

Nicholas J. Montiel

Geologist, Planetary Scientist, and PhD Candidate
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PROFILE

I am a geologist, planetary scientist, and PhD student at the University of Texas Institute for Geophysics and the Jackson School of Geosciences. My research interests encompass geological processes in the mantle, supercontinent cycles on Earth, and the tectonic evolution of terrestrial planets. I also have interests in science communication, education, and scientific art. Currently, I am combining geophysical methods, field methods, and 2D numerical modeling to understand rifted margin evolution and the forces driving continental break-up on Earth as well as testing hypotheses for coronae evolution on Venus. I can be found online [@thepaleomancer](https://www.instagram.com/the_paleomancer) and at <https://deeptime.online>.

PUBLICATIONS & PRESENTATIONS

Montiel, N. J., Masini, E., Lavier, L., & Müntener, O. (2023, pre-print). Mantle Deformation Processes during the Rift-to-Drift Transition at Magma-Poor Margins. *Authorea*. DOI: [10.13140/RG.2.2.33746.02245](https://doi.org/10.13140/RG.2.2.33746.02245)

Montiel, N., Masini, E., Lavier, L., & Müntener, O. (2022, December). Magma-poor rifted margin evolution from rift to drift: a synthesis of numerical modeling and seismic experiments from the Deep Ivory Coast Basin. In *Fall Meeting 2022*. AGU. DOI:10.13140/RG.2.2.24407.14248.

Montiel, N., Massini, E., Lavier, L., & Müntener, O. (2022, May). Characterizing mantle deformation processes during the rift-to-drift transition at magma-poor margins. In *EGU General Assembly Conference Abstracts* (pp. EGU22-13043).

Montiel, N., Lavier, L., Hayman, N. W., & Ball, P. J. (2019, December). Estimating Carbon Flux During Continental Rifting In The Mesozoic And Cenozoic. In *AGU Fall Meeting Abstracts* (Vol. 2019, pp. T33G-0452).

Griffith, C. A., Penteadó, P. F., Turner, J. D., Neish, C. D., Mitri, G., Montiel, N. J., ... & Lopes, R. M. (2019). A corridor of exposed ice-rich bedrock across Titan's tropical region. *Nature Astronomy*, 3(7), 642-648. DOI: [10.1038/s41550-019-0756-5](https://doi.org/10.1038/s41550-019-0756-5).

WORK EXPERIENCE

JPL's Planetary Science Summer School - Summer 2023

I was a Science Objective Lead and Thermal Control Systems engineer on a concept study for a Titan polar orbiter called *THUNDER*. This was part of an internship meant to educate early career scientists on mission concept and design for planetary exploration. I was accountable for science traceability and hypothesis-framing that were answerable to the 2023 Decadal Survey and drove instrument requirements. In addition, I helped design thermal regulation systems for the mission concept.

Athletics Department Tutor Spring 2022

I was a strategy and content tutor for students in the University of Texas Athletics Department. My responsibilities were helping students come up with study plans, develop their reading comprehension and writing skills, and teaching science to ESL students.

Teacher's Assistant, University of Texas at Austin 2019-2021

Courses: Earth Science: Sustainability and Society, Introduction to Geology. I taught Earth Science: Sustainability and Society lab with Dr. Mary Poteet and Dr. Chris Bell as a general education class with a writing flag. This class was an overview of the earth sciences and how they impact our societies. I also taught the lab portion of Introduction to Geology with Dr. Timothy Shanahan, focusing on the basic principles of geology. Since the pandemic was in full swing while I was teaching that, I am intimately familiar with Zoom classrooms.

Undergraduate Teacher's Assistant, University of Arizona 2016-2017

Courses: Introduction to Paleontology, Structural Geology. I assisted Dr. Nan Smith and Dr. Paul Kapp with the paleontology and structural geology labs, respectively. My tasks were interfacing on-on-one with students, prepping lab assignments, and grading.

Telescope Operator, Gerard P. Kuiper Telescope, University of Arizona 2016

Took photometry of exoplanet transits to understand their atmospheres. Project supervised by Dr. Caitlin Griffith.

Undergraduate Research Assistant, Lunar and Planetary Lab, University of Arizona 2015-2017

Used principal components analysis and independent components analysis on Cassini data to identify the spectral signatures of water and organics on Titan to create a compositional map of the tropics. The resultant paper was published in Nature Astronomy. Project was headed by Dr. Caitlin Griffith.

Paid Internship, Organic Geochemistry/Paleoclimatology Lab, University of Arizona 2016-2018

Worked to isolate and analyze GDGTs, FAMEs, and alkenones from leaf waxes in sediment as paleoclimate proxies for surface temperatures and precipitation. The lab was run by Dr. Jessica Tierney, Patrick Murphy, and Paul Zander.

Undergraduate Research Assistant, Mineral Separation Lab, University of Arizona 2016

Worked on U-Pb geochronology on rocks from sedimentary basins in the Puna Plateau with Dr. Barbara Carrapa. EDUCATION

University of Texas at Austin, Austin, TX PhD Student, 2018-Present

Class Highlights: Marine Geology, Marine Tectonics, Marine Geology and Geophysics Field Course, Transitions in the History of Life, Broader Impacts in Science, Python for Geoscientists, Thermodynamics of Petrology

University of Arizona, Tucson, AZ Bachelor of Science, 2018

Major in Geoscience with a Minor in Planetary Science

Class Highlights: Western U.S Cordillera and Orogenic System Field Camp, Regional Structural Geology, Regional Tectonics, Exploration Seismology, and Orogenic Systems, Introduction to MATLAB, Geology and Geophysics of the Planets, Geology of Mars

SKILLS

Numerical Modeling

I have experience in using GeoFLAC and DynEarthSol3D numerical modeling programs to do tectonic and geophysical simulations.

Data Visualization

I am proficient in ParaView, GeoMapApp, and JMARS.

Programming

I have familiarity with Python (Anaconda distribution), MATLAB, and Fortran90 from using GeoFLAC and DynEarthSol3D.

Geological Interpretation

I am proficient in analysis of various types of geological, geophysical, and remote sensing data and in testing numerical model results against real-world observations.

OUTREACH

"Earth Works: Arizona Geology" at El Mirage Library Summer 2022

I was invited to give a public science talk at El Mirage Library in El Mirage, a city in the Phoenix Metropolitan Area. The talk was ~40 minutes long with a question and answer session at the end, during which I gave a 4.5 billion year history of Arizona, evidence for it in the local geology, and why it matters to Arizona residents.