# Jiajia Sun

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## EDUCATION

2015 **Ph.D. in Geophysics with minor in Mathematical and Computer Sciences**
Colorado School of Mines, CO, USA

2008 **B.S. in Geophysics**
China University of Geosciences, Wuhan, China

## PROFESSIONAL APPOINTMENTS

2023-Present **Associate Professor of Geophysics**
University of Houston, Department of Earth and Atmospheric Sciences

2017-2023 **Assistant Professor of Geophysics**
University of Houston, Department of Earth and Atmospheric Sciences

2015-2017 **Post-Doctoral Fellow**
Colorado School of Mines, Department of Geophysics

## RESEARCH INTERESTS

My research interests revolve around the theme of better imaging, characterizing, and monitoring of subsurface systems. My research is highly interdisciplinary because I constantly cross disciplinary boundaries and utilize methods and tools developed in convex optimization, computer vision, pattern recognition, remote sensing, medical imaging and machine learning. My research is also computationally intensive because I rely on heavy computational resources such as GPUs and clusters to carry out my research. My current research focuses on:

- Developing advanced methods for critical minerals and rare earth element (REE) deposit exploration using airborne geophysics and joint inversion;
- Solving geophysical inverse problems and assessing uncertainty using deep generative models;
- Developing joint inversion algorithms for integrated imaging of the Earth based on multi-physical geoscience data sets;
- Differentiating geological units through integrative modeling of multi-physical geoscience data;
- Quantifying uncertainties of geophysical inversions in both deterministic and Bayesian inversion frameworks;

- Tackling magnetic remanence problem by integrating geophysics and machine learning; and
- Developing advanced numerical algorithms for geologically constrained inversion of various geophysical data.

## TEACHING EXPERIENCES

### University of Houston

- **GEOL 7330 Potential Field Methods of Geophysical Exploration**
  Instructor. Developed lectures on potential field theory, potential field data acquisition, processing and interpretation methods. Designed lab exercises on 3D modeling of gravity, magnetic and gravity gradient data, terrain correction, depth estimates and Fourier domain modeling. **Enrollment:** 37 (2020), 11 (2021), 12 (2022), 13 (2023).
- **GEOL 6397 Computational Methods in Geophysical Electromagnetics**
  Instructor. Developed lectures on finite volume method in 1D and 3D, as well as its applications to Maxwell's equations; geophysical inversion theory and its application to EM inversions; Bayesian inversion and its application to EM inversions. Designed lab exercises on solving Maxwell's equations using finite volume method in 1D and 3D, calculating the sensitivities, and implementing 1D and 3D EM inversions. **Enrollment:** 14 (2019).
- **GEOL 4371 Electromagnetic Methods for Exploration**
  Instructor. Lectured on the theory and methods for direct currents, time-domain electromagnetic, frequency-domain electromagnetic using both inductive and grounded sources, as well as magnetotellurics. Designed lab exercises using Jupyter Notebooks and Azure cloud computing. Evaluated and graded students' homework, lab reports, final presentations and exams. **Enrollment:** 27 (2018), 7 (2021).
- **GEOL 4355 Geophysical Field Camp**
  Co-Instructor. Responsible for (1) instructing students in the use of CG5 gravimeter and G-858 MagMapper for collecting gravity and magnetic data at Enchanted Rock and Longhorn Cavern State Park in Texas, (2) teaching students to process and interpret the measured gravity and magnetic data, and (3) evaluating and grading students' daily reports and final presentations. **Enrollment:** 28 (2018), 13 (2019).
- **GEOL 4378/6397 Data Analytics and Machine Learning for Geoscientists**
  Instructor. Developed lectures on Python programming, optimization algorithms (stochastic gradient descent, mini-batch gradient descent), and several widely used machine learning algorithms such as logistic regression, support vector machine, decision trees, random forests, ensemble learning, clustering, dimensionality reduction and neural networks (including CNNs, U-net and GAN). Designed lab exercises based on real-world geoscience data in Jupyter Notebook for students to implement all the machine learning algorithms discussed in class using Scikit-Learn, TensorFlow, Keras and PyTorch. **Enrollment:** 23 (2018), 22 (2019), 42 (2021), 20 (2022), 30 (2023).

### Colorado School of Mines

- **GPGN 605 Inversion Theory** *(Spring, 2016, 2017)*
  Co-instructor. Designed and gave lectures on solving nonlinear inverse problem using Gauss-Newton method, bound constrained inverse problems, general Lp norm inversions and joint

inversions of multi-modal geophysical data.

- **GPGN 605 Inversion Theory** *(Spring, 2011-2014)*
  Guest lecturer. Lectured on nonlinear inverse problems, bound constrained inverse problems, general Lp norm inversions and joint inversions for a total of 17 lecture hours.
- **GPGN 411/511 Advanced Gravity and Magnetic Exploration** *(Fall, 2011)*
  Guest lecturer. Lectured on modeling and analysis of potential field data in Fourier domain for geophysics undergraduates.

## PEER-REVIEWED PUBLICATIONS

(Name indicates supervised students/post-docs)

22. Wei, X., **J. Sun**, and M. K. Sen, 2023,3D Monte Carlo geometry inversion using gravity data: ***Geophys. J. Int.***, under review.
21. Hu, Y., X. Wei, X. Wu, **J. Sun**, Y. Huang, and J. Chen, 2023, 3D joint inversion of airborne magnetic and gravity gradient data using deep learning techniques, ***Geophysics***, under review.
20. Wei, X., **J. Sun**, and M. K. Sen, 2023, Reconstruction of multiple salt bodies using trans-dimensional Monte Carlo gravity inversion: ***Geophys. J. Int.***, under review.
19. **Sun, J.**, and Fournier, D., 2023, Understanding total variation regularization: Why can it recover dipping structures?: ***Geophysical Prospecting***, accepted for publication.
18. Wei, X., **J. Sun**, and M. K. Sen, 2023, Quantifying uncertainty of salt body shapes recovered from gravity data using trans-dimensional Markov chain Monte Carlo sampling: ***Geophys. J. Int.***, 232(3), 1957–1978, https://doi.org/10.1093/gji/ggac430
17. Wei, X., K. Li, and **J. Sun**, 2023, 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***, accepted for publication, https://doi.org/10.1111/1365-2478.13280
16. Hu, Y, X. Wei, X. Wu, **J. Sun**, J. Chen, Y. Huang, and J. Chen, 2023, A deep learning enhanced framework for multi-physics joint inversion: ***Geophysics***, 88(1), K13-K26, https://doi.org/10.1190/geo2021-0589.1
15. Wei, X., and **J. Sun**, 2022, 3D probabilistic geology differentiation based on airborne geophysics, mixed Lp norm joint inversion and physical property measurements, ***Geophysics***, 87(4), K19-K33, https://doi.org/10.1190/geo2021-0833.1.
    **Nominated by editors to be highlighted in Geophysics Bright Spots in TLE:** https://library.seg.org/doi/epub/10.1190/tle41100730.1
14. Li, X., and **J. Sun**, 2022, Toward a better understanding of the recoverability of physical property relationships from geophysical inversions of multiple potential-field datasets: ***Geophys. J. Int.***, 230(3), 1489-1507, https://doi.org/10.1093/gji/ggac130.
13. Wei, X., and **J. Sun**, 2021, Uncertainty analysis of 3D potential-field deterministic inversion using mixed Lp norms: ***Geophysics***, 86(6), G133-G158, https://doi.org/10.1190/geo2020-0672.1
12. **Sun, J.,** and X. Wei, 2021, Recovering sparse models in 3D potential-field inversion without bound dependence or staircasing problems using a mixed Lp-norm regularization, ***Geophysical Prospecting***, 69, 901-910, https://doi.org/10.1111/1365-2478.13063
11. Nurindrawati, F. D., and **J. Sun**, 2020, Predicting total magnetization directions using convolutional neural networks: ***Journal of Geophysical Research: Solid Earth***, 125, no. 10,

e2020JB019675, https://doi.org/10.1029/2020JB019675

**Featured as Editor's Highlight on Eos:** https://eos.org/editor-highlights/machine-learning-for-magnetics

**Featured on cover page of the same issue:** https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1002/jgrb.53494

10. **Sun, J.**, A. Melo, J. D. Kim, and X. Wei, 2020, Unveiling the 3D undercover structure of the Precambrian intrusive complex by integrating airborne magnetic and gravity gradient data into 3D quasi-geology model building: ***Interpretation***, 8(4), SS15-SS29, https://doi.org/10.1190/int-2019-0273.1
9. Bernier, C., Y. Wang, M. Estes, R. Lei, B. Jia, S. Wang, and **J. Sun**, 2019, Clustering surface ozone diurnal cycles to understand the impact of circulation patterns in Houston, TX: ***Journal of Geophysical Research: Atmospheres***, 124, 13,457-13,474. https://doi.org/10.1029/2019JD031725
8. **Sun, J.,** and Y. Li, 2019, Magnetization clustering inversion Part II: Assessing the uncertainty of recovered magnetization directions: ***Geophysics***, 84(4), J17-J29. https://doi.org/10.1190/geo2018-0480.1

   **Nominated by editors to be highlighted in Geophysics Bright Spots in TLE** https://library.seg.org/doi/pdf/10.1190/tle38080646.1
7. **Sun, J.,** and Y. Li, 2018, Magnetization clustering inversion Part I: Building an automated numerical optimization algorithm: ***Geophysics***, 83(5), J61-J73. https://doi.org/10.1190/geo2017-0844.1

   **Nominated by editors to be highlighted in Geophysics Bright Spots in TLE** https://library.seg.org/doi/pdf/10.1190/tle37100780.1
6. Melo, A., **J. Sun** and Y. Li, 2017, Geophysical inversions applied to 3D geology characterization of an iron oxide copper gold deposit in Brazil: ***Geophysics***, 82(5), K1-K13. https://doi.org/10.1190/geo2016-0490.1
5. **Sun, J.**, and Y. Li, 2017, Joint inversion of multiple geophysical and petrophysical data using generalized fuzzy clustering algorithms: ***Geophys. J. Int.***, 208(2), 1201-1216. https://doi.org/10.1093/gji/ggw442
4. Li, Y., and **J. Sun**, 2016, 3D magnetization inversion using fuzzy c-means clustering with application to geology differentiation: ***Geophysics***, 81(5), J61-J78. https://doi.org/10.1190/geo2015-0636.1
3. **Sun, J.**, and Y. Li, 2016, Joint inversion of multiple geophysical data using guided fuzzy c-means clustering: ***Geophysics***, 81(3), ID37-ID57. https://doi.org/10.1190/geo2015-0457.1
2. **Sun, J.**, and Y. Li, 2015, Multidomain petrophysically constrained inversion and geology differentiation using guided fuzzy c-means clustering: ***Geophysics***, 80(4), ID1-ID18. https://doi.org/10.1190/geo2014-0049.1 **Awarded Honorable Mention of Best Paper in GEOPHYSICS**
1. **Sun, J.**, and Y. Li, 2014, Adaptive Lp inversion for simultaneous recovery of both blocky and smooth features in a geophysical model: ***Geophys. J. Int.***, 197(2), 882-899. https://doi.org/10.1093/gji/ggu067

## NON-PEER-REVIEWED PUBLICATIONS

(Name indicates supervised students/post-docs)

4. Li, Y., **J. Sun**, S. Li, and M. Leão-Santos, 2021, A paradigm shift in magnetic data interpretation: Increased value through magnetization inversions: ***The Leading Edge***, 40(2), 89-98. https://doi.org/10.1190/tle40020089.1
3. **Sun, J.,** D. Colombo, Y. Li, and J. Shragge, 2020, GEOPHYSICS introduces new section on multiphysics and joint inversion: ***The Leading Edge***, 39(10), 753-754. https://doi.org/10.1190/tle39100753.1
2. Li, Y., A. Melo, C. Martinez, and **J. Sun**, 2019, Geology differentiation: A new frontier in quantitative geophysical interpretation in mineral exploration: ***The Leading Edge***, 38(1), pp. 60-66. https://doi.org/10.1190/tle38010060.1
1. Nurindrawati, F. D., and **J. Sun**, 2019, A machine learning approach to predicting magnetization directions: ***GSH Journal***, 10(2), 27-30. https://cloud.3dissue.com/190951/191368/223577/Oct2019Volume10No2/index.html

## MANUSCRIPTS IN PREPARATION

(Name indicates supervised students/post-docs)

5. **Sun, J.,** R. Mehta and D. Yang, 2023, Mapping river salinization using airborne electromagnetic data and machine learning, to be submitted to ***IEEE Transactions on Geoscience and Remote Sensing***.
4. **Sun, J.,** and Y. Li, 2023, Inversion of full-waveform induced polarization data and its application to geology differentiation, to be submitted to ***Geophysics***.
3. **Sun, J.,** and Y. Li, 2023, Geology differentiation through joint clustering inversion: A sulfide deposit example from Bathurst Mining Camp, to be submitted to ***Geophysics***.
2. **Sun, J.,** 2023, A multi-barrier approach to solving geophysical discrete-valued inverse problems, to be submitted to ***Geophys. J. Int.***.
1. **Sun, J.,** 2023, Joint inversion of airborne gravity gradiometry and magnetic data based on localized linear correlation, to be submitted to ***Geophys. J. Int.***.

## OPEN DATA & CODES

(Name indicates supervised students/post-docs)

9. **Sun, Jiajia**. (2022). Understanding total variation regularization in geophysical inversions (1.0). Zenodo. https://doi.org/10.5281/zenodo.7492697
8. Li, Xinyan & **Sun, Jiajia** (2022). Understanding the recoverability of physical property relationships from inversions of multiple potential field data (1.0). Zenodo. https://doi.org/10.5281/zenodo.6374466
7. Wei, Xiaolong, & **Sun, Jiajia**. (2021). Interactive geology differentiation and 3D visualization of geological units (1.0). Zenodo. https://doi.org/10.5281/zenodo.5774309
6. Wei, Xiaolong, & **Sun, Jiajia**. (2021). Joint inversion of gravity gradient and magnetic data using mixed Lp norm regularization (1.0). Zenodo. https://doi.org/10.5281/zenodo.5774303
5. Nurindrawati, Felicia Disa & **Sun, Jiajia** (2020). Predicting Magnetization Directions Using Convolutional Neural Networks (Version 1.0). Zenodo. http://doi.org/10.5281/zenodo.3931029
4. **Sun, Jiajia**, & Wei, Xiaolong. (2020). Solving the bound dependence and staircasing problems in 3D potential-field inversions using a mixed Lp-norm regularization (Version 1.0). Zenodo. http://doi.org/10.5281/zenodo.4057134
3. Python codes developed for GEOL 6397 Computational Methods in Geophysical Electromagnetics, implementing 1D MT modeling, 3D DC modeling, 1D inversion and 3D

sensitivity calculation using finite volume method: https://github.com/jiajiasun/GEOL6396-Computational-EM.git

2. Jupyter Notebooks developed for GEOL 4397 Data Analytics and Machine Learning for Geoscientists, implementing logistic regression, support vector machine, decision trees, random forests, ensemble learning, clustering, dimensionality reduction and neural networks (including simple feedforward deep learning and convolutional neural networks). https://github.com/jiajiasun/UHMachineLearning.git
1. Jupyter Notebooks developed for GEOL 4397 Electromagnetic Methods for Exploration, simulating EM responses due to various EM surveys to help students understand the physics, such as how charges are distributed, how currents flow and how EM response changes with differing conductors: https://github.com/jiajiasun/UHElectromagnetics.git

## OPEN BOOK

(Name indicates supervised students/post-docs)

1. Sun, Jiajia (2020). Potential field methods of geophysical exploration: Open textbook for graduate level potential field course at UH. Available to the general public at https://uhlibraries.pressbooks.pub/geophysicspotentialfield/.

## CONFERENCE PROCEEDINGS

(Name indicates supervised students/post-docs)

34. Wei, X., **J. Sun** and M. K. Sen, 2022, Trans-dimensional Bayesian gravity inversion and uncertainty analysis for salt reconstruction: SEG Technical Program Expanded Abstracts: 1145-1149, Houston, US. https://doi.org/10.1190/image2022-3746659.1
33. Li, K. H., X. Wei, and **J. Sun**, 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 Carbonatite: SEG Technical Program Expanded Abstracts: 1256-1260, Denver, US. https://doi.org/10.1190/segam2021-3585069.1
32. Wei, X., and **J. Sun**, 2021, Uncertainty analysis of 3D geophysical inversion using airborne gravity gradient data conditioned on rock sample measurements: SEG Technical Program Expanded Abstracts: 921-925, Denver, US. https://doi.org/10.1190/segam2021-3586552.1
31. Wei, X., and **J. Sun**, 2021, 3D probabilistic geology differentiation using mixed Lp norm joint inversion constrained by petrophysical information: SEG Technical Program Expanded Abstracts: 1231-1235, Denver, US. https://doi.org/10.1190/segam2021-3586619.1
30. Li, X., and **J. Sun**, 2021, Understanding the recoverability of physical property relationships from geophysical inversions of multiple potential-field datasets: SEG Technical Program Expanded Abstracts: 1236-1240, Denver, US. https://doi.org/10.1190/segam2021-3594791.1
29. Hu, Y., X. Wei, X. Wu, **J. Sun**, J. Chen, Y. Huang and J. Chen, 2021, Deep learning enhanced multi-physics joint inversion: SEG Technical Program Expanded Abstracts, 1721-1725, Denver, US. https://doi.org/10.1190/segam2021-3583667.1
28. **Sun, J.**, A. Melo, J. D. Kim and X. Wei, 2020, Characterizing a Precambrian intrusive complex by integrating potential field data into 3D quasi-geology model building: 90th Annual International Meeting, SEG Expanded Abstracts, pp. 1374-1378, Houston, US. https://doi.org/10.1190/segam2020-3428385.1
27. Wei, X.., and **J. Sun**, 2020, Quantifying uncertainties of deterministic geophysical inversions

using mixed Lp norms: 90th Annual International Meeting, SEG Expanded Abstracts, pp. 1404-1408, Houston, US. https://doi.org/10.1190/segam2020-3420227.1

26. Wei, X., and **J. Sun**, 2020, Uncertainty analysis of joint inversion using mixed Lp norm regularization: 90th Annual International Meeting, SEG Expanded Abstracts, pp. 925-929, Houston, US. https://doi.org/10.1190/segam2020-3428359.1
25. Kim, J. D., and **J. Sun**, 2020, Regional scale mineral exploration through joint inversion and geology differentiation based on multi-physics geoscientific Data: 90th Annual International Meeting, SEG Expanded Abstracts, pp. 1379-1383, Houston, US. https://doi.org/10.1190/segam2020-3428427.1
24. Nurindrawati, F. D., and **J. Sun**, 2020, Improving the accuracy of convolutional neural networks in predicting magnetization directions: 90th Annual International Meeting, SEG Expanded Abstracts, pp. 1369-1373, Houston, US. https://doi.org/10.1190/segam2020-3426827.1
23. Li, Y., **J. Sun** and J. Capriotti, 2020, Integration of multiphysics data sets for subsurface imaging through petrophysical data and a fuzzy c-means formalism, 82nd EAGE Conference and Exhibition, Amsterdam, The Netherlands.
22. Nurindrawati, F. D., and **J. Sun**, 2019, Estimating total magnetization directions using convolutional neural networks: 89th Annual International Meeting, SEG Expanded Abstracts, pp. 2163-2167, San Antonio, US. https://doi.org/10.1190/segam2019-3216857.1
21. **Sun, J.**, and Y. Li, 2019, Advances in 3D magnetization clustering inversion: Numerical strategies and uncertainty analysis: International Workshop on Gravity, Electrical & Magnetic Methods and their Applications, Xi'an, China, 19-22 May. https://doi.org/10.1190/GEM2019-118.1
20. **Sun, J.**, and Y. Li, 2018, An automated optimization algorithm for magnetization clustering inversion: 88th Annual International Meeting, SEG Expanded Abstracts, pp. 1410-1414, Anaheim, US. https://doi.org/10.1190/segam2018-2997039.1
19. **Sun, J.**, and Y. Li, 2017, Assessing the uncertainty of magnetization directions from clustering inversion and its effect on geology differentiation: 87th Annual International Meeting, SEG Expanded Abstracts, pp. 2435-2439, Houston, US. https://doi.org/10.1190/segam2017-17796457.1
18. **Sun, J.**, and Y. Li, 2017, Integration of geophysical and petrophysical data through joint inversion, in Proceedings of Exploration 17: Sixth Decennial International Conference on Mineral Exploration, edited by V. Tschirhart and M.D. Thomas, 745-749. https://goo.gl/sm8Fv4
17. **Sun, J.**, and Y. Li, 2016, Joint clustering inversion of gravity and magnetic data applied to the imaging of a gabbro intrusion: 86th Annual International Meeting, SEG Expanded Abstracts, pp. 2175-2179, Dallas, US. https://doi.org/10.1190/segam2016-13871255.1
16. Li, Y., and **J. Sun**, 2016, Geology differentiation with uncertainty estimation using inverted magnetization directions: 86th Annual International Meeting, SEG Expanded Abstracts, pp. 2159-2164, Dallas, US. https://doi.org/10.1190/segam2016-13957163.1
15. Rapstine, T., **J. Sun**, and Y. Li, 2016, Integrating a spatial salt likelihood map and prior petrophysical data into a gravity gradiometry inversion through fuzzy c-means clustering: 86th Annual International Meeting, SEG Expanded Abstracts, pp. 1622-1626, Dallas, US. https://doi.org/10.1190/segam2016-13949789.1
14. **Sun, J.**, and Y. Li, 2015, Advancing the understanding of petrophysical data through joint

inversion: A sulfide deposit example from Bathurst Mining Camp: 85th Annual International Meeting, SEG Expanded Abstracts, pp. 2017-2021, New Orleans, US. https://doi.org/10.1190/segam2015-5930227.1

13. Melo, A. T., **J. Sun**, and Y. Li, 2015, Geophysical inversions applied to geological differentiation and deposit characterization: A case study at an IOCG deposit in Carajás Mineral Province, Brazil: 85th Annual International Meeting, SEG Expanded Abstracts, pp. 2012-2016, New Orleans, US. https://doi.org/10.1190/segam2015-5928819.1
12. Li, Y., and **J. Sun**, 2015, Towards geology differentiation using magnetization inversions: International Workshop on Gravity, Electrical & Magnetic Methods and their Applications, pp. 350-353, Chengdu, China, 19-22 April 2015. https://doi.org/10.1190/GEM2015-091
11. **Sun, J.**, and Y. Li, 2014, Exploration of a sulfide deposit using joint inversion of magnetic and induced polarization data: 84th Annual International Meeting, SEG Expanded Abstracts, pp. 1780-1784, Denver, US. https://doi.org/10.1190/segam2014-1511.1
10. Li, Y., and **J. Sun**, 2014, Total magnetization vector inversion using guided fuzzy c-means clustering: 84th Annual International Meeting, SEG Expanded Abstracts, pp. 1285-1290, Denver, US. https://doi.org/10.1190/segam2014-1041.1
9. **Sun, J.**, and Y. Li, 2013, A general framework for joint inversion with petrophysical information as constraints: 83rd Annual International Meeting, SEG Expanded Abstracts, pp. 3093-3097, Houston, US. https://doi.org/10.1190/segam2013-1185.1
8. **Sun, J.**, and Y. Li, 2013, Petrophysically constrained geophysical inversion using Parzen window density estimation: 83rd Annual International Meeting, SEG Expanded Abstracts, pp. 3051-3056, Houston, US. https://doi.org/10.1190/segam2013-1163.1
7. **Sun, J.**, and Y. Li, 2012, Joint inversion of multiple geophysical data: A petrophysical approach using guided fuzzy c-means clustering: 82nd Annual International Meeting, SEG Expanded Abstracts, 1-5, Las Vegas, US. https://doi.org/10.1190/segam2012-1388.1
6. **Sun, J.**, Y. Li, and M. Nabighian, 2012, Lithology differentiation based on inversion of full waveform induced polarization data from Newmont Distributed IP Data Acquisition System (NEWDAS): 82nd Annual International Meeting, SEG Expanded Abstracts, pp. 1-5, Las Vegas, US. https://doi.org/10.1190/segam2012-1378.1
5. **Sun, J.**, and Y. Li, 2012, Joint inversion of seismic traveltimes and gravity data using petrophysical constraints with application to lithology differentiation: 22nd ASEG International Geophysical Conference and Exhibition, 1-4, Brisbane, Australia. https://doi.org/10.1071/ASEG2012ab179
4. **Sun, J.**, and Y. Li, 2011, Geophysical inversion using petrophysical constraints with application to lithology differentiation: 12th International Congress of the Brazilian Geophysical Society & EXPOGEF, 861-866, Aug 15-18, Rio de Janeiro, Brazil. https://doi.org/10.1190/sbgf2011-178
3. **Sun, J.**, and Y. Li, 2011, Geophysical inversion using petrophysical constraints with application to lithology differentiation: 81st Annual International Meeting, SEG Expanded Abstracts, 30, pp. 2644-2648, San Antonio, US. https://doi.org/10.1190/1.3627741
2. **Sun, J.**, and Y. Li, 2010, Adaptive Lp inversion to recover both blocky and smooth features: 80th Annual International Meeting, SEG Expanded Abstracts, 29, pp. 4297-4301, Denver, US. https://doi.org/10.1190/1.3513768
1. **Sun, J.**, and Y. Li, 2010, Inversion of surface and borehole gravity with thresholding and density constraints: 80th Annual International Meeting, SEG Expanded Abstracts, 29, pp. 1798-

1803, Denver, US. https://doi.org/10.1190/1.3513191

## CONFERENCE ABSTRACTS/PRESENTATIONS

(Name indicates supervised students/post-docs)

21. Ghosh, J., **J. Sun**, S. Thoram, and W. Sager, 2023, Evaluating and improving labels of training data sets using unsupervised machine learning: An example from marine magnetic data interpretation, AGU Fall Meeting Abstracts.
20. Ghosh, J., S. Thoram, **J. Sun**, and W. Sager, 2023, Interpreting marine magnetic anomalies with deep learning, AGU Fall Meeting Abstracts.
19. Hu, Y., X. Wei, X. Wu, **J. Sun**, Y. Huang, and J. Chen, 2023, Deep learning enhanced 3D joint inversion, IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting, 23-28 July, Portland, US.
18. Hu, Y., X. Wei, X. Wu, **J. Sun**, Y. Huang, and J. Chen, 2023, Deep learning enhanced joint inversion for mineral exploration using airborne geophysics: application in Decorah area, IMAGE '23, Houston, TX, US.
17. Wei, X., **J. Sun**, and M. K. Sen, 2023, 3D trans-dimensional Monte Carlo geometry inversion and uncertainty quantification using gravity data, IMAGE '23, Houston, TX, US.
16. **Sun**, **J.**, X. Wei, and M. K. Sen, 2023, Uncertainty quantification of anomalous body shapes using potential field data in a trans-dimensional Bayesian framework, IUGG General Assembly, JG02 Theory and Methods of Potential Fields, Berlin, Germany. https://doi.org/10.57757/IUGG23-4343
15. Wei, X., **J. Sun**, and M. K. Sen, 2022, A Bayesian framework for uncertainty analysis of anomalous body shapes using gravity data, AGU Fall Meeting Abstracts, NG35B-0469.
14. Wei, X., and **J. Sun**, 2021, Building 3D probabilistic geology differentiation models using mixed Lp norm joint inversion, airborne geophysics and petrophysical information, AGU Fall Meeting Abstracts, NG25A-0485, https://ui.adsabs.harvard.edu/abs/2021AGUFMNG25A0485W/abstract.
13. Wei, X., and **J. Sun**, 2021, Analyzing uncertainty of 3D inversion using airborne geophysical data conditioned on petrophysical measurements, AGU Fall Meeting Abstracts, NS35C-0373, https://ui.adsabs.harvard.edu/abs/2021AGUFMNS35C0373W/abstract
12. Li, X., and **J. Sun**, 2021, Investigating the Recoverability of Density-Susceptibility Relationships from Geophysical Inversions, AGU Fall Meeting Abstracts, NS24A-02, https://ui.adsabs.harvard.edu/abs/2021AGUFMNS24A..02L/abstract
11. **Sun, J.,** R. Mehta, and D. Yang, 2021, Mapping River Salinization Using Airborne Electromagnetic Data and Unsupervised Machine Learning, AGU Fall Meeting Abstracts, IN42B-06, https://ui.adsabs.harvard.edu/abs/2021AGUFMIN42B..06S/abstract
10. Li, K. H., Wei, X., and **J. Sun**, 2021, Characterizing a buried niobium deposit using airborne geophysics, joint inversion, and geology differentiation, NS24A-05, https://ui.adsabs.harvard.edu/abs/2021AGUFMNS24A..05L/abstract.
9. Kim, J. D., and **J. Sun**, 2019, Cross-gradient Joint Inversion of the QUEST data in Central British Columbia for regional scale mineral exploration, AGU Fall Meeting Abstracts, NS23B-0839, https://ui.adsabs.harvard.edu/abs/2019AGUFMNS23B0839K
8. Li, K. H., and **J. Sun**, 2019, Geophysical Characterization of the Elk Creek Carbonatite (Southeastern Nebraska) using Joint Inversion of Airborne Gravity Gradiometry and Magnetic

Data, AGU Fall Meeting Abstracts, NS43D-0866, https://ui.adsabs.harvard.edu/abs/2019AGUFMNS43D0866L

7. Nurindrawati, F. D., and **J. Sun**, 2019, Predicting magnetization direction using convolutional neural networks, AGU Fall Meeting Abstracts, GP42A-09, https://ui.adsabs.harvard.edu/abs/2019AGUFMGP42A..09N
6. Bernier, C., Y. Wang, M. Estes, R. Lei, B. Jia, S. Wang, and **J. Sun**, 2019, Clustering surface ozone diurnal cycles to understand the impact of circulation patterns in Houston, TX, AGU Fall Meeting Abstracts, A21G-2650, https://ui.adsabs.harvard.edu/abs/2019AGUFM.A21G2650B
5 **Sun, J.,** and W. W. Sager, 2019, Interpreting marine magnetic anomaly of Ori Massif in the northwest Pacific Ocean using magnetization clustering inversion: 2nd International Conference on Machine Learning in Solid Earth Geoscience, Santa Fe, United States, Mar. 18-22.
4 **Sun, J.,** Y. Zhang, and A. Li, 2018, Accelerating USArray data processing using ensemble learning: Machine Learning in Solid Earth Geoscience Workshop, Santa Fe, United States, Feb. 20-13.
3 **Sun, J.,** and Y. Li, 2017, 3D magnetization vector inversion based on fuzzy clustering: inversion algorithm, uncertainty analysis and application to geology differentiation: American Geophysical Union (AGU) Fall Meeting, New Orleans, United States, Abstract #NS33A-0037, https://ui.adsabs.harvard.edu/abs/2017AGUFMNS33A0037S
2. Irons, T., **J. Sun**, N. Moodie, R. Krahenbuhl, Y. Li, B. McPherson, and W. Ampomah, 2017, Monitoring carbon sequestration using charged wellbore controlled source electromagnetics and integrated reservoir models: AIChE Annual Meeting, Minneapolis, MN, United States, Oct. 29-Nov. 3rd.
1. **Sun, J.,** and Y. Li, 2012, A new joint inversion strategy using a priori petrophysical information as constraints: American Geophysical Union (AGU) Fall Meeting, San Francisco, United States, Abstract #NS34A-05, https://ui.adsabs.harvard.edu/abs/2012AGUFMNS34A..05S

## INVITED TALKS

08/2023 **Sun, J.,** and X. Wei, 2023, Mapping critical mineral resources using multiphysics inversion, IMAGE '23, Houston, TX, US.

07/2023 **Sun, J.**, and X. Wei, Building probabilistic quasi-geology models and mapping mineral resources using joint inversion and geology differentiation, IUGG General Assembly JS06 Joint Inversion of Different Geophysical Data Sets (IASPEI, IAGA, IAG, IAVCEI), Berlin, Germany. https://doi.org/10.57757/IUGG23-4333

09/2022 Wei, X., and **J. Sun**, A Bayesian Framework for Uncertainty Quantification of Salt Body Shapes Using Gravity Data, Geophysical Society of Houston Potential Fields SIG meeting, Houston, TX, United States.

08/2022 **Sun. J.**, Data-driven approaches to mineral prospectivity modeling from deposit to national scales, Post-Convention Workshop: Machine Learning in Accelerating Energy Transition and Enabling Low Carbon, Second International Meeting for Applied Geoscience & Energy, Houston, U.S.

10/2021 **Sun, J.,** Magnetics for energy transition, Post-Convention Workshop: Magnetic

Method for Near Surface and Mining Applications: In Memory of Afif Saad, First International Meeting for Applied Geoscience & Energy, Denver, US.

10/2020 Nurindrawati, F. D., and **J. Sun**, Predicting magnetization directions using convolutional neural networks, SEG Post-Convention Workshop: Machine Learning /Artificial Intelligence in Mineral Exploration, Houston, U.S.

04/2019 **Sun, J.,** Cross-fertilization of geophysical inversion and unsupervised machine learning, SEG webinar series 'Recent Advances and the Road Ahead', SEG Latin America Regional Advisory Committee, April 23rd.

10/2018 Li, Y., **J. Sun,** and A. Melo, Geology differentiation: An integrative approach to imaging geology at depth, International Symposium on Deep Earth Exploration and Practices, Session 9, Oct 24-26, Beijing, China.

05/2018 **Sun, J.**, Tackling magnetic remanence problem using a novel machine learning-based inversion method, Geophysical Society of Houston Potential Fields SIG meeting, Houston, TX, United States.

03/2018 Li, Y., A. Melo, C. Martinez, and **J. Sun**, Geology differentiation: A new frontier in quantitative geophysical interpretation, University of Brasilia, Brasilia, Brazil.

03/2018 **Sun, J.**, and Y. Li, Quantifying the uncertainty of magnetization directions recovered from magnetization clustering inversion, Gravity & Magnetics Research Consortium Annual Meeting, Department of Geophysics, Colorado School of Mines, Golden, United States.

01/2018 **Sun, J.,** Integrating multi-physical geoscientific data through joint inversion, Sensor Physics Seminar, Halliburton, Houston, United States.

12/2017 **Sun, J.,** Geophysics in the era of machine learning, Society of Student Geophysicists in Department of Geophysics at Colorado School of Mines, Golden, United States

11/2017 **Sun, J**., Solving geophysical inverse problems using unsupervised machine learning: Statistics Seminar in Department of Mathematics at University of Houston, Houston, United States

09/2017 Capriotti, J., **J. Sun**, and Y. Li, Subsurface characterization through quantitative integration of multi-physical and diverse geoscientific data sets, SEG Post-Convention Workshop: Multiphysics subsurface characterization and monitoring, 2017 SEG Annual Meeting, Houston, United States.

06/2017 Li, Y., and **J. Sun**, Fuzzy c-means clustering-based magnetization inversion and its application to geology differentiation, China University of Geosciences, Wuhan, China.

10/2016 Li, Y., A. Melo, C. Martinez, and **J. Sun**, Geology differentiation: A new frontier in quantitative geophysical interpretation, Mining and Geothermal Luncheon, 2016 SEG Annual Meeting, Dallas, United States.

06/2016 Li, Y., and **J. Sun**, 3D magnetization inversion using a fuzzy c-means clustering constraint with application to geology differentiation, Chinese Academy of Geological Sciences, Beijing, China.

04/2013 **Sun, J.**, and Y. Li, Joint inversion of geophysical and petrophysical data: A guided fuzzy c-means clustering approaching, Geoscience Australia, Canberra, Australia.

12/2012 **Sun, J.**, and Y. Li, A new joint inversion strategy using a priori petrophysical information as constraints in Session: Joint Inversions and Other Strategies to Integrate Multidisciplinary Geophysical Data II at American Geophysical Union (AGU) Fall Meeting, San Francisco, United States.

11/2012 **Sun, J.**, and Y. Li, Joint inversion using physical property constraints: SEG Post-Convention Workshop: A Working Guide to 3D Inversion Methods in Mining Geophysics, SEG Annual Meeting, Las Vegas, United States.

07/2012 **Sun, J.**, and Y. Li, A new approach to joint inversion using statistical petrophysical constraints: Application to joint seismic travel time and gravity inversion at Bureau of Geophysical Prospecting (BGP) Technical Forum, Zhuozhou, China.

07/2010 Li, Y., **J. Sun**, and K. Davis, Joint inversion: Algorithmic considerations and new directions at Bureau of Geophysical Prospecting (BGP) Technical Forum, Zhuozhou, China.

## OTHER TALKS

07/2023 Wei, X., and **J. Sun,** Building 3D quasi-geology models and predicting mineral resources using joint inversion and open-source code, BIRS Workshop 23w2014: Open-Source Tools to Enable Geophysical Data Processing and Inversion, Banff, Canada. https://www.birs.ca/events/2023/2-day-workshops/23w2014/videos/watch/202307290955-Sun.html

11/2021 Li, X., X. Wei, and **J. Sun**, Building probabilistic quasi-geology models based on multiple airborne geophysical data and sparse joint inversions, Geophysical Society of Houston Potential Fields SIG meeting, Houston, TX, United States.

10/2021 Li, X., and **J. Sun**, Investigating the recoverability of physical property relationships from geophysical inversions of multiple potential-field data, SimPEG Monthly Seminar Series, virtual.

09/2021 Wei, X., and **J. Sun**, From deterministic to probabilistic geoscience modeling: analyzing uncertainties of geophysical inversions and constructing probabilistic subsurface models conditioned on petrophysical measurements, SimPEG Seminar Series, virtual.

09/2021 Wei, X., and **J. Sun**, Uncertainty analysis of 3D geophysical inversions and geology differentiation, 2021 International School on Inverse Problems in Geophysics, virtual.

## STUDENT SUCCESS

- 2022/12 ---- Xiaolong Wei received the Fall 2022 Dan E. Wells Outstanding Dissertation Award.
- 2022/09 ---- Xiaolong Wei accepted a post-doc position at Stanford University.
- 2022/06 ---- Xiaolong Wei received the SEG/Lucien LaCoste Scholarship.

- 2022/05 ---- Xinyan Li accepted a post-doctoral offer from the Department of Land, Air and Water Resources at the University of California, Davis.
- 2022/03 ---- Kenneth Li and Xiaolong Wei received the Best Paper Award from SEG Mining Committee for their paper presented at 2021 SEG Annual Meeting titled *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 Carbonatite*.
- 2022/03 ---- Xiaolong Wei received the Best Student Paper Award from the SEG Mining Committee for his paper presented at 2021 SEG Annual Meeting titled *3D probabilistic geology differentiation using mixed Lp norm joint inversion constrained by petrophysical information*.
- 2021/10 ---- Xiaolong Wei was selected as one of the three recipients of the EAS Student Research Funding Program, https://uh.edu/nsm/earth-atmospheric/news-events/stories/2021/1011-student-research.php.
- 2021/08 ---- Xiaolong Wei was awarded the SEG Technical Program Registration Grant by the SEG Travel Grant Committee.
- 2021/05 ---- Xiaolong Wei was awarded SEG John R. Butler Jr. Scholarship.
- 2021/02 ---- Felicia Nurindrawati received the Best Student Paper Award from SEG Mining Committee for her paper presented at 2020 SEG Annual Meeting titled *Improving the accuracy of convolutional neural networks in predicting magnetization directions*.
- 2021/02 ---- Xiaolong Wei received the Best Poster Award from the SEG Mining Committee for his paper presented at 2020 SEG Annual Meeting titled *Quantifying uncertainties of deterministic geophysical inversions using mixed Lp norms*.
- 2020/10 ---- Felicia Nurindrawati's work was featured as Editor's Highlight (https://eos.org/editor-highlights/machine-learning-for-magnetics). Fewer than 2% of AGU (American Geophysical Union) journal articles are featured this way.
- 2020/10 ---- Felicia Nurindrawati's thesis work was published in Journal of Geophysical Research: Solid Earth and featured on the cover page of the October issue in 2020 (https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1002/jgrb.53494).
- 2020/03 ---- Jae Deok Kim was accepted into PhD programs in UCSD, Stanford, MIT-WHOI, Columbia University and University of Wisconsin-Madison. He is now pursuing his PhD at MIT-WHOI.
- 2020/02 ---- Felicia Nurindrawai won the Best Student Poster Award at 26$^{th}$ Annual Milton B. Dobrin Lecture.
- 2019/09 ---- Melanie Adelman won the Warren L. and Florence W. Calvert Memorial Scholarships from the Houston Geological Society (HGS) (https://www.uh.edu/nsm/earth-atmospheric/news-events/stories/2019/0903-calvert-scholarships.php).
- 2019/07 ---- Felicia Nurindrawati was awarded SEG Technical Program travel grant to attend SEG International Exposition and 89th Annual Meeting in San Antonio, Texas, USA 15-18 September 2019.
- 2019/06 ---- Felicia Nurindrawati and Jae Deok Kim were awarded SEG Robert E. & Margaret S. Sheriff Scholarship in June 2019.

- 2019/05 ---- Jae Deok Kim was awarded SEG/ExxonMobil Student Education Program (SEP) travel grant to participate in the SEP course and attend the 2019 SEG International Exposition & 89th Annual Meeting in San Antonio, Texas 13-18 September 2019.

## HONORS & AWARDS

**University of Houston**

2022 Nominated by the Department of Earth and Atmospheric Sciences for University Teaching Excellence Award (Category 3: Innovation in Instructional Technology).

2021 Finalist for University Teaching Excellence Award (Category 1: Teaching Excellence)

2019 Alternative Textbook Incentive Program Award

**CSIRO, Australia**

2017 CSIRO Deep Earth Imaging Postdoctoral Fellowship (declined)

**Society of Exploration Geophysicists (SEG)**

2021 **Best Paper** in the Mining sessions at the 2021 SEG Annual Meeting for *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 carbonatite* (co-authored with Kenneth Li and Xiaolong Wei)

2021 **Best Student Paper** in the Mining sessions at the 2021 SEG Annual Meeting for *3D probabilistic geology differentiation using mixed Lp norm joint inversion constrained by petrophysical information* (co-authored with Xiaolong Wei)

2021 **J. Clarence Karcher Award**
In recognition of significant contributions to the science and technology of exploration geophysics by a young geophysicist of outstanding abilities who, in the unanimous opinion of the Honors and Awards Committee and the Board of Directors, merits such recognition.

2020 **Best Student Paper** in the Mining sessions at the 2020 SEG Annual Meeting for *Improving the accuracy of convolutional neural networks in predicting magnetization directions* (co-authored with Felicia Nurindrawati)

2020 **Best Poster** in the Mining sessions at the 2020 SEG Annual Meeting for *Quantifying uncertainties of deterministic geophysical inversions using mixed Lp norms* (co-authored with Xiaolong Wei)

2019 **Faculty Advisor Award** for SEG Summit Level Student Chapter
SEG Wavelets, the UH SEG Student Chapter, was recognized as one of 10 Summit-Level Student Chapters (among the 112 active student chapters worldwide) in 2019 by SEG Student Chapter Excellence Program for its outstanding student engagement (https://seg.org/Education/Student-Early-Career/Student-Chapters/Student-Chapter-Excellence-Program). It was ranked 1st in the United States for "***Best SEG Student Chapter***" and 3rd world-wide.

2016 **Best Paper in the Mining sessions** at the 2016 SEG Annual Meeting for *Geology differentiation with uncertainty estimation using inverted magnetization directions* (co-authored with Yaoguo Li)

2015 **Honorable Mention of Best Paper in GEOPHYSICS**
*Multidomain petrophysically constrained inversion and geology differentiation using guided fuzzy c-means clustering* (co-authored with Yaoguo Li)

2015 **Best Student Paper** in the Mining and Geothermal sessions at the 2015 SEG Annual Meeting for *Geophysical inversions applied to geological differentiation and deposit characterization: A case study at an IOCG deposit in Carajás Mineral Province, Brazil* (co-authored with Aline Melo and Yaoguo Li)

2011 SEG/Denver Geophysical Society Scholarship

**Colorado School of Mines**

2015 Mendenhall Prize for Outstanding Graduating Doctor of Philosophy Student (who, throughout their graduate program, have demonstrated outstanding academic performance, the ability to conduct cutting-edge research, and the highest standards of integrity and professional conduct)

2008 Meng Ersheng Geophysics Student Award

**China University of Geosciences (Wuhan)**

2007 National Encouragement Scholarship
2006 Zhongkai Mining Geophysics Scholarship

## UNIVERSITY SERVICE

**Undergraduate Student Advisee**
2019-2020 Bhavya Merchant (Senior Honors Thesis)

**Graduate Student Advisees**
2022-Present Jay Ghosh (Ph.D. in geophysics, co-advise with Will Sager)
2022-Present Qiong Wu (Ph.D. in geophysics)
2022-Present Julio Garcia (M.Sc. in geophysics)
2021-Present Divine Victor Kalu (Ph.D. in geophysics)
2020-Present Keenan Barker (M.Sc. in geophysics)
2018-Present Xinyan Li (Ph.D. in geophysics)
2018-2022 Xiaolong Wei (Ph.D. in geophysics, graduated in Dec 2022)
2018-2021 Kenneth Li (M.Sc. in geophysics, graduated in May 2021)
2018-2020 Felicia Nurindrawati (M.Sc. in geophysics, graduated in May 2020)
2018-2020 Jae Deok Kim (M.Sc. in geophysics, graduated in May 2020)
2018-2019 Melanie Adelman (M.Sc. in geology, graduated in Dec 2019)

**Graduate Thesis Committees**

2022-Present Mohmed H.K. Abdelfatah (Ph.D. in geology)
2022-Present Chesney Petkovsek (Ph.D. in geophysics)

2022-Present Kenneth Shipper (Ph.D. in geophysics)
2022-Present Brendan Cornelison (Ph.D. in geophysics)
2022-Present Veronica Guzman (Ph.D. in geophysics)
2021-Present Muhammad Qasim (Ph.D. in geology)
2020-Present Brian Pack (Ph.D. in geophysics)
2020-Present Guibao Liu (Ph.D. in geophysics)
2020-Present Zhehao Li (Ph.D. in geophysics)
2022 Xiao Yu (Ph.D. in geophysics, graduated in Dec 2022)
2019-Present Yuhao Liu (Ph.D. in geophysics, graduated in Dec 2022)
2021-Present Jacob Kerl (M.Sc. in geophysics, graduated in May 2022)
2020-2021 Benjamin Miller (M.S. in geology, graduated in May 2021)
2020-2021 Drew Sims (M.S. in geophysics, graduated in May 2021)
2019-2021 Yang Mu (Ph.D. in geophysics, graduated in May 2021)
2017-2021 Qianqian Wei (Ph.D. in geophysics, graduated in May 2021)
2019-2020 Fanbo Zhou (M.S. in geophysics, graduated in July 2020)
2018-2020 Marwa Hussein (Ph.D. in Geophysics, graduated in July 2020)
2017-2020 Wenyuan Zhang (Ph.D. in Geophysics, graduated in May 2020)
2019 Christine Kuo (M.S. in geophysics, graduated in Dec 2019)
2018-2019 Wanda Crupa (M.S. in Geophysics, graduated in July 2019)
2017-2018 Po-Hsu Chen (M.Sc. in Geophysics, graduated in Dec. 2018)
2018 Timothy J. Kearns (Ph.D. in Geophysics, graduated in May 2018)

**EAS Department Service**

04/2022 Faculty host for departmental seminar speaker, Dr. Eileen Martin
04/2022 Faculty judge for 35th Annual EAS Student Research Conference
09/2021-Present EAS Diversity, Equity and Inclusion (DEI) Committee
07/2021-Present EAS Industry Recruiting Committee
10/2020-Present EAS Fundraising & Alumni Relations Committee
10/2020-Present Annual Robert E. Sheriff Lecture Committee
02/2020 Faculty judge at Dobrin Lecture
01/2020-Present Manager of EAS social media account
11/2019 Faculty judge for student poster session at 21st Annual Sheriff Lecture
10/2019 Faculty host for department seminar speaker, Dr. Yunsoo Choi
07/2019-Present EAS Department Seminar Committee
04/2019 Faculty judge for Student Research Day
04/2019 Faculty host for department seminar invited speaker, Dr. Haibin Di
02/2019 Faculty host for SEG 2019 1Q/2Q Distinguished Lecturer, Dr. Felix Herrmann
02/2019-Present Geology PhD Candidacy Committee
10/2018-03/2019 Faculty search committee on the geodynamics position
09/2018 Faculty host for department seminar invited speaker, Dr. Mrinal Sen
05/2018-Present EAS Website Committee
05/2018-09/2019 Paradise Professor for the Paradise software donated by Geophysical Insights
05/2018-05/2019 Faculty advisor for SEG Wavelets, the SEG Student Chapter at University of Houston
04/2018 Faculty judge for Student Research Day
03/2018 Faculty host for department seminar invited speaker, Dr. Weichang Li
11/2017-Present Dobrin Event Committee

11/2017 Faculty judge for student poster session at 19th Annual Sheriff Lecture

## PROFESSIONAL SERVICE

### Professional Organizations and Meetings

2022 Session chair for MG 1: New Methods and Case Histories
**Second International Meeting for Applied Geoscience & Energy**, Houston, US

2022 Technical Committee Member
**Second International Meeting for Applied Geoscience & Energy**, Houston.

2021-Present Research Committee
**Society of Exploration Geophysicists (SEG)**

2021 Technical Committee Member
**Second International Meeting for Applied Geoscience & Energy**, Denver.

2021 Lead organizer for post-convention workshop: Magnetic Method for Near Surface and Mining Applications: In Memory of Afif Saad
**First International Meeting for Applied Geoscience & Energy**, Denver, US

2021 Session chair for MG P2 and P3: New Methods and Case Histories
**First International Meeting for Applied Geoscience & Energy**, Denver, US

2021 Technical Committee member, 2nd SEG workshop "The Artificially Intelligent Earth Exploration", 30 Nov - 2 Dec 2021, Saudi Arabia.

2020-Present **SEG Mining Committee** Technical Chair and Key Contact

2020 Lead organizer for Post-Convention Workshop W-10: Machine Learning/Artificial Intelligence in Mineral Exploration
**SEG Annual Meeting, Houston, United States**

2020 Session chair for MG P1: New Methods and Case Histories
**SEG Annual Meeting, Houston, United States**

2019 Session chair for GM P1: Examples and Methods for Potential Fields
**SEG Annual Meeting, San Antonio, United States**

2019 Session chair for EMRS P3: Inversion and Interpretation
**SEG Annual Meeting, San Antonio, United States**

2019 Technical Committee Chair
**GEM 2019 Xi'an: International Workshop on Gravity, Electrical & Magnetic Methods and Their Applications, Xi'an, China** co-organized by CGS and SEG

2018 Session chair for GM P1: Application of Interpretation Tools
**SEG Annual Meeting, Anaheim, United States**

2018-Present Member of Gravity and Magnetics Committee

**Society of Exploration Geophysicists (SEG)**

2019-Present Member of Mining Committee
**Society of Exploration Geophysicists (SEG)**

2020-Present Geomagnetism, Paleomagnetism, and Electromagnetism (GPE) Committee
**American Geophysical Union (AGU)**

2020-Present GPE web editor and social media manager
**American Geophysical Union (AGU)**

2020-Present SEG Gravity and Magnetics Committee social media manager

**Reviewer**

2011-Present Pure and Applied Geophysics
2013-Present Geophysics
2015-Present Exploration Geophysics
2016-Present Journal of Applied Geophysics
2016-Present Geophysical Prospecting
2016-Present Geophysical Journal International
2016-Present Interpretation
2016-Present Journal of Geophysical Research – Solid Earth
2018-Present SEG Annual Meeting Expanded Abstracts
2018-Present Computational Geosciences
2019-Present IEEE J. Multiscale and Multiphysics Computational Techniques (JMMCT)
2020-Present IEEE Transactions on Geoscience and Remote Sensing (TGRS)
2020 NSF
2021 Natural Sciences and Engineering Research Council of Canada (NSERC)
2021 Academy of Finland
2021 Mitacs Accelerate
2021-Present Geophysical Research Letters
2021-Present Economic Geology
2021-Present Earth-Science Reviews
2021-Present Natural Resources Research
2021-Present Earth and Space Science
2021-Present Earth System Science Data (ESSD)
2022-Present Computers & Geosciences
2022-Present GSA Today
2022-Present Earth & Planetary Physics
2022-Pressent The Leading Edge
2022 Cambridge University Press (book chapter)

**Panelist**

2018 Geology Transfer Panel, Lone Star College – University Park

**Editorial Service**

2020-Present **Associate Editor**, *GEOPHYSICS*
2021-Present **Associate Editor** for Special Issue machine learning applications in geophysical

exploration and monitoring, *Geophysical Prospecting*

2018-2019 **Guest Associate Editor**, *Interpretation*

## PROFESSIONAL AFFILIATIONS

2008-Present Society of Exploration Geophysicists (SEG)
2009-Present American Geophysical Union (AGU)
2017-Present European Association of Geoscientists & Engineers (EAGE)
2018-Present Geophysical Society of Houston (GSH)

## CERTIFICATIONS

09/2014 **Machine Learning**
Certificate signed by Prof. Andrew Ng upon successfully completing the online machine learning course provided by Stanford University through Coursera Inc.

08/2017 **Neural Networks and Deep Learning**
Certificate signed by Dr. Andrew Ng upon successfully completing the online machine learning course provided by deeplearning.ai on Coursera.

09/2017 **Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization**
Certificate signed by Dr. Andrew Ng upon successfully completing the online machine learning course provided by deeplearning.ai on Coursera.

10/2017 **Structuring Machine Learning Projects**
Certificate signed by Dr. Andrew Ng upon successfully completing the online machine learning course provided by deeplearning.ai on Coursera.

10/2017 **Machine Learning Practical Applications in Petrophysics Bootcamp**
Certificate signed by Dr. Lewis Matthews upon successfully completing the course in Houston, TX. Course organized by Society of Petrophysicists and Well Log Analysts (SPWLA) Houston Chapter.