# Gabriel Nathan

PhD, Planetary Scientist · US Citizen

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## Professional Appointments

**Postdoctoral Fellow, NASA Postdoctoral Program (NPP)** — *La Cañada Flintridge, CA, USA*
NASA Jet Propulsion Laboratory (JPL) — *2026 - present*
- Advisor: Dr. Amy Hofmann

## Education

**Michigan State University** — *East Lansing, MI, USA*
PhD Earth & Environmental Science — *2020 - 2025*
- Advisor: Dr. Seth A. Jacobson

**Northwestern University** — *Evanston, IL, USA*
MS Earth & Planetary Science — *2018 - 2020*
- Advisor: Dr. Seth A. Jacobson
- Advisor: Dr. Steve Jacobsen

**University of Chicago** — *Chicago, IL, USA*
BA Philosophy & Allied Fields — *2012 - 2016*
- Allied field: Physics

## Awards, Fellowships, & Grants

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| 2023 - 26 | **Future Investigators in NASA Earth & Space Science & Technology**, NASA | *$ 150,000* |
| 2022 - 23 | **Graduate Fellowship**, Michigan Space Grant Consortium (NASA) | *$ 5,000* |
| 2021 - 22 | **Graduate Fellowship**, Michigan Space Grant Consortium (NASA) | *$ 5,000* |
| 2021 - 22 | **Neal Research and Scholarship Award**, Michigan State University | *$ 2,000* |
| 2012 - 16 | **University Scholar**, University of Chicago | *$ 20,000* |
| | **Dean's List**, University of Chicago | |
| 2012 | **National Merit Scholar Award**, National Merit Scholarship Corporation | *$2,500* |

## Publications

**Nathan, G.**, & Jacobson, S. A. (*In rev.*). Stable Fe isotope fractionation during multi-stage core formation

Dale, K. I., ... **Nathan, G.**, ... Rubie, D. C. (*In rev.*). Oxidation Constraints on Terrestrial Planet Formation from a Ring

**Nathan, G.**, Nguyen, H. D. & Jacobson, S. A. (*In prep.*). Building the Earth from varying accretion scenarios

Rubie, D.C., Dale, K.I., **Nathan,G.**...Morbidelli, A. (2025). Tungsten isotope evolution during Earth's formation and new constraints on the viability of accretion simulations. EPSL

Dale, K. I., ... **Nathan, G.**, ... Morbidelli, A. (2023). An improved model of metal/silicate differentiation during Earth's accretion. Icarus, 406, 115739

**Nathan, G**, Rubie, D. C., & Jacobson, S. A. (2023). Constraining the origin of Mars with simulations of multi-stage core formation. Icarus, 401, 115596.

## Presentations

**Nathan, G**., Jacobson, S.A., (March 2025)."Tin Delivery and Isotopic Fractionation During Accretion and Differentiation of the Early Earth". Poster: Lunar and Planetary Science Conference, Woodlands, TX, USA

**Nathan, G**., Nguyen, H.D., Jacobson, S.A., (March 2025)."Varying Solar System Formation Scenarios Successfully Build Earth if Initial Accreted Material Is Reduced and Later Accreted Material Is Oxidized". Poster: Lunar and Planetary Science Conference, Woodlands, TX, USA

Nguyen, H.D., **Nathan, G**., Jacobson, S.A., (March 2025)."Oxidation State Gradient in the Protoplanetary Disk: Piecewise or Smooth". Poster: Lunar and Planetary Science Conference, Woodlands, TX, USA

**Nathan, G**., Nguyen, H.D., Jacobson, S.A., (August 2024)."Solar System formation scenarios' effect on ideal redox state of disk needed to produce Earth". Talk: Goldschmidt Conference, Chicago IL, USA

**Nathan, G**. Nguyen, H.D., Jacobson, S.A., (May 2024)."Solar System formation scenarios' effect on ideal redox state of disk needed to produce Earth". Poster Presentation: Earth and Planetary Origins Conference, Paris, FR

**Nathan, G**. (February 2024)."Meteorite types and classifications". Lecture for Facility for Rare Isotope Beams seminar, Michigan State University, Lansing, MI, USA

**Nathan, G**. &, Jacobson, S.A., (December 2023)."Delivery and fractionation of vanadium isotopes during multi-stage terrestrial core formation". Poster Presentation: American Geophysical Union, San Francisco CA, USA

**Nathan, G**., (May 2023)."Stable and Radiogenic Isotopic Fractionation During Multi-Stage Core Formation". Oral Presentation: Geological Society of America North Central Section, Grand Rapids, MI, USA

**Nathan, G**., (October 2022)"Stable and Radiogenic Isotopic Fractionation During Multi-Stage Core Formation". Type: Michigan Space Grant Consortium Fall Conference, Ann Arbor, MI, USA

**Nathan, G**., (September 2022)."Stable and Radiogenic Isotopic Fractionation During Multi-Stage Core Formation". Oral Presentation: fO2 School Trieste, IT

**Nathan, G**., (March 2022)."Fe Isotopic Fractionation due to Metal-Silicate Equilibration during Core Formation". Poster Presentation: Lunar and Planetary Science Conference, Houston, TX, USA

**Nathan, G**., (December 2019)."Multi-Stage Core Formation of Mars". Poster Presentation: American Geophysical Union, San Francisco

**Nathan, G**., (December 2019)."Multi-Stage Core Formation of Mars". Oral Presentation: Lake Michigan Exoplanet and Planet Formation Conference, Chicago, IL, USA

## Research Experience

**Observatoire de la Cote d'Azur** *Nice, FR, USA*

Advisor: Dr. Alessandro Morbidelli *May-July 2024*

- Visiting Researcher: HolyEarth Project
- Modeled delivery of molybdenum to early accreting Earth

**Michigan State University - Dept of Earth & Environmental Sciences** *East Lansing, Michigan, USA*
Advisor: Dr. Seth A. Jacobson *Aug. 2020 - Present*

- Resarch Assistant: Jacobson Planetary Physics & Chemistry Research Group
- Built numerical N-body simulations of Solar System formation and terrestrial planet differentiation
- Used super computing clusters to reconcile dynamical histories and chemical compositions of planetary bodies

**Northwestern University - Dept of Earth & Planetary Sciences** *Evanston, Illinois, USA*
Advisors: Dr. Seth A. Jacobson, Dr. Steve Jacobsen *2018-2020*

- Resarch Assistant: Jacobson Planetary Group
- Thesis: "Multi-stage core formation of Mars"
- Resarch Assistant: Jacobsen Mineral Physics Research Group
- Investigated meteorite and Solar System evolution using Raman Spectroscopy and FTIR

**University of Chicago - Dept of Physics** *Chicago, Illinois, USA*
Advisor: Dr. Henry Frisch *2016 - 2017*

- Lab assistant: Large Area Picosecond Photo Detector (LAPPD) Lab
- Designed circuits to monitor lab projects

**University of Chicago - Dept of Geophysical Sciences** *Chicago, Illinois, USA*
Advisor: Dr. Edwin Kite *2015*

- Lab assistant: Solar System and Exoplanet Habitability Lab
- Prepared ArcGIS image mapping of Mars' surface from Mars Reconnaisance Orbiter

## Teaching Experience

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| 2021 | **ISP 203L: Geology of the Human Environment**, Teaching Assistant | *MSU* |
| 2019 | **Earth 101: Earth Science for the 21st Century**, Teaching Assistant | *NU* |

## Mentoring

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| 2023-2026 | **Hung D. Nguyen**, Professorial Assistantship, Michigan State | |
| 2022 | **Scarlett Abreu**, GeoCaFES Research summer intern, Michigan State | |

## Workshops

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| Sept 2024 | **fO2 School, Trieste**, Participant | *Trieste, IT* |
| July 2022 | **Cooperative Institute for Dynamic Earth Research (CIDER), UC Berkeley**, | *Berkeley, CA* |

## Service & Outreach

### Internal Service

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| 2020-2022 | **Earth & Environmental Sciences Graduate Student Organization**, Secretary | *MSU* |

### Service to the Field

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| 2023 | **Division of Dynamical Astronomy (DDA) Meeting**, Local Committee Member | *MSU* |

### Outreach & Engagement with the Public

**Astronomy On Tap**, (October 2022) Delivered original public lecture on Apollo missions, lunar science research and future lunar exploration. Lansing, MI

**Astronomy On Tap**, (July 2020) Delivered original public lecture on terrestrial accretion science
Online presentation

**Northwestern One Book Day of Outreach**, (October 2019) Planned and wrote original activity to teach students about Lunar cratering history for campus event to celebrate lunar history and space exploration Evanston, IL