# Yishen Zhang

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## EDUCATION

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|---|---|
| 2019–2024 | Ph.D. in Geology — KU Leuven, Leuven, Belgium |
| 2018–2019 | Visiting Scholar — University of Liège, Liège, Belgium |
| 2016–2019 | M.Sc. in Geology — China University of Geosciences (Beijing), China |
| 2012–2016 | B.Sc. in Geology — China University of Geosciences (Beijing), China |

## ACADEMIC APPOINTMENTS

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| 2024- | CLEVER Planet Postdoctoral Associate, Department of Earth, Environmental and Planetary Sciences, Rice University |
| 2019–2024 | Teaching Assistant, Department of Earth and Environmental Sciences, KU Leuven, Belgium |

## GENERAL RESEARCH INTERESTS

My research is rooted in igneous petrology, and I am broadly interested in the physical and chemical processes that govern interior evolution, volcanic activity, and magmatic differentiation on Earth and other rocky planets. I focus particularly on 1) mantle melting, differentiation and volatile evolution in the context of large-scale mantle heterogeneity, 2) the growth habits of crystals and their response to magmatic dynamics, and 3) the mechanisms of metal enrichment in magmatic ore-forming systems.

To carry out my research, I integrate geochemical datasets, experimental petrology, field observations, thermodynamics, computational modelling, and geophysical constraints to quantitatively interrogate natural samples and experimental products in a multidisciplinary framework

## GRANTS & FELLOWSHIPS

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| 2026–2028 | IPD–STEMA Postdoctoral Fellowship, Exoplanet Geology, University of Liège, Belgium (€82k) |
| 2023–2024 | ECR Postdoctoral Fellowship, Diffusion in olivine, University of Münster, Germany (declined, €30k) |
| 2020 | Europlanet Transnational Access Grant, ion probe at CRPG Nancy, France |

## TEACHING

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| 2025 | Cosmochemistry — Guest lecturer, Rice University |
| 2024 | Igneous Petrology — Guest lecturer, Rice University |
| 2022 | Soil Science & Geology (practical), KU Leuven |
| 2021 | Soil Science & Geology (practical), KU Leuven |

## PUBLICATIONS

**Peer-reviewed journal publications (15 total; 5 first-author, 1 equal-contribution as second author)**

2026

1. Bai Y, Su BX, Xiao Y, He YS, **Zhang Y**, Charlier B (2026). Magnesium isotopes constraint on the origin of stratiform chromitite. *Accepted in Mineralium Deposita*.

2025

2. **Zhang Y**, Dasgupta R, Ji D, Lee C.T., Peng Y, Charlier B, Jin Z, Chen J, Namur O. (2025). Mantle melting conditions of mare lavas on South Pole–Aitken basin of lunar farside. *Geophysical Research Letters 52, e2024GL112418*.
3. Saracino F, Charlier B, **Zhang Y**, Lécaille M, Lin Y, Namur O. (2025). The role of sulfur on the liquidus temperature and olivine–orthopyroxene equilibria in highly reduced magmas. *Chemical Geology, 683, 122777*.
4. Jin Z, Hou T, Zhu M.H., **Zhang Y**, Namur O. (2025). Late-stage microstructures in Chang'E-5 basalt and implications for the evolution of lunar ferrobasalt. *American Mineralogist, 110(4), pp.560-569.*
5. Li W, Shorttle O, Maclennan J, Matthews S, **Zhang Y**, Namur O, Soderman C, Geist D. (2025). Taking the temperature of ocean islands: a petrological approach. *Journal of Petrology, 66(5), egaf033*.

2024

6. **Zhang Y**, Charlier B, Krein S.B., Grove T.L., Namur O, Holtz F. (2024). The very late-stage crystallization of the lunar magma ocean and the composition of immiscible urKREEP. *Earth and Planetary Science Letters 646, 118989*.
7. Jin Z, **Zhang Y**, Bose M, Glynn S, Couffignal F. (2024). Petrogenesis of Erg Chech 002 Achondrite and Implications for an Altered Magma Ocean. *The Astrophysical Journal 965(1), 24*.
8. Xu Y, Lin Y, Wu P, Namur O, **Zhang Y**, Charlier B. (2024). A diamond-bearing core–mantle boundary on Mercury. *Nature Communications 15(1), 5061*.
9. Dekoninck A, de Putter T, Ruffet G, Mees F, **Zhang Y**, Namur O, Kapoma J. (2024). Depositional setting and hydrothermal alteration of Paleoproterozoic manganiferous metasedimentary rocks in the Ampanihy district (Southern Madagascar). *Journal of Geochemical Exploration, 107579*.

2023

10. **Zhang Y**, Namur O, Li W, Shorttle O, Gazel E, Jennings E.S., Thy P, Grove T.L., Charlier B. (2023). An extended calibration of the olivine–spinel aluminum exchange thermometer: Application to the melting conditions and mantle lithologies of large igneous provinces. *Journal of Petrology 64(11), egad077*.
11. **Zhang Y**, Namur O, Charlier B. (2023). Experimental study of high-Ti and low-Ti basalts: liquid lines of descent and silicate liquid immiscibility in large igneous provinces. *Contributions to Mineralogy and Petrology 178(1): 1–24*.
12. Pirotte H, Cartier C, Pommier A, Namur O, **Zhang Y**, Berndt J, Klemme S, Charlier B. (2023). Internal differentiation and volatile budget of Mercury inferred from trace element partitioning experiments at highly reduced conditions. *Icarus 115699*.
13. Vlieghe M., Rochez G., Pire-Stevenne S., Storme J.Y., Dekoninck A., Vanbrabant Y., Namur O., **Zhang Y**, Van Ham-Meert A., Donnadieu J.P., Berbigé M. (2023). Ni-rich mineral nepouite explains the exceptional green color of speleothems. *Scientific Reports 13(1), 15017*.

2022

14. Dekoninck A., Rufet G., Baptiste J., Wyns R., Philippo S., **Zhang Y**, Namur O. (2022). Petrogenesis and $^{40}Ar/^{39}Ar$ dating of epithermal romanechite from the subaerial fault-related Romanèche Mn deposit (France). *Chemical Geology 121280*.

2018

15. **Zhang Y**, Hou T, Veksler I.V., Lesher C.E., Namur O. (2018). Phase equilibria and geochemical constraints on the petrogenesis of high-Ti picrite from the Paleogene East Greenland flood basalt province. *Lithos 300–301, 20–32*.

**Manuscripts under review & in revision**

1. **Zhang Y**, Dasgupta R. (under review in *Geochimica et Cosmochimica Acta*). The effects of sulfur on near-liquidus phase relations of highly reduced mafic silicate melts with implications on magmatism in Mercury.
2. Lee CT, Zhang J, Keller D, **Zhang Y**, Ji D, Mou J, (under review in *Lithos*).The enigma of silicic magmatism and the missing cumulates: extreme magmatic differentiation without low melt fractions.
3. Saracino F., Charlier B., **Zhang Y**, Namur O. (under review in *AGC*). Crystallization of Mercury's magma ocean and the formation of its primordial mantle structure.
4. Kat Shepherd, Namur O., Neave D., **Zhang Y**, van Gerve T., van Acker T., van Helden T., Vanhaecke F., Klemme S., Berndt-Gerdes J., Charlier B. (under review in *Volcanica*). Insights into the magma plumbing system architecture beneath an off-ridge ocean island (Terceira, Azores) from crystal zoning.

## CONFERENCE ABSTRACTS

1. **Zhang Y**, Dasgupta R. (2025). Effects of sulfur on phase stability and melt generation in highly reduced planetary interiors. *AGU 2025* — poster.
2. **Zhang Y**, Dasgupta R., Ji D., Lee C.T., Peng Y., Charlier B., Jin Z., Chen J., Namur O. (2025). Mantle melting conditions of South Pole–Aitken basin of lunar farside. *56th Lunar and Planetary Science Conference* — oral.
3. **Zhang Y**, Namur O., Hakim K., Dasgupta R., Shorttle O. (2024). Forming Mercury-analog exoplanets in the solar neighborhood. *Goldschmidt 2024, Chicago* — poster; *Geologica Belgica 2024, Liège* — oral.
4. **Zhang Y**, Charlier B., Grove T.L., Brown S.M., Namur O., Holtz F. (2024). The very late-stage crystallization of the lunar magma ocean and the composition of immiscible urKREEP. *Rocky Worlds III, Zürich* — poster.
5. **Zhang Y**, Namur O., Charlier B. (2023). Magmatic differentiation and silicate liquid immiscibility in large igneous province. *EMPG-XVIII 2023* — oral.
6. **Zhang Y**, Namur O., Charlier B., Holness M.B. (2023). A general model for olivine growth rate and morphology. *Goldschmidt 2023* — poster.
7. Namur O., Tosi N., Shorttle O., Cartier C., Lin Y., **Zhang Y**, Saracino F., Liado L., Pirotte H., Charlier B. (2023). Mercury's mantle as constrained by its crust. *Goldschmidt 2023* — keynote talk.
8. Saracino F., Charlier B., **Zhang Y**, Namur O. (2023). The role of sulfur on liquidus temperature and olivine–orthopyroxene equilibria in highly reduced magmas. *Goldschmidt 2023* — poster.
9. Pirotte H., Cartier C., Pommier A., Namur O., **Zhang Y**, Berndt J., Klemme S., Charlier B. (2023). Investigating Mercury's internal structure and volatile budget using trace element partitioning experiments. *Goldschmidt 2023* — poster.
10. Shepherd K., Namur O., Bachmann O., **Zhang Y**, Hendrickx T., Charlier B. (2022). Timescales and petrological processes in an area of plume–ridge interaction: Insights from the islands of Terceira and Flores, Azores. *AGU 2022* — oral.
11. **Zhang Y**, Namur O., Charlier B., Li W., Shorttle O., Gazel E., Jennings E.S., Thy P., Grove T.L. (2022). A re-evaluation of Al-in-Olivine geothermometer. *Goldschmidt 2022* — oral.
12. **Zhang Y**, Namur O., Charlier B. (2020). Experimental liquid lines of descent and silicate liquid immiscibility for low-Ti and high-Ti basalts of the Emeishan Large Igneous Province, SW China. *AGU 2021* — poster.
13. **Zhang Y**, Namur O., Charlier B. (2020). Experimental liquid lines of descent for low-Ti and high-Ti basalts of

the Emeishan Large Igneous Province, SW China. *EMPG-XVII 2020* — poster.

14. **Zhang Y**, Hou T., Veksler I.V., Lesher C.E., Namur O. (2018). Phase equilibria and geochemical constraints on the petrogenesis of high-Ti picrite from the Paleogene East Greenland flood basalt province. *Goldschmidt 2018* — oral.

## INVITED TALKS

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| 2026 | University of Washington, Petrolunch talk |
| 2025 | Brown University, Geochemistry, Mineralogy, and Petrology "Lunch Bunch" series |
| 2025 | University College London |
| 2025 | The University of Hong Kong |
| 2024 | RiMG Workshop — *Exoplanets: Compositions, Mineralogy, Evolution*, keynote talk (with O. Shorttle) |
| 2024 | Earth and Environmental Sciences, University of Manchester (with O. Namur and T. van Gerve) |
| 2023 | Guangzhou Institute of Geochemistry, Chinese Academy of Sciences |
| 2023 | Department of Physics and Astronomy, KU Leuven (with O. Namur, B. Charlier, C. Cartier, et al.) |
| 2023 | Goldschmidt Conference — keynote talk (with O. Namur, N. Tosi, O. Shorttle, C. Cartier, Y. Lin, et al.) |

## PRACTICAL AND ANALYTICAL PROFICIENCY

- Experimental petrology: Extensive experience with high-temperature and high-pressure experiments, including >300 runs in 1 atm gas-mixing furnaces (high- to low-temperature and kinetic cooling experiments) and piston-cylinder experiments at 1–2 GPa (half-inch assemblies, capsule and assemblage preparation)
- Electron microprobe analysis (EPMA): >1000 hours of operation, including instrument calibration, analytical method development, high-precision measurements, and quantitative compositional mapping
- Scanning electron microscopy (SEM): Backscattered- and secondary-electron imaging for textural and microstructural characterization
- X-ray tomography (nanotom system): Three-dimensional scanning of geomaterials and subsequent data reconstruction and processing
- NanoSIMS: Analytical experience including mapping-based trace element analysis and data reduction
- LA-ICP-MS: Trace-element data reduction and interpretation
- Raman spectroscopy: Spectral acquisition, baseline correction, calibration, and compositional interpretation

## COMPUTER SKILLS

- Python: package development, numerical modelling, data analysis, and multivariate statistics (including PCA)
- MATLAB: numerical modelling and data analysis
- Shell scripting, Julia, and web development (Django framework, HTML, CSS); regular Vim user
- Thermodynamic modelling software: `alphaMELTS` family, MAGEMin, PerpleX
- Scientific writing and typesetting: Word, LaTeX, Overleaf
- Figure preparation and media editing: Adobe Illustrator, Photoshop, Premiere

## FIELD WORK EXPERIENCE

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| 2023 | Eifel volcano, Germany — 2 days |
| 2022 | Fogo volcano, Cape Verde — 1 week |
| 2018 | Changbai Mountain, Tianchi volcano, North China — 2 weeks |
| 2018 | Tengchong volcano, Yunnan, China — 2 weeks |
| 2018 | Emeishan Province, China — 2 weeks |
| 2018 | Yaojiazhuang complex, Zhangjiakou, North China — 1 week |
| 2014 | Akesu, Xinjiang, China — gold deposits, 3 weeks |
| 2013 | Zhoukoudian, China — field mapping course, 4 weeks |
| 2012 | Beidaihe, China — excursion, 3 weeks |

## RESEARCH VISITS

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| 2025 | University of Texas at Austin — 2 days, microprobe analysis |
| 2025 | University of Cambridge — 1 day, research discussion |
| 2024 | University of Cambridge — 2 days, research discussion |
| 2024 | German Aerospace Center (DLR) — 3 days, ESA BepiColombo Mercury mission workshop |
| 2024 | ETH Zürich — 1 week, conference and laboratory visit |
| 2024 | University of Lausanne — 1 week, ion probe workshop |
| 2023 | Royal Observatory of Belgium — 2 days, research discussion |
| 2023 | Open University — 2 weeks, NanoSIMS analysis session |
| 2019–2020 | University of Münster — 3 weeks, microprobe analysis |
| 2019–2020 | University of Hannover — 1 week, microprobe analysis |

## CURRENT & RECENT COLLABORATORS

- *Rajdeep Dasgupta*, Rice University
- *Cin-Ty Lee*, Rice University
- *Bijaya Karki*, Louisiana State University
- *Anne Pommier*, Carnegie EPL
- *Timothy Grove*, MIT
- *Oliver Shorttle*, University of Cambridge
- *Marian Holness*, University of Cambridge
- *Bernard Charlier*, University of Liège
- *Jacqueline Vander Auwera*, University of Liège
- *Olivier Namur*, KU Leuven
- *Kaustubh Hakim*, KU Leuven
- *Stephan Klemme*, University of Münster
- *Anne-Sophie Bouvier*, University of Lausanne
- *Yanhao Lin*, HPSTAR
- *Weiran Li*, The University of Hong Kong

– *Ziliang Jin*, Macau University of Science and Technology

## SUPERVISION & MENTORSHIP

– *Yale Zhang* — Lunar mantle melting (High school intern, 2025)
– *Ayush Gupta* — Lunar mantle melting (Master's student, 2024)
– *Soetkin Willemyns* — Mantle melting and mantle mineralogy in exoplanets (Master's student, 2023)
– *Kinjal Ganguly* — Interior structure and mineralogy of exoplanets (Master's student, 2023)
– *Lander Cuypers* — Experimental study of olivine morphology (Bachelor student, 2021)
– *Sarah Stammen* — Experimental study of olivine and spinel equilibrium (Master's student, 2020)

## PRIZES & AWARDS

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| 2023 | Belgian FWO travel grant for Rocky Worlds III, Zürich (€500) |
| 2023 | Belgian FWO travel grant for Goldschmidt, Lyon (€500) |
| 2018 | Institute travel grant for attending Goldschmidt 2018 (¥12,000 ≈ USD 1,700) |
| 2018 | National Award for Excellent Graduate Students (¥30,000 ≈ USD 4,300, top 1%) |
| 2014.12 | Third prize in professional course (top 15%) |
| 2014.06 | Third prize in professional course (top 15%) |
| 2014.05 | Fourth prize in Institute Scientific Research Activity |

## SERVICE

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| 2025 | Member, ECR-Net Working Group, IAVCEI |
| 2023 | Primary convenor, Goldschmidt 2023 session *"Dynamics and timescales in magmatic reservoirs, conduits and dikes"* (proposal preparation and session convening) |
| 2024–present | Journal reviewer: *Nature Astronomy (×1), Nature Communications(×1), Science Advances(×1), Geology(×1), American Mineralogist(×2), Geochimica et Cosmochimica Acta(×3), Communications Earth & Environment(×2), Icarus(×1), Contributions to Mineralogy and Petrology(×1), Geophysical Research Letters(×1), Bulletin of Volcanology(×1)* |
| 2024–present | Thesis reviewer, KU Leuven<br>*Soetkin Willemyns* — Master thesis: Mantle melting behaviour in low-Mg exoplanets<br>*Collin Isaline* — Master thesis: Crystallization temperature of parent magmas and mantle sources for volcanoes in the Southern Volcanic Zone of the Andean Arc (Chile) |

## OUTREACH

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| 2025 | K–12 Earth and planetary open house, Rice University & R-STEM |
| 2024 | Identification and building of molecular models of Venus' atmosphere, Middle School Planetary Exploration, Rice University & Houston Independent School District |

*Last edit: 07 January 2026, Houston, TX*