Parnell-Turner, R.**, Sohn, R., Peirce, C., Reston, T., Macleod, C., Searle, R. and Simão, N. (2021). Seismicity trends and detachment fault structure at 13°N, Mid-Atlantic Ridge, *Geology*. doi:10.1130/G48420.1
18. \*de Melo, G. W. S., **Parnell-Turner, R.**, Dziak, R. P., Smith, D. K., Maia, M., do Nascimento, A., and Royer, J.-Y (2020). Uppermost mantle velocity beneath the Mid-Atlantic Ridge and transform faults in the equatorial Atlantic Ocean, *Bulletin of the Seismological Society of America*. doi:10.1785/0120200248
17. **Parnell-Turner, R.**, Briaies, A., and LeVay, L. (2020). Expedition 395 Scientific Prospectus: Reykjanes Mantle Convection and Climate. *International Ocean Discovery Program*. doi:10.14379/iodp.sp.395.2020

16. Urann, B. M., Dick, H. J. B., **Parnell-Turner, R.**, and Casey, J. F. (2020). Recycled arc mantle recovered from the Mid-Atlantic Ridge, *Nature Communications*, doi:10.1038/s41467-020-17604-8
15. **Parnell-Turner, R.**, Sim, S. J., and Olive, J.-A. (2020). Time-dependent crustal accretion on the Southeast Indian Ridge revealed by Malaysia Airlines MH370 search, *Geophysical Research Letters*, 47, e2020GL087349.
14. Hoggard, M. J., **Parnell-Turner, R.**, and N. J. White (2020). Hotspots and Mantle Plumes Revisited: Reconciling the Mantle Heat Transfer Discrepancy. *Earth and Planetary Science Letters*, doi.org/10.1016/j.epsl.2020.116317.
13. Smith, D. K., H. Schouten, **Parnell-Turner, R.**, E. Klein, J. Cann, C. Dunham, G. Alodia, I. Blasco, B. Wernette, and S. Curry (2020). The Evolution of Seafloor Spreading Behind the Tip of the Westward Propagating Cocos-Nazca Spreading Center, *Geochemistry, Geophysics, Geosystems*, doi:10.1029/2020GC008957.
12. Olive, J.-A., **Parnell-Turner, R.**, Escartín, J., Smith, D., and Petersen, S. (2019). Controls on seafloor exposure of detachment fault surfaces, *Earth and Planetary Science Letters*, 506, 381–387.
11. **Parnell-Turner, R.**, E. Mittelstaedt, M. D. Kurz, F. Klein, S. A. Soule, M. Jones, D. Fornari and V. D. Wanless (2018). The Final Stages of Slip and Volcanism on an Oceanic Detachment Fault at 13°48'N, Mid-Atlantic Ridge, *Geochemistry, Geophysics, Geosystems*, 19, doi:10.1029/2018GC007536.
10. **Parnell-Turner, R.**, J. Escartín, J.-A. Olive, D. Smith and S. Petersen (2018). Genesis of corrugated surfaces by strain localization recorded at oceanic detachments, *Earth & Planetary Science Letters*, 498, 116–128.
9. **Parnell-Turner, R.**, Sohn, R.A., Peirce, C., Reston, T.J., Macleod, C.J., Searle, R.C. and Simaõ, N.M. (2017). Oceanic Detachment Faults Generate Compression in Extension, *Geology*, 45, 923–926.
8. **Parnell-Turner, R.**, N. J. White, T. J. Henstock, S. M. Jones, J. MacLennan and B. J. Murton (2017). Causes and Consequences of Diachronous V-Shaped Ridges in the North Atlantic Ocean, *Journal of Geophysical Research - Solid Earth*, doi:10.1002/2017JB014225.
7. Craig, T. J. and **R. Parnell-Turner** (2017). Depth-varying seismogenesis on an oceanic detachment fault at 13°20'N on the Mid-Atlantic Ridge, *Earth & Planetary Science Letters*, 479, 60–70.
6. **Parnell-Turner, R.**, H. Schouten and D. K. Smith (2016). Tectonic Structure of the Mid-Atlantic Ridge near 16°30'N, *Geochemistry, Geophysics, Geosystems*, doi: 10.1002/2016GC006514.
5. **Parnell-Turner, R.**, White, N.J., McCave, I. N., Henstock, T.J., Murton, B. J., and Jones, S.m (2015). Architecture of North Atlantic contourite drifts controlled by the Iceland mantle plume. *Geochemistry, Geophysics, Geosystems*, 16, 3414–3435, doi: 10.1002/2015GC005947.
4. **Parnell-Turner, R.**, N. White, T. Henstock, B. Murton, J. MacLennan and S. Jones (2014). A continuous 55-million-year record of transient mantle plume activity, *Nature Geoscience*, 7, 914–919.
3. **Parnell-Turner, R.**, J. R. Cann, D. K. Smith, H. Schouten, D. Yoerger, C. Palmiotto, A. Zheleznov, and H. Bai (2014). Sedimentation Rates Test Models of Oceanic Detachment Faulting, *Geophysical Research Letters*, 41(20) 7080–7088.
2. Smith, D. K, H. Schouten, H. Dick, J. Cann, V. Salters, H. Marschall, F. Ji, D. Yoerger, A. Sanfilippo, **Parnell-Turner, R.**, et al. (2014). Development and evolution of detachment faulting along 50 km of the MAR near 16.5°N, *Geochemistry, Geophysics, Geosystems*, doi: 10.1002/2014GC005563.
1. **Parnell-Turner, R.**, White, N.J., MacLennan, J., Henstock, T.J., Jones, S. and Murton, B. (2013). Crustal manifestations of a hot transient pulse at 60°N beneath the Mid-Atlantic Ridge. *Earth & Planetary Science Letters* 363, 109–120.

## Leadership and Field Experience

- 2023 Co-Chief Scientist, International Ocean Discovery Program Expedition 395, *JOIDES Resolution*, Reykjanes Ridge.
- 2022 Chief Scientist, cruise MGL2214, RV *Marcus G. Langseth*, Cayman Trough.
- 2018 Co-Chief Scientist, cruise AT42-06, RV *Atlantis*, East Pacific Rise, 9°50'N. Hydrothermal vent surveys with autonomous underwater vehicle *Sentry* and human occupied vehicle (HOV) *Alvin*.
- 2018 Scientific observer, HOV *Alvin* dive 5003, Coral seamount (depth 2890 m); 8°20'N Eastern Pacific ocean.
- 2013 Shipboard scientist, cruise KN210-05, RV *Knorr*, Mid-Atlantic Ridge, 16°N. Seafloor imaging using AUV *Sentry*, towed magnetic survey and rock sample dredging
- 2012 Shipboard scientist, cruise AT21-03, RV *Atlantis*, Equatorial Mid-Atlantic Ridge. Deployment of autonomous hydrophone array and seafloor mapping
- 2010 Shipboard scientist, cruise JC50, RRS *James Cook*, Irminger Sea, Atlantic Ocean. Multichannel seismic reflection imaging and bathymetric data acquisition
- 2009 Staff geologist, *Transocean Rother*. Faroe-Shetland Basin, Atlantic Ocean  
Geological representative for BP on semi-submersible rig drilling deep water commercial well.

## Teaching

- 2020– SIO103 'Introduction to Geophysics'. Four-unit undergraduate class; fall (yearly)
- 2020– SIOG221 'Plate Tectonics in Practice'. Four-unit graduate class; spring (alternate years)
- 2023– SIOG200C 'Geophysical Research Skills'. Two-unit graduate class; spring (yearly)

## Advising

### *Graduate Students*

- 2022–23 Evan Phelan, Scripps Institution of Oceanography. *M.S. Co-Advisor*
- 2021– Evan Anderson, Scripps Institution of Oceanography. *Ph.D. Co-Advisor*
- 2019– Jyun-Nai Wu, Scripps Institution of Oceanography. *Ph.D. Advisor*

### *Postdoctoral Scholars*

- 2023– Margaret Morris, Scripps Institution of Oceanography. *Co-Advisor*
- 2020–21 Tim Jones, Scripps Institution of Oceanography. *Co-Advisor*

## Selected Service

### *University of California, San Diego*

- 2021– Associate Director, Institute of Geophysics and Planetary Physics
- 2021– Member, Geoscience Program Advisory Committee, Scripps Institution of Oceanography
- 2019–22 Admissions co-chair, Geophysics graduate program, Scripps Institution of Oceanography

### *Scientific Community*

- 2019– U.S. Chair and representative, InterRidge Steering Committee
- 2019– Member, Ocean Bottom Seismograph Instrument Center Operations Subcommittee
- 2018–21 Member, IODP Science Evaluation Panel
- 2019 Co-Author, *Exploring Earth by Scientific Ocean Drilling: 2050 Science Framework*