

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:

Present: Yankun Di (Postdoc at UCD Aug. 31, 2022 - present, PhD from ANU awarded in 2023); **Audrey Miller** (PhD in EPS at UC Davis, Sept. 2020 – present, degree in progress); **Paige Cary** (PhD in EPS at UC Davis, Sept. 2020 – present, degree in progress); **Supratim Dey** (PhD in EPS at UC Davis, Sept. 2017 – Sept. 2023); **Edward Su** (undergraduate research assistant)

Past: **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** (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 Asst. Prof. at UC Irvine); **Frederic Moynier** (postdoc from 7/2006-1/2008, now Professor at IGP, 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).

(f) Selected Publications: (out of >200 total peer-reviewed papers)

- Q. Ma et al. (2024) High-resolution chronostratigraphy of late Mesozoic sequences in northern North China: Implications for the linkage between intracontinental orogeny, volcanism, Jehol Biota and Pacific subduction. *Geology*, 52 45–50. <https://doi.org/10.1130/G51535.1>
- 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>
- Q. Zhou, et al (2023) The youngest lunar zircon reveals an extremely fractionated nature of Chang'e-5 basalt. *GCA* 358, 126-133 <https://www.sciencedirect.com/science/article/pii/S0016703723004167>
- 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.