



David Zhen Yin

Senior Research Scientist - Physical
Earth & Planetary Sciences

Bio

BIO

David Zhen Yin is the co-founder and program director of Stanford Mineral-X, a research innovation hub on creating resilient mineral supply chains for energy transitions. He is also the principal scientist at Stanford Center for Earth Resources Forecasting. Since 2024, David has been serving on the US National Academies Committee on optimizing the USGS Mineral Resources Program.

David develops data-scientific approaches for prediction, uncertainty quantification, and decision-making in critical earth resources exploration and development. He has broad experience with complex projects involving academia and industry and has broad knowledge of the fields. His research delivered several key technologies transferred as in-house technologies in Chevron, Equinor, and KoBold. Over the past decade, his research developments have been implemented on various subjects, from Antarctica bed topography modeling, North Sea and Gulf of Mexico energy projects, and numerous critical mineral exploration projects across five continents.

Before joining Stanford, David was a Research Associate at the Edinburgh Time-Lapse Project in Scotland, leading a geophysical monitoring research project in collaboration with Equinor from 2016 to 2018. He was also a technology consultant at Equinor's Research Center in Bergen, Norway. Then, he was a Chevron CoRE Postdoctoral Fellow at Stanford from 2018 to 2021. He was the Co-PI of the Stanford-KoBold collaboration from 2020 to 2022 which led to a \$192.5 million Series B fundraising.

David received his Ph.D. in Geosciences from Heriot-Watt University, Edinburgh, UK, in 2016. His research interests include data science for geosciences, geological uncertainty quantification, and decision-making under uncertainty. He has authored one book and tens of articles in peer-reviewed journals and international conferences.

ACADEMIC APPOINTMENTS

- Sr Res Scientist-Physical, Earth & Planetary Sciences

ADMINISTRATIVE APPOINTMENTS

- Senior Research Scientist, Stanford University, (2024- present)
- Co-founder & Program Director, Stanford Mineral-X, (2022- present)
- Research Scientist, Stanford University, (2021-2024)
- Chevron CoRE Postdoctoral Fellow, Stanford University, (2018-2021)
- Research Associate, Heriot-Watt University, (2016-2018)

HONORS AND AWARDS

- PROSE Award for Earth Science, Association of American Publishers (2025)
- Chevron CoRE (Center of Research Excellence) Fellowship, Chevron (2018)
- Frans and Alice Hammons Award, SEG (2014)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Committee member, National Academies Committee on optimizing the USGS Mineral Resources Program Science Portfolio (2024 - present)
- Co-chair, Stanford Earth Postdoc Advisory Council (2019 - 2022)

LINKS

- Stanford Mineral-X: <https://mineralx.stanford.edu/>

Teaching

COURSES

2025-26

- Introduction to Data Science for Geoscience: EARTHSYS 100A, EPS 6 (Win)

Publications

PUBLICATIONS

- **Gaussian process regression for modeling computational and experimental mineral processing data** *MINERALS ENGINEERING*
Eskanolu, A., Yin, D., Caers, J.
2026; 237
- **Quantifying Model Misrepresentation in Geophysical Inversion for Critical Mineral Exploration** *IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING*
Yin, Z., Miltenberger, A., Topinka, M., Wang, L., Mukerji, T., Caers, J.
2025; 63
- **Mapping high-resolution basal topography of West Antarctica from radar data using non-stationary multiple-point geostatistics (MPS-BedMappingV1)** *GEOSCIENTIFIC MODEL DEVELOPMENT*
Yin, Z., Zuo, C., MacKie, E. J., Caers, J.
2022; 15 (4): 1477-1497
- **Quantifying Uncertainty in Downscaling of Seismic Data to High-Resolution 3-D Lithological Models** *IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING*
Yin, Z., Amaru, M., Wang, Y., Li, L., Caers, J.
2022; 60
- **Stochastic modeling of subglacial topography exposes uncertainty in water routing at Jakobshavn Glacier** *JOURNAL OF GLACIOLOGY*
MacKie, E. J., Schroeder, D. M., Zuo, C., Yin, Z., Caers, J.
2021; 67 (261): 75–83
- **A Monte Carlo-based framework for risk-return analysis in mineral prospectivity mapping** *GEOSCIENCE FRONTIERS*
Wang, Z., Yin, Z., Caers, J., Zuo, R.
2020; 11 (6): 2297–2308
- **Automated Monte Carlo-based quantification and updating of geological uncertainty with borehole data (AutoBEL v1.0)** *GEOSCIENTIFIC MODEL DEVELOPMENT*
Yin, Z., Strebelle, S., Caers, J.
2020; 13 (2): 651–72
- **A Tree-Based Direct Sampling Method for Stochastic Surface and Subsurface Hydrological Modeling** *WATER RESOURCES RESEARCH*

- Zuo, C., Yin, Z., Pan, Z., MacKie, E. J., Caers, J.
2020; 56 (2)
- **Simulation of hydrogen generation via in-situ combustion gasification of heavy oil** *INTERNATIONAL JOURNAL OF HYDROGEN ENERGY*
Song, P., Li, Y., Yin, Z., Ifticene, M., Yuan, Q.
2024; 49: 925-936
 - **Unraveling the uncertainty of geological interfaces through data-knowledge-driven trend surface analysis** *COMPUTERS & GEOSCIENCES*
Wang, L., Peeters, L., MacKie, E. J., Yin, Z., Caers, J.
2023; 178
 - **GStatSim V1.0: a Python package for geostatistical interpolation and conditional simulation** *GEOSCIENTIFIC MODEL DEVELOPMENT*
MacKie, E. J. J., Field, M., Wang, L., Yin, Z., Schoedl, N., Hibbs, M., Zhang, A.
2023; 16 (13): 3765-3783
 - **A nearest neighbor multiple-point statistics method for fast geological modeling** *COMPUTERS & GEOSCIENCES*
Zuo, C., Pan, Z., Yin, Z., Guo, C.
2022; 167
 - **A workflow for building surface-based reservoir models using NURBS curves, coons patches, unstructured tetrahedral meshes and open-source libraries** *Computers & Geosciences*
Zhang, Z., Yin, Z., Yan, X.
2018; 121: 11
 - **Evaluation of inter-well connectivity using well fluctuations and 4D seismic data** *JOURNAL OF PETROLEUM SCIENCE AND ENGINEERING*
Yin, Z., MacBeth, C., Chassagne, R., Vazquez, O.
2016; 145: 533–47
 - **Enhancement of dynamic reservoir interpretation by correlating multiple 4D seismic monitors to well behavior** *Interpretation-A Journal of Subsurface Characterization*
Yin, Z., Ayzenberg, M., MacBeth, C., Feng, T., Chassagne, R.
2015; 3 (2): SP35–SP52
 - **A method to update fault transmissibility multipliers in the flow simulation model directly from 4D seismic** *JOURNAL OF GEOPHYSICS AND ENGINEERING*
Benguigui, A., Yin, Z., MacBeth, C.
2014; 11 (2)
 - **Joint interpretation of interwell connectivity by integrating 4D seismic with injection and production fluctuations** *SPE EUROPEC*
Yin, Z., MacBeth, C., Chassagne, R.
2015
 - **Improving 4D Seismic Interpretation and Seismic History Matching Using the Well2seis Technique** *First EAGE Workshop on Practical Reservoir Monitoring*
Yin, Z., Ayzenberg, M., MacBeth, C.
2017