

# 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

2021             SEG Technical Program Registration Grant  
2021             John R. Butler Jr. Scholarship from SEG  
2021             The Best Poster in the Mining Sessions at the 2020 SEG Annual Meeting  
2020–2021       Outstanding Academic Achievement, University of Houston, Houston, USA (×2)  
2016–2018       The First Prize Scholarship, Northwest University, Xi'an, China (×3)  
2015             The Best Bachelor Thesis, China University of Geosciences, Beijing, China  
2013             The Second Prize Scholarship, China University of Geosciences, Beijing, China  
2012             Outstanding Volunteer for rural elementary schools, China University of Geosciences, Beijing, China

## Publications

### Peer-reviewed

4. Hu, Y., **Wei, X.**, Wu, X., Sun, J., Chen, J., Huang, Y., Chen, J., 2021. A deep learning enhanced framework for multi-physics joint inversion. *Geophysics*. under review
3. **Wei, X.** and Sun, J., 2021. Uncertainty analysis of 3D potential-field deterministic inversion using mixed L p norms. *Geophysics*, 86(6), pp.1-103.
2. Sun, J., **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*. doi:[10.1111/1365-2478.13063](https://doi.org/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](https://doi.org/10.1190/INT-2019-0273.1).

### In preparation

2. **Wei, X.** and Sun, J., 2021. Uncertainty analysis of 3D geology differentiation models via joint inversion.
1. Li, K., **Wei, X.**, 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

### 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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1190/segam2020-3428385.1).

## Reviewers

2021–present	Acta Geophysica
2021–present	IEEE Transactions on Geoscience and Remote Sensing

## Professional Affiliations & Activities

2021	Participant of 2021 ISInProG@Lario - 2021 International School on Inverse Problems in Geophysics on the shore of the Lario Lake
2020–	Contributor of joint inversion code in SimPEG ( <a href="https://simpeg.xyz/">https://simpeg.xyz/</a> )
2020–Present	American Geophysical Union (AGU)
2020–Present	European Association of Geoscientists & Engineers (EAGE)
2018–Present	Society of Exploration Geophysicists (SEG)

## Teaching Experiences

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

## Invited Talks

09/2021	<b>Wei, X.</b> and Sun, J., From deterministic to probabilistic geoscience modeling: analyzing uncertainties of geophysical inversions and constructing probabilistic subsurface models conditioned on petrophysical measurements, SimPEG monthly seminar.
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## Certifications

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| 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. |