

# Jiajia Sun

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Google Scholar: <https://scholar.google.com/citations?user=j8vhgpMAAAAJ&hl=en>

## EDUCATION

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- 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

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- 2017-Present   **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

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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:

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

## TEACHING EXPERIENCES

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### University of Houston

- **GEOL 7330 Potential Field Methods of Geophysical Exploration** (*Spring, 2020*)  
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).
- **GEOL 6397 Computational Methods in Geophysical Electromagnetics** (*Fall, 2019*)  
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 4397 Electromagnetic Methods for Exploration** (*Fall, 2018*)  
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).
- **GEOL 4355 Geophysical Field Camp** (*Summer, 2018, 2019*)  
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 4397 Data Analytics and Machine Learning for Geoscientists** (*Spring, 2018, 2019*)  
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 convolutional neural networks). 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 the Scikit-Learn package, TensorFlow and Keras. **Enrollment:** 23 (2018), 22 (2019).

### 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)

13. Wei, X., and **J. Sun**, 2020, Uncertainty analysis of geophysical inversions using mixed Lp norms: *Geophysics*, under review.
12. **Sun, J.**, and X. Wei, 2020, Recovering sparse models in 3D potential-field inversion without bound dependence or staircasing problems using a mixed Lp-norm regularization, *Geophysical Prospecting*, published online. <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 as cover image on 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 mentioned 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

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(Name indicates supervised students/post-docs)

4. Li, Y., **J. Sun**, S. Li, and M. Leão-Santos, 2020, A paradigm shift in magnetic data interpretation: Increased value through magnetization inversions: *The Leading Edge*, accepted for publication.
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

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(Name indicates supervised students/post-docs)

6. Li, X. and **J. Sun**, 2020, Understanding the recoverability of physical property relationships from inversions of multiple potential-field datasets: to be submitted to *Geophysics* in Dec.
5. Kim, J. D., **J. Sun**, and A. Melo, 2020, Regional-scale mineral exploration through joint inversion and geology differentiation based on multi-physics geoscientific data in the QUEST project area: to be submitted to *Geophysics* in Nov.
4. **Sun, J.**, and Y. Li, 2021, Inversion of full-waveform induced polarization data and its application to geology differentiation.
3. **Sun, J.**, and Y. Li, 2021, Geology differentiation through joint clustering inversion: A sulfide deposit example from Bathurst Mining Camp.
2. **Sun, J.**, 2021, A multi-barrier approach to solving geophysical discrete-valued inverse problems.
1. **Sun, J.**, 2021, Joint inversion of airborne gravity gradiometry and magnetic data based on incomplete petrophysical knowledge.

## OPEN DATA & CODES

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(Name indicates supervised students/post-docs)

5. Nurindrawati, Felicia Disa & Sun, Jijia (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

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(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

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(Name indicates supervised students/post-docs)

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: 90<sup>th</sup> 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: 90<sup>th</sup> 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: 90<sup>th</sup> 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: 90<sup>th</sup> 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: 90<sup>th</sup> 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, 82<sup>nd</sup> EAGE Conference and Exhibition, Amsterdam, The Netherlands.

22. **Nurindrawati, F. D., and J. Sun**, 2019, Estimating total magnetization directions using convolutional neural networks: 89<sup>th</sup> 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: 88<sup>th</sup> 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: 87<sup>th</sup> 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: 86<sup>th</sup> 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: 86<sup>th</sup> 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: 86<sup>th</sup> 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: 85<sup>th</sup> 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: 85<sup>th</sup> 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: 84<sup>th</sup> 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: 84<sup>th</sup> 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: 83<sup>rd</sup> 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: 83<sup>rd</sup> 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: 82<sup>nd</sup> 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): 82<sup>nd</sup> 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: 22<sup>nd</sup> 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: 12<sup>th</sup> 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: 81<sup>st</sup> Annual International Meeting, SEG Expanded Abstracts, 30, pp. 2644-2648, San Antonio, US. <https://doi.org/10.1190/1.3513768>
  2. **Sun, J.**, and Y. Li, 2010, Adaptive Lp inversion to recover both blocky and smooth features: 80<sup>th</sup> 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: 80<sup>th</sup> Annual International Meeting, SEG Expanded Abstracts, 29, pp. 1798-1803, Denver, US. <https://doi.org/10.1190/1.3513191>

## CONFERENCE ABSTRACTS/PRESENTATIONS

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(Name indicates supervised students/post-docs)

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: 2<sup>nd</sup> 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. 3<sup>rd</sup>.
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

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| 10/2020 | <u>Nurindrawati, F. D.</u> , and <b>J. Sun</b> , Predicting magnetization directions using convolutional neural networks, SEG Post-Convention Workshop: Machine Learning /Artificial Intelligence in Mineral Exploration, Houston, U.S. |
| 04/2019 | <b>Sun, J.</b> , 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 23 <sup>rd</sup> .       |
| 10/2018 | Li, Y., <b>J. Sun</b> , 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 | <b>Sun, J.</b> , 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 <b>J. Sun</b> , Geology differentiation: A new frontier in quantitative geophysical interpretation, University of Brasilia, Brasilia, Brazil.   |
| 03/2018 | <b>Sun, J.</b> , and Y. Li, Quantifying the uncertainty of magnetization directions   |



recovered from magnetization clustering inversion, Gravity & Magnetism 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 approach, 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.

## STUDENT SUCCESS

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- 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 article are featured this way.
- Felicia Nurindrawati's thesis work was published in Journal of Geophysical Research: Solid Earth and selected as the cover image for the October issue in 2020 (<https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1002/jgrb.53494>).
- Jae Deok Kim was accepted into PhD programs in UCSD, Stanford, MIT-WHOI, Columbia University and University of Wisconsin-Madison in spring 2020. He is now pursuing his PhD at MIT-WHOI.
- Felicia Nurindrawai won the Best Student Poster Award at 26<sup>th</sup> Annual Milton B. Dobrin Lecture on February 12<sup>th</sup>, 2020.
- Melanie Adelman won the Warren L. and Florence W. Calvert Memorial Scholarships from the Houston Geological Society (HGS) in 2019 (<https://www.uh.edu/nsm/earth-atmospheric/news-events/stories/2019/0903-calvert-scholarships.php>).
- 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.
- Felicia Nurindrawati and Jae Deok Kim were awarded SEG Robert E. & Margaret S. Sheriff Scholarship in June 2019.
- 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

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### University of Houston

- 2020 University Teaching Excellence Award (selected as one of the finalists, winners to be announced in April, 2021).
- 2019 Alternative Textbook Incentive Program Award

### CSIRO, Australia

- 2017 CSIRO Deep Earth Imaging Postdoctoral Fellowship (declined)

### Society of Exploration Geophysicists (SEG)

- 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)
- 2016 **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**

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### **Undergraduate Student Advisee**

2019-Present Bhavya Merchant (Senior Honors Thesis)

### **Graduate Student Advisees**

- 2020-Present Keenan Barker (M.Sc in Geophysics)  
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-Present Kenneth Li (M.Sc. in Geophysics)  
2018-2019 Melanie Adelman (M.Sc. in Geology, graduated in Dec 2019)  
2018-Present Xinyan Li (Ph.D. in Geophysics)  
2018-Present Xiaolong Wei (Ph.D. in Geophysics)

### **Graduate Thesis Committees**

- 2020-Present Brian Pack (Ph.D. in geophysics)  
2020-Present Guibao Liu (Ph.D. in geophysics)  
2020-Present Zhehao Li (Ph.D. in geophysics)  
2020-Present Benjamin Miller (M.S. in geology)  
2020-Present Drew Sims (M.S. in geophysics)

2019-2020 Fanbo Zhou (M.S. in geophysics, graduated in July 2020)  
 2019-Present Yuhao Liu (Ph.D. in geophysics)  
 2019 Christine Kuo (M.S. in geophysics, graduated in Dec 2019)  
 2019-Present Yang Mu (Ph.D. in geophysics)  
 2018-2020 Marwa Hussein (Ph.D. in Geophysics, graduated in July 2020)  
 2018-2019 Wanda Crupa (M.S. in Geophysics, graduated in July 2019)  
 2018 Timothy J. Kearns (Ph.D. in Geophysics, graduated in May 2018)  
 2017-2020 Wenyuan Zhang (Ph.D. in Geophysics, graduated in May 2020)  
 2017-2018 Po-Hsu Chen (M.Sc. in Geophysics, graduated in Dec. 2018)  
 2017-Present Qianqian Wei (Ph.D. in geophysics)  
 2019-Present Xiang Ling (Ph.D. in geology)

### **EAS Department Service**

10/2020 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 21<sup>st</sup> 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 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 19<sup>th</sup> Annual Sheriff Lecture

## **PROFESSIONAL SERVICE**

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### **Professional Organizations and Meetings**

2021 Technical Committee member, SEG Annul Meeting, Denver, United States  
 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 Magnetism 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 Magnetism 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 SEG Annual Meeting Expanded Abstracts
- 2018-Present Computational Geosciences
- 2019 SEG Annual Meeting Expanded Abstracts
- 2019-Present IEEE J. Multiscale and Multiphysics Computational Techniques (JMMCT)
- 2020-Present IEEE Transactions on Geoscience and Remote Sensing (TGRS)
- 2020 SEG Annual Meeting Expanded Abstracts
- 2020 NSF
- 2021 Natural Sciences and Engineering Research Council of Canada (NSERC)
- 2021 Academy of Finland
- 2021-Present Geophysical Research Letters

### **Panelist**

- 2018 Geology Transfer Panel, Lone Star College – University Park

### **Editorial Service**

2020-Present **Associate Editor, *GEOPHYSICS***  
2018-2019 **Guest Associate Editor, *Interpretation***

## **PROFESSIONAL AFFILIATIONS**

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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**

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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.