Xiaolong Wei

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Education

2018–Present	**Ph.D. in Geophysics**, University of Houston, Houston, USA
2015–2018	**M.S. in Geology**, Northwest University, Xi'an, China
2011–2015	**B.S. in Geophysics**, China University of Geosciences, Beijing, China

Research Interests

- Geophysical inverse problems for multiple data sets (e.g., gravity, gravity gradiometry and magnetic)
- Structural similarity constraint joint inversion
- Uncertainty analysis in geophysical separate/joint inversions in both deterministic and stochastic frameworks
- Geology differentiation models
- Machine/deep learning algorithms applied to geophysical data interpretations

Awards & Honors

2022	SEG Lucien LaCoste Scholarship ($5,305.12)
2022	The Best Paper in the Mining Sessions at 2021 IMAGE Annual Meeting, Denver, CO, USA (co-author)
2022	The Best Student Paper in the Mining Sessions at 2021 IMAGE Annual Meeting, Denver, CO, USA
2021	Student Travel Award, University of Houston, Houston, USA
2021	Student Research Funding (paid directly to student), University of Houston, Houston, USA ($1,000)
2021	SEG Technical Program Registration Grant
2021	SEG John R. Butler Jr. Scholarship ($510.86)
2021	The Best Poster in the Mining Sessions at 2020 SEG Annual Meeting, Online
2020–2021	Outstanding Academic Achievement, University of Houston, Houston, USA ($700×2)
2016–2018	The First Prize Scholarship, Northwest University, Xi'an, China

2015 The Best Bachelor Thesis, China University of Geosciences, Beijing, China

2013 The Second Prize Scholarship, China University of Geosciences, Beijing, China

Publications

Peer-reviewed

6. **Wei, X.**, Li, K. and Sun, J., 2021 Mapping critical mineral resources using airborne geophysics, 3D joint inversion and geology differentiation: A case study of a buried niobium deposit in the Elk Creek carbonatite, Nebraska, USA. *Geophysical Prospecting*. under review

5. **Wei, X.** and Sun, J., 2021. 3D probabilistic geology differentiation based on airborne geophysics, mixed Lp norm joint inversion and petrophysical measurements. *Geophysics*. under review

4. Hu, Y., **Wei, X.**, Wu, X., Sun, J., Chen, J., Huang, Y. and Chen, J., 2021. A deep learning enhanced framework for multi-physics joint inversion. *Geophysics*. under revision

3. **Wei, X.** and Sun, J., 2021. Uncertainty analysis of 3D potential-field deterministic inversion using mixed L p norms. *Geophysics*, 86(6), pp.G133-G158. doi:10.1190/geo2020-0672.1

2. Sun, J. and **Wei, X.**, 2020. Recovering sparse models in 3D potential-field inversion without bound dependence or staircasing problems using a mixed Lp-norm regularization. *Geophysical Prospecting*, 69(4), pp.901-910. doi:10.1111/1365-2478.13063.

1. Sun, J., Melo, A., Kim, J.D. and **Wei, X.**, 2020. Unveiling the 3D undercover structure of a Precambrian intrusive complex by integrating airborne magnetic and gravity gradient data into 3D quasi-geology model building. *Interpretation*, 8(4), pp.1-50. doi:10.1190/INT-2019-0273.1.

Conference proceedings

7. **Wei, X.** and Sun, J., 2021. 3D probabilistic geology differentiation using mixed L p norm joint inversion constrained by petrophysical information. In *IMAGE Technical Program Expanded Abstracts 2021* doi:10.1190/segam2021-3586619.1.

6. **Wei, X.** and Sun, J., 2021. Uncertainty analysis of 3D geophysical inversion using airborne gravity gradient data conditioned on rock sample measurements. In *IMAGE Technical Program Expanded Abstracts 2021* doi:10.1190/segam2021-3586552.1.

5. Hu, Y., **Wei, X.**, Wu, X., Sun, J., Chen, J., Chen, J., Huang, Y., 2021. Deep learning-enhanced multiphysics joint inversion. In *IMAGE Technical Program Expanded Abstracts 2021* doi:10.1190/segam2021-3583667.1.

4. Li, K., **Wei, X.**, Sun, J., 2021. Geophysical characterization of a buried niobium and rare earth element deposit using 3D joint inversion and geology differentiation: A case study on the Elk Creek carbonatite2021. In *IMAGE Technical Program Expanded Abstracts 2021* doi:10.1190/segam2021-3585069.1.

3. **Wei, X.** and Sun, J., 2020. Uncertainty analysis of joint inversion using mixed Lp-norm regularization. In *SEG Technical Program Expanded Abstracts 2020* (pp. 925-929). Society of Exploration Geophysicists. doi:10.1190/segam2020-3428359.1.

2. **Wei, X.** and Sun, J., 2020. Quantifying uncertainties of deterministic geophysical inversions using mixed Lp norms. In *SEG Technical Program Expanded Abstracts 2020* (pp. 1404-1408). Society of Exploration Geophysicists. doi:10.1190/segam2020-3420227.1.

1. Sun, J., Melo, A., Deok Kim, J. and **Wei, X.**, 2020. Characterizing a Precambrian intrusive complex by integrating potential field data into 3D quasi-geology model building. In *SEG Technical Program Expanded Abstracts 2020* (pp. 1374-1378). Society of Exploration Geophysicists. doi:10.1190/segam2020-3428385.1.

Conference abstracts

3. **Wei, X.** and Sun, J., 2021, December. Building 3D probabilistic geology differentiation models using mixed Lp norm joint inversion, airborne geophysics and petrophysical information. In *AGU Fall Meeting Abstracts*.

2. **Wei, X.** and Sun, J., 2021, December. Analyzing uncertainty of 3D inversion using airborne geophysical data conditioned on petrophysical measurements. In *AGU Fall Meeting Abstracts*.

1. Li, K., **Wei, X.**, Sun, J., 2021, December. Characterizing a buried niobium deposit using airborne geophysics, joint inversion, and geology differentiation. In *AGU Fall Meeting Abstracts*.

Open code and data

3. **Wei, X.** and Sun, J., 2021. Joint inversion of gravity gradient and magnetic data using mixed Lp norm regularization (1.0). *Zenodo*. doi:10.5281/zenodo.5774303.

2. **Wei, X.** and Sun, J., 2021. Interactive geology differentiation and 3D visualization of geological units (1.0). *Zenodo*. doi:10.5281/zenodo.5774309.

1. Sun, J., and **Wei, X.**, 2020. Solving the bound dependence and staircasing problems in 3D potential-field sparse inversions using a mixed Lp-norm regularization (1.0). *Zenodo*. doi:10.5281/zenodo.4057134.

Professional Service & Outreach

Peer-Reviewer

2022–present	Geocarto International, SEG Conference Proceeding
2021–present	Geophysics, Geophysical Journal International, IEEE Transactions on Geoscience and Remote Sensing, Acta Geophysica

Conferences

2022	Session Chair for GM 1: Inversion Insights at IMAGE Annual Meeting, Houston, Texas, USA
2021	Session Chair for MG P1: New Methods and Case Histories 1 at IMAGE Annual Meeting (SEG and AAPG joint annual conference), Denver, Colorado, USA

Affiliations

2022–Present	European Geosciences Union (EGU)
2021–Present	Geophysical Society of Houston (GSH)
2020–Present	American Geophysical Union (AGU), European Association of Geoscientists & Engineers (EAGE)
2018–Present	Society of Exploration Geophysicists (SEG)

Others

2020–2021	Contributor of the joint inversion code in SimPEG (https://simpeg.xyz/)

Teaching Experience

2020	GEOL7330: Potential Field Methods of Geophysical Exploration (graduate core course), **guest lecturer**. *University of Houston.*
2019	GEOL4355: Geophysical Field Camp, **teaching assistant**. *University of Houston.*

Invited Talks

011/2021	**Wei, X.** and Sun, J. Build probabilistic quasi-geology models based on multiple airborne geophysical data and sparse joint inversions (online). *Geophysical Society of Houston.*
09/2021	**Wei, X.** and Sun, J. From deterministic to probabilistic geoscience modeling: analyzing uncertainties of geophysical inversions and constructing probabilistic subsurface models conditioned on petrophysical measurements (online). *SimPEG monthly seminar.*

Certifications

2022	Remote pilot for the small unmanned aircraft system issued by Federal Aviation Administration
2021	FAA Part 107 Knowledge Test Prep for Drone Pilot through Udemy, Inc.
2021	ISInProG@Lario - 2021 International School on Inverse Problems in Geophysics on the shore of the Lario Lake
2021	Magnetotellurics (MT) short course given by Dr. Alan G. Jones
2018	Certificate signed by Prof. Andrew Ng upon successfully completing the online machine learning course provided by Stanford University through Coursera, Inc.