

PI: Qing-Zhu Yin (<https://eps.ucdavis.edu/people/faculty/yin>)

(a) Professional Preparation:

Max-Planck-Inst. für Chemie/Johannes Gutenberg-Universität, Mainz, Germany, Cosmochemistry, **Ph.D.**
summa cum laude, 1995

(b) Appointments:

Professor: Dept. of Earth and Planetary Sciences, University of California, Davis (7/1/2012 to present)

Associate Professor: Dept. of Geology, Univ. of California, Davis (7/1/2008 – 6/30/2012)

Assistant Professor: Department of Geology, University of California, Davis (07/1/2005 – 06/30/2008)

Associate Research Scientist: Dept. of Geology, University of California at Davis (9/1/2003 – 6/30/2005)

Research Associate: Dept. of Earth and Planetary Sciences, Harvard University (9/1/1995 – 8/31/2003)

(c) Professional Services (since 2005- present)

Member (7/11/2018-present): Initial Sample Analysis Chemistry Team for Hayabusa 2 Spacecraft
Sample Return Mission from Asteroid Ryugu.

Member: NASA Panel for Discovery Program.

Member: NASA Panel for New Frontiers Program.

Member: NASA Panel for Origins of Solar Systems Program.

Member: NASA Panel for Cosmochemistry Program.

Member: NASA Panel for Sample Return Laboratory Instruments and Data Analysis/LARS Program.

Member: NASA Panel for Exobiology Program.

Reviewers for NASA's • Cosmochemistry • Origins of Solar Systems • Planetary Geology and
Geophysics • Astrobiology: Exobiology and Evolutionary Biology and Planetary Protection Research
• Sample Return Laboratory Instruments and Data Analysis • New Frontiers • Exoplanet • Emerging
Worlds • Solar System Workings • LARS • Discovery

Associate Editor: *Geochemica et Cosmochimica Acta* (Since Sept. 1, 2012 – Dec. 2019)

(d) Qualification and Performance on Relevant Prior Research Efforts. PI has successfully executed the following grants funded by NASA and NSF (NNG05GN22G:/2005-2008; NNG05GN03G:/2005-2010; NNX08AG57G:/2008-2011; NNX09AC93G:/2009-2011; NNX11AJ51G:/2011-2014; NNX12AJ63G:/2012-2014; NNX13AJ50G:/2013-2017; NNX14AM62G:/2014-2017; NNX15AL69G:/2015-2018; NNX16AD34G:/2016-2021; NNX17AH09G:/2017-2021; 80NSSC17K0242:/2017-2021; NSF 1729882:/2017-2022; NNH19ZDA001N-FINESST:/2020-2023). Since 2005, PI's group has published >200 peer-reviewed papers. The PI has a demonstrable record of executing research activities through professional training of graduate students and postdoctoral research associates.

(e) Undergraduate, Graduate and Postdoctoral Advisees:

Jason Antognini, Alicia Noel, Chris Colla, Ariel Graykowski, Thomas Behrs, Madaline Schwarz, Gayle Zheng, Rebeca Ontiveros, Kacie Brunk, Walid Aslan, Jessica Ramirez, Quinn McMichael, Oliva Brock, Levy Pettyjohn, Edward Su (undergraduate assistants); **Benjamin Jacobsen** (grad student, PhD 2009, now Staff Scientist at LLNL) **Xiaoyu Shi** (grad student, PhD 2012, postdoc 9/1/2012 – 5/31/2013, now Associate Prof. at UC Irvine); **Supratim Dey** (PhD in EPS at UC Davis, Sept. 2017 – Sept. 2023); **Audrey Miller** (MS Sept. 2020 – Dec. 2024); **Paige Cary** (MS, Sept. 2020 – June 2026); **Frederic Moynier** (postdoc from 7/2006-1/2008, now Professor at IPGP, Université Paris Diderot); **Keita Irisawa** (visiting PhD student from Tokyo Institute of Technology, Jan.-March 2007; now at Japan Atomic Energy Agency); **Geneviève Hublet** (visiting PhD student from Département des Sciences de la Terre et de l'Environnement, Université Libre de Bruxelles, 2011/2012). **Jay Black** (joint postdoc at Chemistry and Geology Department, UC Davis, now Research Fellow at Univ. Melbourne); **Vinciane Debaille** (visiting Postdoctoral Fellow at UC Davis from LPI/JSC, Houston 2006-2007, now Professor at Université Libre de Bruxelles). **Luo Yan** (postdoc 09/2008-05/2009, now at Univ. of Alberta). **Darren Tollstrup** (postdoc 09/2009-01/2011, now at ThermoScientific). **Akane Yamakawa** (postdoc, 9/2011 – 6/2013; now at National Institute of Environmental Studies, Tokyo); **Joshua Wimpenny** (postdoc 9/1/2009 – 8/31/2014; now Staff Scientist at LLNL); **Yih-Chung Chang** (postdoc 2012–2014, Physical Chemistry, UC Davis). **Kate**

Souders (UC Davis postdoc from 2/16 to 7/31/2015); **Matthew Sanborn** (UC Davis postdoc from 2/1/2013-1/31/2018; Project Scientist from 2/1/2018-11/30/2019; now a Staff Scientist at LANL). **Magdalena Huyskens** (UC Davis postdoc from 10/9/2014 to 09/30/2020, Associate Specialist from 10/1/2020-Aug. 31, 2022, now a Staff Scientist at the Geological Survey of Norway). **Yankun Di** (Postdoc at UCD Aug. 31, 2022 – Dec. 31, 2025; PhD from ANU awarded in 2023).

(f) Selected Publications: (out of 217 total peer-reviewed papers)

- Y. K. Di, F. L. H. Tissot, **Q.-Z. Yin**, Y. Amelin (2026) Thermal processing history of Solar System's first solids inferred from stable isotopes of refractory elements. *Astrophysical Journal* <https://iopscience.iop.org/article/10.3847/1538-4357/ae5179>
- M.-H. Zhu, M. Ding, M. Wiecek, A. Morbidelli, L. Y. Xu, and **Q.-Z. Yin** (2025) Obliteration of ancient impact basins on the Moon by viscous relaxation. *Nature Astronomy* 9, 333–346 <https://www.nature.com/articles/s41550-024-02444-z>
- T. Iizuka et al (2025) The fate of water on carbonaceous asteroids inferred from hafnium isotopes in Ryugu samples. *Nature*, 646, 62-67. <https://rdcu.be/eFrpU>
- E. Krestianinov et al (2023) Igneous meteorites suggest Aluminium-26 heterogeneity in the early Solar Nebula. *Nature Communications*. 14:4940 <https://www.nature.com/articles/s41467-023-40026-1>
- W. Y. Liu et al (2023) I/Pu reveals Earth mainly accreted from volatile-poor differentiated planetesimals. *Science Advances* 9, eadg921 <https://www.science.org/doi/full/10.1126/sciadv.adg9213>
- T. Yokoyama et al (2023) Samples returned from the asteroid Ryugu are similar to Ivuna-type carbonaceous meteorites. *Science* 379, 786, eabn7850 <https://www.science.org/doi/pdf/10.1126/science.abn7850?download=true>
- T. Yokoyama et al (2023) Water circulation in Ryugu asteroid affected the distribution of nucleosynthetic isotope anomalies in returned sample. *Science Advances* 9, 45 <https://www.science.org/doi/10.1126/sciadv.adi7048>
- T. Hopp, et al. (2022) Ryugu's nucleosynthetic heritage from the outskirts of the Solar System. *Science Advances*. 8, eadd8141. <https://www.science.org/doi/10.1126/sciadv.add8141>
- N. Kawasaki et al (2022) Oxygen Isotopes show kinship between asteroid Ryugu and comet 81P/Wild2. *Science Advances*. 8, eade2067 <https://www.science.org/doi/full/10.1126/sciadv.ade2067?af=R>
- M.-H. Zhu et al. (2021) Vesta reveals common feedstocks of late accretion for the terrestrial planets. *Nature Astronomy* 5, 1286-1296. <https://www.nature.com/articles/s41550-021-01475-0>
- Z. Vaci, J. M. D. Day, M. Paquet, K. Ziegler, **Q.-Z. Yin**, S. Dey, A. Miller, Carl Agee, R. Bartoschewitz, and A. Pack (2021) Olivine-rich achondrites from Vesta and the missing mantle problem. *Nature Communications* 12-5443 <https://www.nature.com/articles/s41467-021-25808-9.pdf>
- C. Williams, M. E. Sanborn, C. Defouilloy, **Q.-Z. Yin**, N. T. Kita, D. S. Ebel, A. Yamakawa, K. Yamashita (2020) Chondrules Reveal Large-Scale Outward Transport of Inner Solar System Materials in the Protoplanetary Disk. *Proceedings of the National Academy of Sciences*. 117 (38) 23426-23435
- W. Y. Liu, Y.G. Zhang, **Q.-Z. Yin**, Y. Zhao and Z.G. Zhang (2020) Magnesium partitioning between silicate melt and liquid iron using first-principles molecular dynamics: implications for the early history of the Earth. *Earth and Planetary Science Letters* 531, 115934
- R. Merle, Y. Amelin, **Q.-Z. Yin**, et al Sieber (2020) Exploring the efficiency of stepwise dissolution in removal of stubborn non-radiogenic Pb in chondrule U-Pb dating. *Geochimica et Cosmochimica Acta* 277, 1–20 <https://doi.org/10.1016/j.gca.2020.03.010>
- M.-H. Zhu, N. Artemieva, A. Morbidelli, **Q.-Z. Yin**, H. Becker, and K. Wünnemann (2019) Reconstructing the late accretion history of the Moon. *Nature* 571: 226-229
- Sanborn, M. E., Wimpenny, J., Williams, C. D., Yamakawa, A., Huyskens, M. H., Amelin, Y., Irving, A. J. and **Yin, Q.-Z.** (2019) Carbonaceous Achondrites Northwest Africa 6704/6693: Milestones for Early Solar System Chronology and Genealogy. *Geochimica et Cosmochimica Acta*. 245: 577-596
- Wimpenny, J., Sanborn, M., Koefoed, P., Cooke, I., Stirling, C., Amelin, Y. and **Yin, Q.-Z.** (2019) Reassessing the origin and chronology of the unique achondrite Asuka 881394: Implications for distribution of ²⁶Al in the early Solar System. *Geochimica et Cosmochimica Acta*. 244, 478-501.
- Carlson, R. W. Brasser, R., **Yin, Q.-Z.**, Fischer-Goedde, M. and Qin L. P. (2018) Feed Stocks of the

- Terrestrial Planets. *Space Sci. Rev.* 214: 121. <https://doi.org/10.1007/s11214-018-0554-x>
- V. Debaille et al. (2017) The role of phosphates for the Lu-Hf chronology of meteorites. *Earth and Planetary Science Letters* 473, 52–61 <https://doi.org/10.1016/j.epsl.2017.05.039>
- Schmitz, B., **Yin, Q.-Z.**, Sanborn, M. E., Tassinari, M., Caplan, C. E., and Huss G. R. (2016) A new type of solar-system material recovered from Ordovician marine limestone. *Nature Comm.* 7:11851.
- J. Wimpenny et al (2015) The Lu isotopic composition of achondrites: closing the case for accelerated decay of ^{176}Lu . *Astrophysical Journal Letters*. 812, L3 <http://dx.doi.org/10.1088/2041-8205/812/1/L3>
- Yin, Q.-Z.**, et al (2014) Records of the Moon-Forming Impact and the 470 Ma Disruption of the L-Chondrite Parent Body in the Asteroid Belt from U-Pb Apatite Ages of Novato (L6). *Meteoritics and Planetary Science* 49, 1426–1439. <http://dx.doi.org/10.1111/maps.12340>
- Debaille, V. et al (2013) Stagnant-lid tectonics in early Earth revealed by ^{142}Nd variations in late Archean rocks. *Earth and Planetary Science Letters* 373, 83 – 92. <http://dx.doi.org/10.1016/j.epsl.2013.04.016>
- Popova, O. P. et al. including **Yin, Q.-Z.** (2013) Chelyabinsk Airburst, Damage Assessment, Meteorite Recovery, and Characterization. *Science* 342, 1069-1073.
- Wasserburg, G. J., Wimpenny, J. (postdoc), and **Yin, Q.-Z.** (2012) Mg Isotopic Heterogeneity, Al-Mg Isochrons, and Canonical $^{26}\text{Al}/^{27}\text{Al}$ in the Early Solar System. *Meteorit. & Planet. Sci.* 47, 1980–1997.
- Zhang, Y.G. and **Yin, Q.-Z.** (2012) Carbon and other light element contents in the Earth's core based on first-principles molecular dynamics. *Proceedings of the National Acad. of Sci.*, 109, 19579-19583.
- Jenniskens, P., Fries, M. D., **Yin, Q.-Z.** et al. (2012) Radar enabled recovery of Sutter's Mill, a unique carbonaceous chondrite regolith breccia. *Science* 338, 1583-1587.
- Schlichting, H., Warren, P. and **Yin, Q.-Z.** (2012) The last stages of terrestrial planet formation: dynamical friction and the late veneer. *Astrophysical Journal* 752 8 [doi:10.1088/0004-637X/752/1/8](https://doi.org/10.1088/0004-637X/752/1/8).
- Moynier, F. (postdoc), **Yin, Q.-Z.**, Schauble, E. (2011) Isotopic evidence of Cr partitioning into the Earth's core. *Science* 331, 1417-1420.
- Elkins-Tanton, L., Burgess, S., **Yin, Q.-Z.** (2011) The lunar magma ocean: reconciling the solidification process with lunar petrology and geochronology. *Earth and Planetary Science Letters*. 304, 326–336.
- Moynier, F. (postdoc), **Yin, Q.-Z.**, Irisawa, K., Boyet, M., Jacobsen, B. and Rosing, M. T. (2010) A coupled ^{182}W - ^{142}Nd constraint for early Earth differentiation. *Proceedings of the National Academy of Sciences* 107, 10810–10814 <http://dx.doi.org/10.1073/pnas.0913605107>
- Rustad, J. R. and **Yin, Q.-Z.** (2009) Iron isotope fractionation in the Earth's lower mantle. *Nature Geoscience* 2, 514-518.
- Debaille, V. et al. (2009) Early martian mantle overturn inferred from isotopic composition of nakhlite meteorites. *Nature Geoscience* 2, 548-552. <http://dx.doi.org/10.1038/NNGEO579>
- Jacobsen, B. (graduate student), **Yin, Q.-Z.**, et al (2008) ^{26}Al - ^{26}Mg and ^{207}Pb - ^{206}Pb Systematics of Allende CAIs: Canonical Solar Initial $^{26}\text{Al}/^{27}\text{Al}$ Ratio Reinstated. *Earth Planet. Sci. Letters* 272, 353-364.
- Shen B., Jacobsen B. (graduate student), Lee C.-T., **Yin, Q.-Z.** and Morton, D. M. (2009) The Mg isotopic signature of granites and the role of weathering in continent formation. *Proceedings of the National Academy of Sciences* 106, 20652–20657. <http://dx.doi.org/10.1073/pnas.0910663106>
- Debaille, V. et al (2008) Martian mantle mineralogy investigated by the ^{176}Lu - ^{176}Hf and ^{147}Sm - ^{143}Nd systematics of shergottites. *EPSL*. 269: 186-199. <http://dx.doi.org/10.1016/j.epsl.2008.02.008>
- Moynier, F. (postdoc), **Yin, Q.-Z.** and Jacobsen, B. (2007) Dating the First Stage of Planet Formation. *Astrophysical Journal Letters* 671: L181-L183.
- Debaille, V., Brandon, A. D., **Yin, Q.-Z.**, Jacobsen, B. (2007) Coupled ^{142}Nd - ^{143}Nd evidence for a protracted magma ocean in Mars. *Nature*, 450, 525-528.
- Yin, Q.-Z.** et al. (2007) Towards consistent chronology in the early Solar System: high resolution ^{53}Mn - ^{53}Cr chronometry for chondrules. *Astrophysical Journal* 662: L43-46.
- Yin Q.-Z.** (2004) Predicting the Sun's Oxygen Isotope Composition, *Science*, 305, 1729-1730.
- Yin Q.-Z.**, Jacobsen S.B., Yamashita, K., Blichert-Toft J., Télouk P., and Albarède F. (2002a). A short timescale of terrestrial planet formation determined by Hf-W chronometry. *Nature*, 418, 949-952.
- Yin Q.-Z.**, Jacobsen S.B., Yamashita, K. (2002b) Diverse supernova sources of pre-solar material inferred from molybdenum isotopes in meteorites. *Nature*, 415, 881-883.