

# NOAH MARTIN

U.S. Citizen

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## SUMMARY

Planetary Science PhD candidate at Purdue University with five years of research experience working at the intersection of science and engineering. Serves on the Mars 2020 Perseverance SuperCam science and engineering operations teams, conducting Martian aeolian research and investigating LIBS spectral interactions with regolith. Develops optical tolerancing and thermal-optical models for the NASA MatISSE-funded OrganiCam instrument using Ansys Zemax OpticStudio. Author of six first-author conference presentations and contributor to two peer-reviewed journal publications. Seeking to apply expertise in spectral instrumentation, optical systems, and mission operations to space-based instrument development.

## EDUCATION

**Purdue University**, West Lafayette, IN

05/2024 – Present

PhD in Planetary Science

Advisor: Roger Wiens

*Wiens Planetary Spectroscopy Lab*

GPA: 4.0/4.0

**Purdue University**, West Lafayette, IN

Class of 2023

Bachelor of Science in Aeronautical and Astronautical Engineering

GPA: 3.52/4.0

*Minor in Earth, Atmospheric, and Planetary Sciences*

## SKILLS AND INTERESTS

**Optical Engineering:** Ansys Zemax OpticStudio (tolerancing, thermal-optical modeling)

**Spectroscopy & Remote Sensing:** LIBS, passive reflectance, Raman, laser-induced luminescence; ENVI, IDL, JMARS

**Programming:** Python (primary), MATLAB, C, Java, IDL

**CAD:** CATIA V5, Autodesk Inventor, AutoCAD

**Interests:** FAA Licensed Private Pilot, Astronomy on Tap, EAPS Graduate Student Association

## WORK EXPERIENCE

**Graduate Research Assistant** – Purdue University

May 2024 – Present

*Dr. Roger Wiens Planetary Spectroscopy Laboratory*

- Investigate Martian aeolian bedforms using SuperCam multi-modal data (LIBS, passive reflectance, Raman) on Mars 2020 Perseverance, with a focus on wind-driven sediment transport processes in Jezero crater.
- Co-led an aeolian campaign to investigate the Kerllaguna and Hazeyview megaripples outside of Jezero crater, Mars.
- Analyze Laser Induced Breakdown Spectroscopy (LIBS) spectral variation and acoustic response in regolith samples to characterize grain size effects on elemental quantification accuracy.
- Operate as an engineering Payload Uplink Lead (ePUL), engineering Payload Downlink Lead (ePDL), and science Payload Uplink Lead (sPUL) for SuperCam on Mars 2020 Perseverance, supporting daily mission planning and instrument commanding since May 2022.
- Develop optical tolerancing and thermal-optical performance models for the OrganiCam instrument (Raman/laser-induced luminescence) using Ansys Zemax OpticStudio, supporting optical verification across Mars thermal environments.

**Space Data Science & Systems Post-Bachelor Student** – Los Alamos National Laboratory

May 2023 – May 2024

- Extended characterization of regolith physical property effects on SuperCam LIBS spectra and acoustic signals, developing quantitative analysis methods for grain size determination from laser-induced plasma diagnostics.
- Presented first-author research poster at the 2024 Lunar and Planetary Science Conference (LPSC).

## WORK EXPERIENCE (CONT'D)

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**Planetary Science Undergraduate Research Assistant** – Purdue University January 2023 – May 2023

- Investigated the relationship between SuperCam microphone audio signals and regolith physical properties, identifying acoustic signatures indicative of grain size variation.
- Analyzed SuperCam LIBS spectra on regolith targets to identify adverse spectral effects driven by regolith properties; results contributed to a 2024 peer-reviewed publication in *Spectrochimica Acta Part B*.
- Presented first-author research poster at the 2023 Lunar and Planetary Science Conference (LPSC).

**Space Data Science & Systems Intern** – Los Alamos National Laboratory May 2022 – May 2023

- Analyzed audio datasets from the SuperCam instrument's microphone on Mars, investigating acoustic signatures of laser-induced plasma interactions with geological targets across multiple surface types.
- Awarded First Place Poster at the 2022 Los Alamos National Laboratory Student Symposium.

**Composite Manufacturing Undergraduate Research Assistant** – Purdue University August 2021 – May 2022

- Measured material permeability of composite preforms through experimental flow testing and analytical calculation to support cure process modeling.
- Applied Vacuum Assisted Resin Transfer Molding (VARTM) techniques in fabrication experiments to validate permeability measurements.
- Performed basic fluid flow simulation in STAR-CCM+ Computational Fluid Dynamics software to model resin infusion behavior.

**Summer Undergraduate Research Fellowship (SURF)** – Purdue University May 2021 – August 2021

- Characterized composite preform permeability using experimental measurement and analytical methods as part of a funded undergraduate research fellowship.
- Surveyed machine learning regression techniques applicable to permeability prediction from fiber architecture parameters, producing a literature summary for future model development.
- Published "Permeability Characterization and Machine Learning" in the Purdue 2021 SURF Symposium booklet.
- Presented research at the 2021 Virtual SURF Symposium.

## TEACHING AND MENTORING EXPERIENCE

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**Graduate Teaching Assistant (Instructor of Record)** – Purdue University EAPS July 2026

- Directed the comprehensive end-to-end execution of a 25-student undergraduate course, EAPS 105: The Planets, including syllabus creation and delivery.
- Managed overall course administration, including grading, office hours, and student performance tracking.
- Compressed a 16-week course into a 4-week long summer course.

**STEM Professional Pen Pal** – Letters to a Pre-Scientist Organization September 2025 – May 2026

- Wrote science-focused letters to a middle-school student as a "STEM professional" through the LPS program to spark their interest in a future STEM career.
- Wrote a total of 4 letters over the course of a school year focused on introducing the student to the daily life of a planetary scientist/PhD student.

**Graduate Teaching Assistant** – Purdue University EAPS August 2025 – December 2025

- Led laboratory sessions for EAPS 243: Mineralogy.
- Created presentations to engage students and graded laboratory exams and weekly laboratory assignments.
- Assisted students in the scientific learning process during weekly laboratory sessions and office hours.

**Review Board Member for AAE 450 (Spacecraft Design)** – Purdue University AAE December 2025 and May 2026

- Invited member of the review board for mock Critical Design Review.
- Provided feedback on student-led designs for Titan lake-based lander mission proposals, Enceladus lander mission proposals, Mars helicopter mission proposals, and orbital debris removal proposals.

## TEACHING AND MENTORING EXPERIENCE (CONT'D)

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### Guest Lecturer in AAE 450 (Spacecraft Design) – Purdue University AAE

October 2025 and March 2026

- Delivered invited lecture on spacecraft instrumentation for planetary science, covering analytical techniques (LIBS, Raman, spectroscopy), relevant mission applications, and the engineering design process for flight instruments.

### Guest Lecturer in AAE 590 (Space Flight Operations) – Purdue University AAE

December 2025

- Delivered invited lecture on day-to-day Mars 2020 Perseverance Rover operations, covering mission goals, planning methods, instrument operator roles, and firsthand experience as an ePUL/ePDL/sPUL.

## LEADERSHIP POSITIONS

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### Astronomy on Tap Lead Organizer

August 2024 – Present

- Lead organizer for the Purdue chapter of Astronomy on Tap, coordinating monthly public science communication events that give Purdue researchers opportunities to present their work to general audiences.

### EAPS Graduate Student Association Social Committee

August 2025 – Present

- Organize social events for the EAPS Graduate Student Association, fostering community among graduate students across Earth, Atmospheric, and Planetary Sciences.

### Spacecraft Design Team Project Manager

January 2023 – May 2023

- Elected by fellow team members to the position of Project Manager at the beginning of the Spring 2023 semester.
- Led spacecraft design team to complete a mission design architecture for the human exploration of the surface of Mars.
- Facilitated twice-weekly cross-team meetings to coordinate progress and assign deliverables across engineering sub-teams.
- Presented key team updates to the teaching staff and peers in bi-weekly presentations.
- Created and presented a mid-semester design review to the teaching staff and peers.
- Orchestrated the creation of a final technical document detailing the mission design architecture developed by the team.
- Produced and presented a final design review to the teaching staff, peers, and a board of reviewers.

### Purdue AAE Student Ambassador

August 2022 – May 2023

- Selected to represent the school of Aeronautics and Astronautics to serve as a tour guide to prospective students and faculty.
- Presented key information about the school of Aeronautics and Astronautics to prospective and first-year engineering students.

### Purdue Pilots Incorporated Treasurer

January 2023 – May 2023

- Tracked finances and created a budget for Purdue Pilots Incorporated student organization.
- Worked with Purdue Aviation, LLC to track Purdue Pilots Incorporated rental income and fuel expenses.
- Worked with Purdue Pilots Incorporated maintenance officer to plan for necessary aircraft maintenance.

## PUBLICATIONS

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A. Cousin, P.-Y. Meslin, O. Forni, O. Beyssac, E. Clavé, E. Hausrath, P. Beck, E. Dehouck, S. Schröder, T. Fouchet, C. Bedford, J. Johnson, P. Pilleri, J. Lasue, O. Gasnault, **N. Martin**, B. Chide, A. Udry, R. Sullivan, A. Vaughan, I. Poblacion, G. Arana, J.M. Madariaga, S. Clegg, S. Maurice, R.C. Wiens. (2025). "Soil diversity at Jezero crater and Comparison to Gale crater, Mars." *Icarus*, 425. <https://doi.org/10.1016/j.icarus.2024.116299>

H. T. Manelski, R. C. Wiens, B. Bousquet, P. B. Hansen, S. Schröder, S. Clegg, **N. D. Martin**, A. E. Nelson, R. K. Martinez, A. M. Ollila, A. Cousin. (2024). "LIBS Plasma Diagnostics with SuperCam on Mars: Implications for Quantification of Elemental Abundances." *Spectrochimica Acta Part B: Atomic Spectroscopy*, 222. <https://doi.org/10.1016/j.sab.2024.107061>

Elenchezian, M., Enos, R., **Martin, N.**, et. al., "Cure Process Modeling and Characterization of Composites Using In-Situ Dielectric and Fiber Optic Sensor Monitoring," Proceedings Paper at CAMX – The Composites and Advanced Materials Expo, Anaheim, CA, October 2022.

## CONFERENCE ABSTRACTS

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**N. D. Martin**, C. C. Bedford, G. McDonald, J. Johnson, E. Caradelli, G. Martínez, C. Newman, C. Donaldson, M. Rice, A. Vaughan, R. Lorenz, A. Cousin, L. Mandon, A. Stott, B. Chide, R. Hueso, A. Munguira, A. Vincente-Retortillo, M. Deahn, R. C. Wiens, “Overview and SuperCam Results of the Kerlaguna Megaripples on the Rim of Jezero Crater, Mars,” Lunar and Planetary Science Conference, The Woodlands, TX, March 2026.

**N. D. Martin**, R. C. Wiens, P. J. Gasda, C. J. Puckett, L. A. Ott, R. T. Newell, A. Zandanel, A. Huynh, A. Nelson, R. Scobie, J. Williams, J. P. Martinez, M. Caffrey, J. Michel, M. Cecil, C. Legett, A. K. Misra, T. Acosta-Maeda, “OrganiCam: A compact time-resolved luminescence imager and Raman spectrometer for planetary exploration,” The Great Scientific Exchange (SciX), Covington, KY, October 2025.

**N. D. Martin**, S. Clegg, R. Martinez, E. Dauson, R. C. Wiens, B. Chide, A. Cousin, U. Wolf, A. Ollila, “Grain Sizing of Regolith Using LIBS Acoustics,” The Great Scientific Exchange (SciX), Covington, KY, October 2025.

**N. D. Martin**, R. C. Wiens, P. J. Gasda, C. J. Puckett, L. A. Ott, R. T. Newell, A. Zandanel, A. Huynh, A. Nelson, R. Scobie, J. Williams, J. P. Martinez, M. Caffrey, J. Michel, M. Cecil, C. Legett, A. K. Misra, T. Acosta-Maeda, “Optical Performance of OrganiCam, a Laser-Induced Luminescence Remote Instrument for Planetary Exploration,” International Workshop on Instrumentation for Planetary Missions – 6, Boulder, CO, August 2025.

**N. D. Martin**, S. Clegg, R. Martinez, E. Dauson, R. C. Wiens, B. Chide, A. Cousin, U. Wolf, A. Ollila, “Grain Sizing of Soils Using LIBS Acoustics,” Lunar and Planetary Science Conference, The Woodlands, TX, March 2025.

**N. D. Martin**, H. T. Manelski, R. C. Wiens, S. Clegg, P. B. Hansen, S. Schröder, B. Chide, “LIBS Peak Broadening in Soils on Mars,” Lunar and Planetary Science Conference, The Woodlands, TX, March 2024.

**N. D. Martin**, B. Chide, A. Sheridan, A. Cousin, E. M. Hausrath, O. Beyssac, R. C. Wiens, N. Lanza, “Acoustic and LIBS Profiling of Soils at Jezero Crater, Mars,” Lunar and Planetary Science Conference, The Woodlands, TX, March 2023.

**N. D. Martin**, “Geology on Mars with the SuperCam Microphone,” Los Alamos National Laboratory Summer Student Symposium, Los Alamos, NM, August 2022.

**N. D. Martin**, R. Enos, D. Zhang, “Permeability Characterization and Machine Learning,” Presentation and Proceedings Paper at Purdue Summer Undergraduate Research Symposium, West Lafayette, IN, August 2021.

H. T. Manelski, R. C. Wiens, B. Bousquet, P. B. Hansen, S. Schröder, S. Clegg, **N. D. Martin**, A. E. Nelson, R. K. Martinez, A. M. Ollila, A. Cousin, “LIBS Plasma Diagnostics with SuperCam on Mars: Implications for Quantification of Elemental Abundances,” The Great Scientific Exchange (SciX), Covington, KY, October 2025.

R. C. Wiens, S. Maurice, S. M. Clegg, A. Cousin, A. Ollila, R. Anderson, T. Gabriel, O. Beyssac, C. Bedford, E. Clave, S. Connell, H. Manelski, U. Wolf, **N. D. Martin**, B. Chide, O. Forni, A. Udry, O. Gasnault, S. Schroeder, J. Madariaga, J. Johnson, “Overview of First Four Years on Mars with SuperCam’s Remote LIBS and Co-Boresighted Techniques,” The Great Scientific Exchange (SciX), Covington, KY, October 2025.

A. Zandanel, P. J. Gasda, L. A. Ott, A. P. Huynh, C. J. Puckett, A. L. Nelson, R. H. Scobie, J. V. Williams, J. P. Martinez, M. P. Caffrey, J. M. Michel, M. A. Cecil, R. T. Newell, **N. D. Martin**, C. Legett, A. K. Misra, T. Acosta-Maeda, R. C. Wiens, “Organic Detection and Critical Mineral Identification with OrganiCam,” Lunar and Planetary Science Conference, The Woodlands, TX, March 2025.

H. T. Manelski, R. C. Wiens, S. Schröder, P. B. Hansen, B. Bousquet, **N. D. Martin**, S. Clegg, “LIBS Plasma Diagnostics with SuperCam on Mars,” Lunar and Planetary Science Conference, The Woodlands, TX, March 2024.

A. Cousin, O. Beyssac, O. Forni, P. Y. Meslin, **N. D. Martin**, B. Chide, E. M. Hausrath, R. Sullivan, F. Poulet, E. Dehouck, J. Lasue, S. Schröder, O. Gasnault, P. Pilleri, R. C. Wiens, S. Maurice, “Soil Diversity on Mars: Comparison Between Gale and Jezero Craters,” Lunar and Planetary Science Conference, The Woodlands, TX, March 2023.

## CONFERENCE ABSTRACTS (CONT'D)

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M. Elenchezian, R. Enos, **N. D. Martin**, et. al., "Cure Process Modeling and Characterization of Composites Using In-Situ Dielectric and Fiber Optic Sensor Monitoring," The Composites and Advanced Materials Expo, Anaheim, CA, October 2022.

## AWARDS

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H. Jay Melosh Planetary Conference Award, Purdue University (2025)

*NASA Group Achievement Award*, Mars 2020 Jezero Western Fan & Margin Units Team (2024)

Los Alamos National Laboratory Student Symposium First Place Poster (August 2022)

John F. and Edith L. Wilsterman Scholarship Trust (March 2019 – May 2023)