Xiaowei JIA

xiaowei@pitt.edu
https://sites.pitt.edu/~xiaowei/
https://scholar.google.com/citations?user=mIvajOgAAAAJ&hl=en

EDUCATION

Sep.2015 – July.2020 **UNIVERSITY OF MINNESOTA, TWIN CITIES** Minneapolis, MN, USA
Ph.D. in Computer Science
Research on Data Mining and Machine Learning **Advisor: Prof. Vipin Kumar**
Thesis: "Integrating Physics into Machine Learning for Monitoring Scientific Systems"

Aug.2012 – July.2015 **UNIVERSITY AT BUFFALO, SUNY** Buffalo, NY, USA
M.S. in Computer Science

Sep.2008 – July.2012 **UNIVERSITY OF SCIENCE AND TECHNOLOGY OF CHINA (USTC)** Hefei, Anhui, China
Bachelor in Computer Science

EXPERIENCE

Associate Professor September 2025-present
Department of Computer Science, University of Pittsburgh

Assistant Professor August 2020-August 2025
Department of Computer Science, University of Pittsburgh

Data Science Research Intern Summer 2018, 2019
System Technology Lab, Adobe Research

Graduate Research Assistant 2015-2020
University of Minnesota, Twin Cities

HONORS & AWARDS

ICDM Blue Sky Track Best Paper	2025
AWRA William R. Boggess Award	2024
ESA's Ecological Forecasting Outstanding Publication Award	2023
SDM Best Applied Data Science Paper Award	2023
Best Dissertation Award, University of Minnesota	2022
SIGSPATIAL Best Paper Finalist	2022
Top 3 Performance in the SIGSPATIAL Cup competition	2022
SDM Best Applied Data Science Paper Award	2022
ICDM Best Conference Paper Award	2021
SDM Best Applied Data Science Paper Award	2021
KDD DeepSpatial Workshop Best Paper Award	2021
IEEE Rising Stars Conference - People Choice Award in YP Poster Competition	2021
Doctoral Dissertation Fellowship, University of Minnesota	2019
UMII MnDRIVE Graduate Fellowship, University of Minnesota	2017

College of Science and Engineering Fellowship, University of Minnesota	2015
Ranked amongst top 40 in Baidu Scholarship over around 10,000 nominations	2017
ASONAM Best Conference Paper Award	2016
IEEE BIBE Conference Best Student Paper Award	2014
Outstanding Graduate, USTC	2012
Excellent Student Scholarship, USTC (top 15% of students annually)	2009/2010/2011/2012

RESEARCH GRANTS

[16] NSF Award 2530609, "Collaborative Research: CAIG: Emulating Water Isotopes in Fully-coupled Global Climate Models using Knowledge-guided Machine Learning", personal share $383,203. 11/01/2025-10/31/2028. (Role: PI. Lead PI: Feng Zhu, NCAR. Other PIs: Yiqun Xie, University of Maryland).

[15] NASA AIST23_2-0041, "A Digital Twin Integrating Knowledge and AI for Understanding Carbon and Biodiversity Corridors in Central Africa", $1,399,788, personal share $300,000. 11/01/2025-10/31/2027 (anticipated). (Role: Co-PI. PI: Yiqun Xie, University of Maryland. Other Co-PIs: Lei Ma, George Hurtt, Catherine Nakalembe, University of Maryland; Patrick Jantz, Northern Arizona University).

[14] NSF Award 2425845, "Collaborative Research: CAIG: Toward Next-Generation Global Forest Carbon Monitoring via Integrated Sensing, Modeling and AI to Advance Carbon Cycle Science", personal share $252,540, 10/01/2024-09/30/2027. Date Awarded: 08/29/2024. (Role: PI, Lead PI: Yiqun Xie, UMD)

[13] NASA Early Career Investigator Program 80NSSC24K1061, "Towards Generalizable, Fair, and Knowledge Guided Machine Learning for Monitoring Earth Systems", $299,867, 08/01/2024-07/31/2027. Date Awarded: 02/21/2024. (Role: Sole PI)

[12] NSF Award IIS-2316305, "Collaborative Research: III: Small: Physics Guided Graph Networks for Modeling Water Dynamics in Freshwater Ecosystems", $599,993 (personal share $349,993), 10/01/2023-09/30/2026. Date awarded: 08/23/2023 (Role: Lead PI, Other PIs: Sheng Li, University of Virginia)

[11] NSF Award IIS-2239175, "CAREER: Combine Machine Learning and Physics-based Modeling Approaches for Accelerating Scientific Discovery", $599,987, 07/01/2023-06/30/2028. Date awarded: 06/13/2023. (Role: Sole PI)

[10] NE CASC with US Geological Survey Funding, "Beyond Temperature-only Coldwater Climate Refugia: Integration of Process-guided Deep Learning Models for Flow and Temperature into Assessments for Coldwater Streams", $413,952 (personal share $76,522), 07/15/2023-07/14/2025. Date awarded: 04/24/2023. (Role: Co-PI. PI: Jennifer Fair, USGS. Other Co-PIs: Amrita Gupta, Microsoft; Scott Jackson, UMass Amherst; Benjamin Letcher, USGS; Jeffrey Walker, USGS)

[9] NEC Lab Gift Funding, "Machine Learning in Supply Chain and Carbon Emission", $45,000. Date Awarded: 01/26/2023. (Role: Sole PI)

[8] Pitt Momentum Grant, "Preserving Fairness of Deep Learning Under Environmental Changes", $24,675, 06/30/2023-06/30/2024. Date awarded: 02/10/2023. (Role: PI. Co-PI: Hassan Karimi)

[7] NASA AIST-21-0068, "Coupled Statistics-Physics Guided Learning to Harness Heterogeneous Earth Data at Large Scales", $599,956 (personal share: $188,697), 07/01/2022-12/31/2023. Date awarded: 05/11/2022. (Role: Co-PI. PI: Yiqun Xie, University of Maryland. Other Co-PI: Sergii Skakun, University of Maryland)

[6] U.S. Geological Survey Grant G22AC00266, "Machine Learning for Flow Estimation Using Camera Images and Physical Knowledge", $79,495, 06/01/2022-05/31/2024. Date awarded: 06/01/2022. (Role: Sole PI)

[5] NSF Award OAC-2203581, "CDS&E: Physics Guided Super-Resolution for Turbulent Transport", $499,624 (personal share: $320,585), 08/01/2022-07/31/2025. Date awarded: 05/23/2022. (Role: PI. Co-PI: Peyman Givi)

[4] NSF Award IIS-2147195, "FAI: Advancing Deep Learning Towards Spatial Fairness", $755,098 (personal share: $330,324), 06/01/2022-05/31/2025. Date awarded: 05/25/2022. (Role: PI. Co-PIs: Yiqun Xie, Sergii Skakun, University of Maryland)

[3] U.S. Geological Survey Grant G21AC10564, "Advancing Process-Guided Deep Learning for Modeling Stream Networks with Reservoirs", $180,000, 01/01/2022- 12/31/2024. Date awarded: 09/20/2021. (Role: Sole PI)

[2] U.S. Geological Survey Grant G21AC10207, "Process-Guided Machine Learning for Modeling Stream and Reservoir Networks", $116,000, 03/22/2021-03/21/2023. Date awarded: 03/24/2021. (Role: Sole PI)

[1] Pitt Momentum Grant, "Physics-guided Machine Learning for Scientific Knowledge Discovery", $15,725, 06/30/2021-06/30/2022. Date awarded: 02/11/2021. (Role: Sole PI)

PUBLICATIONS

* Names underlined indicate individuals mentored by Xiaowei Jia

JOURNAL PAPERS

[49] J. Yang, L. Liu, Q. Yang, **X. Jia**, B. Peng, K. Guan, Z. Jin. Knowledge-guided graph machine learning improves corn yield mapping in the US Midwest. **Remote Sensing of Environment (RSE)**, 335, p.115287, 2026.

[48] Z. Li, Y. Xie, S. Skakun, **X. Jia**, G. Mai, W. Lu, M. Tong, and Z. Wang. Annotation-free cloud masking for PlanetScope images in the Arctic via cross-platform ability transfer using deep learning and foundation models. **Remote Sensing of Environment (RSE)**, 334, p.115138, 2026.

[47] Z. Jin, L. Liu, Q. Yang, **X. Jia**, S. Tao, Y. Guo, R. Ghosh, S. Wang, Q. Zhu, M. Jung, and K. Guan. Knowledge-Guided Machine Learning for Global Change Ecology Research. **Global Change Biology (GCB)**, 32(2), p.e70742, 2026.

[46] M. Ramezanpour, A. M. Robertson, Y. Tobe, **X. Jia**, and J. R. Cebral. AI-based modality-agnostic classification system for vascular calcifications. **Scientific Reports**, 15, no. 1 (2025): 35500, 2025.

[45] Z. Li, Y. Xie, **X. Jia**, G. Mai, Z. Wang, and W. Chen. Machine-learning-enabled spatial pattern mining: evaluating the impact of imperfect inputs. **International Journal of Geographical Information Science**, 39(10), pp.2362-2400, 2025.

[44] A. Karpatne, A. Deshwal, **X. Jia**, W. Ding, M. Steinbach, A. Zhang, and V. Kumar. AI-enabled scientific revolution in the age of generative AI: second NSF workshop report. **npj Artificial Intelligence**, 1(1), pp.18, 2025.

[43] R. Yu, Y. Xie, **X. Jia**. Environmental Computing as a Branch of Science. **Communications of the ACM (CACM)**. Published: June 12, 2025. 5 pages. CACM impact factor: 11.1. DOI link

[42] Z. Li, Y. Xie, **X. Jia**, G. Mai, Z. Wang, W. Chen. Machine-learning-enabled spatial pattern mining: evaluating the impact of imperfect inputs. **International Journal of Geographical Information Science (IJGIS).** Published: April 21, 2025. 39 pages. IJGIS impact factor: 4.3. DOI link

[41] Y. Xie, A. N. Nhu, X. Song, **X. Jia**, S. Skakun, H. Li, and Z. Wang. Accounting for Spatial Variability with Geo-aware Random Forest: A Case Study for US Major Crop Mapping. **Remote Sensing of Environment (RSE)**. Published: March 15, 2025. 16 pages. RSE impact factor: 13.5. DOI link

[40] G. Mai, Y. Xie, **X. Jia**, N. Lao, J. Rao, Q., Z. Liu, Y., J. Jiao. Towards the Next Generation of Geospatial Artificial Intelligence. **International Journal of Applied Earth Observation and Geoinformation**. Published: January 20, 2024. 20 pages. International Journal of Applied Earth Observation and Geoinformation impact factor: 7.6. DOI link

[39] Y. Wang, H. A. Karimi, **X. Jia**. Deep Learning Model for ENSO Forecasting Using Multiple-Scale Spatiotemporal Information. **IEEE Transactions on Geoscience and Remote Sensing (TGRS)**. Published: January 13, 2025. 10 pages. TGRS impact factor: 7.5. DOI link

[38] Y. Wan, J. Wu, T. Hou, C. Hsieh, **X. Jia**. Multi-channel Learning for Integrating Structural Hierarchies into Context-dependent Molecular Representation. **Nature Communications**. Published: January 06, 2025. 13 pages. Nature Communications impact factor: 14.7. DOI link

[37] J. D. Willard, C. Varadharajan, **X. Jia**, V. Kumar. Time Series Predictions in Unmonitored Sites: A Survey of Machine Learning Techniques in Water Resources. **Environmental Data Science**. Published: January 22, 2025. 39 pages. Environmental Data Science impact factor: 1.9. DOI link

[36] D. Qi, H. Zhao, **X. Jia**, S. Li. Revealing an Overlooked Challenge in Class-Incremental Graph Learning. **Transactions of Machine Learning Research (TMLR)**. Published: June 24, 2024. 19 pages. OpenReview link

[35] E. He, Y. Xie, W. Chen, S. Skakun, H. Bao, R. Ghosh, P. Ravirathinam, **X. Jia**. Learning with Location-based Fairness: A statistically-robust Framework and Acceleration. **IEEE Transactions on Knowledge and Data Engineering (TKDE)**. Published: March 06, 2024. 18 pages. TKDE impact factor: 8.9. DOI link

[34] L. Liu, W. Zhou, K. Guan, B. Peng, S. Xu, J. Tang, Q. Zhu, J. Till, **X. Jia**, C. Jiang, S. Wang, Z. Qin, H. Kong, R. Grant, S. Mezbahuddin, V. Kumar, Z. Jin. Knowledge-guided machine learning can improve carbon cycle quantification in agroecosystems. **Nature Communications**. Published: January 08, 2024. 15 pages. Nature Communications impact factor: 16.6. DOI link

[33] S. Chen, T. Bao, P. Givi, C. Zheng, **X. Jia**. Reconstructing Turbulent Flows Using Physics-Aware Spatio-Temporal Dynamics and Test-Time Refinement. **ACM Transactions on Intelligent Systems and Technology (TIST)**. Published: January 16, 2024. 18 pages. TIST impact factor: 5.0. DOI link

[32] S. Chen, S. Feng, Y. Huang, Z. Lei, **X. Jia**, Y. Lin, E. Rougier. HOSSNet: An Efficient Physics-guided Neural Network for Simulating Micro-crack Propagation. **Computational Materials Science**. Published: Mar 01, 2024. 18 pages. Computational Materials Science impact factor: 3.3. DOI link

[31] Y. Wang, H. A. Karimi, **X. Jia**. Reconstruction of Continuous High-Resolution Sea Surface Temperature Data Using Time-Aware Implicit Neural Representation. **Remote Sensing**. Published: December 06, 2023. 17 pages. Remote Sensing impact factor: 5.0. DOI link

[30] J. Zhou, Q. Yang, L. Liu, Y. Kang, **X. Jia**, M. Chen, R. Ghosh, S. Xu, C. Jiang, K. Guan, V. Kumar, Z. Jin. A deep transfer learning framework for mapping high spatiotemporal resolution LAI. **ISPRS Journal of Photogrammetry and Remote Sensing (P&RS)**. Published: November 02, 2023. 19 pages. P&RS impact factor: 12.7. DOI link

[29] X. Zhou, H. Bao, Y. Xie, Y. Li**, X. Jia**. STORM-GAN+: Spatio-Temporal Meta-GAN for Cross-City Estimation of Heterogeneous Human Mobility Responses to COVID-19. **Knowledge and Information Systems (KAIS)**. Published: July 17, 2023. 37 pages. KAIS impact factor: 3.3. DOI link

[28] S. Chen, N. Kalanat, Y. Xie, S. Li, J. A Zwart, J. M Sadler, A. P Appling, S. K Oliver, J. S Read, **X. Jia**. Physics-guided machine learning from simulated data with different physical parameters. **Knowledge and Information Systems (KAIS)**. Published: March 31, 2023. 28 pages. KAIS impact factor: 3.3. DOI link

[27] L. Yin, R. Ghosh, C. Lin, D. Hale, C. Weigl, J. Obarowski, J. Zhou, J. Till, **X. Jia**, N. You, T. Mao, V. Kumar, and Z. Jin. Mapping smallholder cashew plantations to inform sustainable tree crop expansion in Benin. **Remote Sensing of Environment (RSE)**, 295, p.113695, 2023. Published: September 01, 2023. 18 pages. RSE impact factor: 13.5. DOI link

[26] J. A Zwart, J. Diaz, S. Hamshaw, S. Oliver, J. C. Ross, M. Sleckman, A. P Appling, H. Corson-Dosch, **X. Jia**, J. Read, J. Sadler, T. Thompson, D. Watkins, and E. White. Evaluating deep learning architecture and data assimilation for improving water temperature forecasts at unmonitored locations. **Frontiers in Water** 5 (2023): 1184992, 2023. Published: June 22, 2023. 18 pages. Frontiers in Water impact factor: 2.9. DOI link

[25] J. A Zwart, S. K Oliver, W. D Watkins, J. M Sadler, A. P Appling, H. R Corson-Dosch, **X. Jia**, V. Kumar, and J. S Read. Near-term forecasts of stream temperature using deep learning and data assimilation in support of management decisions. **JAWRA Journal of the American Water Resources Association (JAWRA)**. Published: December 27, 2022. 21 pages. JAWRA impact factor: 2.4. DOI link

[24] S. N Topp, J. Barclay, J. Diaz, A. Y Sun, **X. Jia**, D. Lu, J. M Sadler, and A. P Appling. Stream temperature prediction in a shifting environment: Explaining the influence of deep learning architecture. **Water Resources Research (WRR)** 59, no. 4 (2023): e2022WR033880, 2023. Published: March 14, 2023. 19 pages. WRR impact factor: 5.4. DOI link

[23] Y. Xie, W. Chen, E. He, **X. Jia**, H. Bao, X. Zhou, R. Ghosh, and P. Ravirathinam. Harnessing heterogeneity in space with statistically guided meta-learning. **Knowledge and information systems (KAIS)** 65, no. 6 (2023): 2699-2729, 2023. Published: March 08, 2023. 31pages. KAIS impact factor 3.3. DOI link

[22] X. Li, A. Khandelwal, **X. Jia**, K. Cutler, R. Ghosh, A. Renganathan, S. Xu, K. Tayal, J. Nieber, C. Duffy, M. Steinbach, and V. Kumar. Regionalization in a global hydrologic deep learning model: from physical descriptors to random vectors. **Water Resources Research (WRR)**, 58, no. 8 (2022): e2021WR031794, 2022. Published: August 11, 2022. 29 pages. WRR impact factor: 5.4. DOI link

[21] J. Willard*, **X. Jia***, S. Xu, M. Steinbach, and V. Kumar. Integrating Scientific Knowledge with Machine Learning for Engineering and Environmental Systems. **ACM Computing Surveys (CSUR)** (*equal contribution). Published: November 21, 2022. 37 pages. CSUR impact factor: 16.6. DOI link

[20] L. Liu, S. Xu, J. Tang, K. Guan, T. J. Griffis, M. D. Erickson, A. L. Frie, **X. Jia**, T. Kim, L. T. Miller, B Peng, S. Wu, Y. Yang, W. Zhou, V. Kumar, and Z. Jin. KGML-ag: a modeling framework of knowledge-guided machine learning to simulate agroecosystems: a case study of estimating N2O emission using data from mesocosm experiments. **Geoscientific Model Development (GMD)**, 15, no. 7 (2022): 2839-2858. Published: April 07, 2022. 20 pages. GMD impact factor: 5.1. DOI link

[19] Z. Lyu, Y. Fang, Z. Zhu, **X. Jia**, X. Gao, and G. Wang. Prediction of acoustic pressure of the annular combustor using stacked long short-term memory network. **Physics of Fluids**, 34, no. 5 (2022): 054109. Published: May 11, 2022. 15 pages. Physics of Fluids impact factor: 4.6. DOI link

[18] Xie, W., M. Kimura, K. Takaki, Y. Asada, T. Iida, and **X. Jia**. Interpretable Framework of Physics-guided Neural Network with Attention Mechanism: Simulating Paddy Field Water Temperature Variations**. Water Resources Research (WRR)**, (2022): e2021WR030493. Published: May 02, 2022. 16 pages. WRR impact factor: 5.4. DOI link

[17] J. Sadler, A. Appling, J. Read, S. Oliver, **X. Jia**, X. Jia, J. Zwart, V. Kumar. Multi-task deep learning of daily streamflow and water temperature. **Water Resources Research (WRR)**, 2022**.** Published: March 02, 2022. 18 pages. WRR impact factor: 5.4. DOI link

[16] Z. Wei, K. Jia, **X. Jia**, P. Liu, Y. Ma, T. Chen, G. Feng. Mapping Large-Scale Plateau Forest in Sanjiangyuan Using High-Resolution Satellite Imagery and Few-Shot Learning. **Remote Sensing**, 14 (2), p.388, 2022. Published: January 13, 2022. 19 pages. Remote Sensing impact factor: 5.0. DOI link

[15] J. Willard, J. S Read, A. P Appling, S. K Oliver, **X. Jia**, and V. Kumar. Predicting water temperature dynamics of unmonitored lakes with meta transfer learning. **Water Resources Research (WRR)**, 2021. Published: June 16, 2021. 20 pages. WRR impact factor: 5.4. DOI link

[14] Y. Xie, **X. Jia**, S. Shekhar, H. Bao, and X. Zhou. Significant DBSCAN+: Statistically Robust Density-based Clustering. **ACM Transactions on Intelligent Systems and Technology (TIST)** 12, no. 5, 2021: 1-26, 2021. Published: November 24, 2021. 26 pages. TIST impact factor: 5.0. DOI link

[13] Z. Wei, K. Jia, P. Liu, **X. Jia**, Y. Xie, and Z. Jiang. Large-Scale River Mapping Using Contrastive Learning and Multi-Source Satellite Imagery. **Remote Sensing**, 13(15), p.2893, 2021. Published: July 19, 2021. 18 pages. Remote Sensing impact factor: 5.0. DOI link

[12] Z. Lyu, **X. Jia**, Y. Yang, K. Hu, F. Zhang, and G. Wang. A comprehensive investigation of LSTM-CNN deep learning model for fast detection of combustion instability. **Fuel**, 303, p.121300, 2021. Published: June 25, 2021. 14 pages. Fuel impact factor: 7.4. DOI link

[11] **X. Jia**, J. Willard, A. Karpatne, J. S Read, J. Zwart, M. Steinbach and V. Kumar. Physics-Guided Machine Learning for Scientific Discovery: An Application in Simulating Lake Temperature Profiles. **ACM Transactions on Data Science (TDS)**, 2021. Published: May 18, 2021. 26 pages. TDS impact factor: 2.0. DOI link

[10] P. C Hanson, A. B. Stillman, **X. Jia**, A. Karpatne, H. A. Dugan, C. C. Carey, J. Stachelek, N. K Ward, Y. Zhang, J. S Read, and V. Kumar. Predicting Lake Surface Water Phosphorus Dynamics Using Process-guided Machine Learning. **Ecological Modelling**, 430 (2020): 109136. Published: August 15, 2020. 11 pages. Ecological Modelling impact factor: 3.1. DOI link

[9] Z. Wei, K. Jia, **X. Jia**, Ankush Khandelwal, and Vipin Kumar. Global River Monitoring Using Semantic Fusion Networks. **Water**, 12, no. 8, 2258, 2020. Published: August 12, 2020. 17 pages. Water impact factor: 3.4. DOI link

[8] **X. Jia**, A. Khandelwal, J. S Gerber, K. M Carlson, P. C West, L. H Samberg, and V. Kumar. Plantation Mapping in Southeast Asia Using MODIS Data and Imperfect Visual Annotations. **Remote Sensing**, 12(4), p.636, 2020. Published: February 14, 2020. 23 pages. Remote Sensing impact factor: 5.0. DOI link

[7] **X. Jia**, A. Khandelwal, D. Mulla, P. G Pardey, and V. Kumar. Bringing Automated, Remote-sensed, Machine Learning Methods to Monitoring Crop Landscapes at Scale. **Agricultural Economics**, 2019. Published: October 30, 2019. 10 pages. Agricultural Economics impact factor: 4.1. DOI link

[6] J. S Read, **X. Jia**, J. Willard, A. Appling, J. A Zwart, S. K Oliver, A. Karpatne, G. J.A. Hansen, W. Watkins, M. Steinbach, and V. Kumar. Process-guided Deep Learning Predictions of Lake Water Temperature. **Water Resources Research (WRR)**, 2019. Published: November 08, 2019. 18 pages. WRR impact factor: 5.4. DOI link

[5] **X. Jia**, X. Li, N. Du, Y. Zhang, V. Gopalakrishnan, G. Xun, and A. Zhang. Tracking Community Consistency in Dynamic Networks: An Influence-based Approach. **IEEE Transactions on Knowledge and Data Engineering (TKDE)**, 2019. Published: August 06, 2019. 14 pages. TKDE impact factor: 8.9. DOI link

[4] **X. Jia**, A. Khandelwal, J. Gerber, K. Carlson, P. West and V. Kumar. Plantation Mapping in Southeast Asia**. Frontiers in Big Data**, 2019. Published: December 06, 2019. 12 pages. Frontiers in Big Data impact factor: 3.1. DOI link

[3] G. Xun, **X. Jia**, V. Gopalakrishnan, and A. Zhang. A Survey on Context Learning. **IEEE Transactions on Knowledge and Data Engineering (TKDE)**, 29(1), pp.38-56, 2016. Published: September 30, 2016. 19 pages. TKDE impact factor: 8.9. DOI link

[2] G. Xun, **X. Jia**, and A. Zhang. Detecting Epileptic Seizures with Electroencephalogram via a Context-learning Model. **BMC Medical Informatics and Decision Making**, no. 2, 70, 2016. Published: July 21, 2016. 13 pages. BMC Medical Informatics and Decision Making impact factor: 3.5. DOI link

[1] N. Du, **X. Jia**, J. Gao, and A. Zhang. Tracking Temporal Community Strength in Dynamic Networks. **IEEE Transactions on Knowledge and Data Engineering (TKDE)**, 27(11), pp.3125-3137, 2015. Published: May 20, 2015. 13 pages. TKDE impact factor: 8.9. DOI link

CONFERENCE PAPERS

[99] Q. Cheng, L. Liu, Y. Zhang, M. Hong, S. Luo, Z. Jin, Y. Xie, **X. Jia**. "Knowledge Guided Encoder-Decoder Framework: Integrating Multiple Physical Models for Agricultural Ecosystem Modeling." IEEE International Conference on Big Data (**IEEE BigData**), 2025.

[98] S. Luo, R. Yu, C. Qiu, R. Ghosh, R. Ladwig, P. C. Hanson, Y. Xie, and **X. Jia**. "Learning to Retrieve for Environmental Knowledge Discovery: An Augmentation-Adaptive Self-Supervised Learning Framework.", IEEE International Conference on Data Mining (**ICDM**)**,** 2025.

[97] Z. Li, Q. Cheng, R. Li, F. Zhu, **X. Jia**, and Y. Xie. "IsoSim: A Long-term Benchmark Dataset for Water Isotope Emulation in Global Climate Models." In Proceedings of the 33rd ACM International Conference on Advances in Geographic Information Systems (SIGSPATIAL), pp. 526-537. 2025.

[96] Z. Wang, C. Li, R. Wang, L. Ma, G. Hurtt, **X. Jia**, G. Mai, Z. Li, and Y. Xie. "TreeFinder: A US-Scale Benchmark Dataset for Individual Tree Mortality Monitoring Using High-Resolution Aerial Imagery." In The Thirty-ninth Annual Conference on Neural Information Processing Systems (**NeurIPS**) Datasets and Benchmarks Track, 2025.

[95] Z. Wang, L. Ma, G. Hurtt, **X. Jia**, Y. Li, R. Li, Z. Li, S. Xu, and Y. Xie. "CarbonGlobe: A Global-Scale, Multi-Decade Dataset and Benchmark for Carbon Forecasting in Forest Ecosystems." In The Thirty-ninth Annual Conference on Neural Information Processing Systems (**NeurIPS**) Datasets and Benchmarks Track, 2025.

[94] R. Li, Y. Xie, **X. Jia**, G. Mai, S. Hou, Z. Wang, and Z. Li. "Scenario-Based Evaluation of Probabilistic Time Series Forecasting for Solar Energy." In Proceedings of the 33rd ACM International Conference on Advances in Geographic Information Systems (**SIGSPATIAL**), pp. 631-634. 2025.

[93] S. Luo, R. Yu, S. Chen, Y. Fan, Y. Xie, Y. Li, and **X. Jia**. "Geo-Aware Models for Stream Temperature Prediction across Different Spatial Regions and Scales." In Proceedings of the 33rd ACM International Conference on Advances in Geographic Information Systems (**SIGSPATIAL**), pp. 124-136. 2025.

[92] S. Ling, Y. Wan, **X. Jia**, and N. Du. "DriveBLIP2: Attention-Guided Explanation Generation for Complex Driving Scenarios." In 2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), pp. 20662-20668. IEEE, 2025.

[91] Y. Wan, **X. Jia**, and X. L. Li. "Unveiling confirmation bias in chain-of-thought reasoning." In Findings of the Association for Computational Linguistics: ACL 2025 (**ACL Findings**), pp. 3788-3804. 2025.

[90] R. Yu, S. Chen, Y. Xie, and **X. Jia**. "A survey of foundation models for environmental science." In Pacific-Asia Conference on Knowledge Discovery and Data Mining (**PAKDD**), pp. 39-57. Singapore: Springer Nature Singapore, 2025.

[89] Y. Fan, R. Yu, J. R. Barclay, A. P. Appling, Y. Sun, Y. Xie, **X. Jia**. "Multi-Scale Graph Learning for Anti-Sparse Downscaling." In Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI**), vol. 39, no. 27, pp. 27969-27977, 2025. Acceptance rate: 23.3%. 9 pages. DOI link

[88] E. He, D. Kutscher, Y. Xie, J. Zwart, Z. Jiang, H. Yao, **X. Jia**. "Physics-Guided Fair Graph Sampling for Water Temperature Prediction in River Networks." In Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI**), vol. 39, no. 27, pp. 28070-28078, 2025. Acceptance rate: 23.3%. 9 pages. DOI link

[87] R. Yu, C. Qiu, R. Ladwig, P. Hanson, Y. Xie, **X. Jia**. "Physics-Guided Foundation Model for Scientific Discovery: An Application to Aquatic Science." In Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI**), vol. 39, no. 27, pp. 28548-28556, 2025. Acceptance rate: 23.3%. 9 pages. DOI link

[86] Y. Sun, R. Yu, R. Bao, Y. Xie, Y. Ye, **X. Jia**. "Domain-Adaptive Continual Meta-Learning for Modeling Dynamical Systems: An Application in Environmental Ecosystems." In Proceedings of the 2025 SIAM International Conference on Data Mining (**SDM**), pp. 297-306, 2025. Acceptance rate: 26.7%. 10 pages. DOI link

[85] R. Yu, Y. Xie, **X. Jia**. "What We Talk About When We Talk About AI for Science." In Proceedings of the 2025 SIAM International Conference on Data Mining (**SDM**), pp. 439-442, 2025. 4 pages. DOI link

[84] R. Li, Y. Xie, **X. Jia**, D. Wang, Y. Li, Y. Zhang, Z. Wang, Z. Li. "SolarCube: An Integrative Benchmark Dataset Harnessing Satellite and In-situ Observations for Large-scale Solar Energy Forecasting." Advances in Neural Information Processing Systems (**NeurIPS**), pp. 3499-3513, 2024. Acceptance rate: 25.3%. 15 pages. OpenReview link

[83] R. Yu, C. Qiu, R. Ladwig, P. C. Hanson, Y. Xie, Y. Li, **X. Jia**. "Adaptive Process-Guided Learning: An Application in Predicting Lake DO Concentrations." IEEE International Conference on Data Mining (**ICDM**), pp. 580-589, 2024. Acceptance rate: 19.5%. 10 pages. DOI link

[82] K. Tayal, A. Renganathan, **X. Jia**, V. Kumar, D. Lu. "ExoTST: Exogenous-Aware Temporal Sequence Transformer for Time Series Prediction." IEEE International Conference on Data Mining (**ICDM**), pp. 857-862, 2024. Acceptance rate: 19.5%. 6 pages. DOI link

[81] H. Li, J. Liu, Z. Wang, S. Luo, **X. Jia**, H. Yao. "LITE: Modeling Environmental Ecosystems with Multimodal Large Language Models." First Conference on Language Modeling (**COLM**), 2024. 15 pages. OpenReview link

[80] R. Yu, R. Ladwig, X. Xu, P. Zhu, P. Hanson, Y. Xie, **X. Jia**. "Evolution-based Feature Selection for Predicting Dissolved Oxygen Concentrations in Lakes." The 18th International Conference on Parallel Problem Solving From Nature (**PPSN**), pp. 398-415. 2024. 18 pages. DOI link

[79] T. Bao, T. Johnson, **X. Jia**. "Transfer Learning using Inaccurate Physics Rule for Streamflow Prediction." The 33nd International Joint Conference on Artificial Intelligence (**IJCAI**), pp. 7170-7178. 2024. Acceptance rate: 20%. 9 pages. DOI link

[78] E. He, Y. Xie, A. Sun, J. Zwart, J. Yang, Z. Jin, Y. Wang, H. Karimi, and **X. Jia**. "Fair Graph Learning Using Constraint-Aware Priority Adjustment and Graph Masking in River Networks." In Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI**), vol. 38, no. 20, pp. 22087-22095. 2024. Acceptance rate: 24.2%. 9 pages. DOI link

[77] Z. Xu, T. Xiao, W. He, Y. Wang, Z. Jiang, S. Chen, Y. Xie, **X. Jia**, D. Yan, and Y. Zhou. "Spatial-Logic-Aware Weakly Supervised Learning for Flood Mapping on Earth Imagery." In Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI**), vol. 38, no. 20, pp. 22457-22465. 2024. Acceptance rate: 24.2%. 9 pages. DOI link

[76] W. Chen, Y. Xie, **X. Jia**, E. He, H. Bao, B. An, X. Zhou. "Referee-Meta-Learning for Fast Adaptation of Locational Fairness". In Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI**), vol. 38, no. 20, pp. 21949-21957. 2024. Acceptance rate: 24.2%. 9 pages. DOI link

[75] Z. Wang, Y. Xie, Z. Li, **X. Jia**, Z. Jiang, A Jia, S Xu. "SimFair: Physics-Guided Fairness-Aware Learning with Simulation Models". In Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI**), vol. 38, no. 20, pp. 22420-22428. 2024. Acceptance rate: 24.2%. 9 pages. DOI link

[74] S. Ling, Y. Wan, **X. Jia**, N. Du. "Improving Explainable Object-induced Model through Uncertainty for Automated Vehicles". In Proceedings of the 2024 ACM/IEEE International Conference on Human-Robot Interaction (**HRI**), pp. 443-451. 2024. Acceptance rate: 24.9%. 9 pages. DOI link

[73] S. Chen, S. Fang, Y. Luo, **X. Jia**, and Y. Lin. "BrainPuzzle: a new data-driven method for ultrasound brain imaging." In Medical Imaging 2024: Ultrasonic Imaging and Tomography, vol. 12932, pp. 206-211. SPIE, 2024. 6 pages. DOI link

[72] E. He, Y. Xie, L. Liu, Z. Jin, D. Zhang, and **X. Jia**. "Knowledge Guided Machine Learning for Extracting, Preserving, and Adapting Physics-aware Features." In Proceedings of the 2024 SIAM International Conference on Data Mining (**SDM**), pp. 715-723. Society for Industrial and Applied Mathematics, 2024. Acceptance rate: 29.2%. 9 pages. DOI link

[71] N. Kalanat, Y. Xie, Y. Li, and **X. Jia**. "Spatial-Temporal Augmented Adaptation via Cycle-Consistent Adversarial Network: An Application in Streamflow Prediction." In Proceedings of the 2024 SIAM International Conference on Data Mining (**SDM**), pp. 598-606. Society for Industrial and Applied Mathematics, 2024. Acceptance rate: 29.2%. 9 pages. DOI link

[70] M. Hu, X. Zhang, Y. Li, Y. Xie, **X. Jia**, X. Zhou, and J. Luo. "Only Attending What Matter within Trajectories–Memory-Efficient Trajectory Attention." In Proceedings of the 2024 SIAM International Conference on Data Mining (**SDM**), pp. 481-489. Society for Industrial and Applied Mathematics, 2024. Acceptance rate: 29.2%. 9 pages. DOI link

[69] P. Ravirathinam, R. Ghosh, A. Khandelwal, **X. Jia**, D. Mulla, and V. Kumar. "Combining Satellite and Weather Data for Crop Type Mapping: An Inverse Modelling Approach." In Proceedings of the 2024 SIAM International Conference on Data Mining (**SDM**), pp. 445-453. Society for Industrial and Applied Mathematics, 2024. Acceptance rate: 29.2%. 9 pages. DOI link

[68] Z. Wang, Y. Xie, **X. Jia**, L. Ma, and G. Hurtt. "High-Fidelity Deep Approximation of Ecosystem Simulation over Long-Term at Large Scale." In Proceedings of the 31st ACM International Conference on Advances in Geographic Information Systems (**SIGSPATIAL**), pp. 1-10. 2023. Acceptance rate: 20.1%. 10 pages. DOI link

[67] Y. Xie, Z. Wang, G. Mai, Y. Li, **X. Jia**, S. Gao, and S. Wang. "Geo-Foundation Models: Reality, Gaps and Opportunities." In Proceedings of the 31st ACM International Conference on Advances in Geographic Information Systems (**SIGSPATIAL**), pp. 1-4. 2023. Acceptance rate: 20.1%. 4 pages. DOI link

[66] S. Chen, N. Kalanat, S. Topp, J. Sadler, Y. Xie, Z. Jiang, and **X. Jia**. "Meta-Transfer-Learning for Time Series Data with Extreme Events: An Application to Water Temperature Prediction." The 32nd ACM International Conference on Information and Knowledge Management (**CIKM**), pp. 266-275. 2023. Acceptance rate: 24%. 10 pages. DOI link

[65] M. Hu, Z. Zhong, X. Zhang, Y. Li, Y. Xie, **X. Jia**, X. Zhou, and J. Luo. "Self-supervised Pre-training for Robust and Generic Spatial-Temporal Representations. " The 23rd IEEE International Conference on Data Mining (**ICDM**), pp. 150-159. 2023. Acceptance rate: 19.9%. 10 pages. DOI link

[64] K. Tayal, A. Renganathan, R. Ghosh, **X. Jia**, and V. Kumar. "Koopman Invertible Autoencoder: Leveraging Forward and Backward Dynamics for Temporal Modeling." The 23rd IEEE International Conference on Data Mining (**ICDM**), pp. 588-597. 2023. Acceptance rate: 19.9%. 10 pages. DOI link

[63] E. He, Y. Wan, B. H Letcher, J. H Fair, Y. Xie, and **X. Jia**. "CGS: Coupled Growth and Survival Model with Cohort Fairness." The 32nd International Joint Conference on Artificial Intelligence (**IJCAI**), pp. 5986-5994. 2023. Acceptance rate: 20%. 9 pages. DOI link

[62] Z. Li, Y. Xie, and **X. Jia**. "Confidence-based Spatial Self-Corrective Learning to Expand Height Data in High Latitudes." The 32nd International Joint Conference on Artificial Intelligence (**IJCAI**), pp. 6049-6057. 2023. Acceptance rate: 20%. 9 pages. DOI link

[61] **X. Jia**, S. Chen, C. Zheng, Y. Xie, Z. Jiang, N. Kalanat. "Physics-guided Graph Diffusion Network for Combining Heterogeneous Simulated Data: An Application in Predicting Stream Water Temperature." In Proceedings of the 2023 SIAM International Conference on Data Mining (**SDM**), pp. 361-369, 2023. Acceptance rate: 27.4%. 9 pages. DOI link

[60] S. Chen, Y. Xie, X. Li, X. Liang, **X. Jia**. "Physics-Guided Meta-Learning Method in Baseflow Prediction over Large Regions." In Proceedings of the 2023 SIAM International Conference on Data Mining (**SDM**), pp. 217-225, **Best Applied Data Science Paper Award**, 2023. Acceptance rate: 27.4%. 9 pages. DOI link

[59] S. Xu, A. Khandelwal, X. Li, **X. Jia**, L. Liu, J. Willard, R. Ghosh, K. Cutler, M. Steinbach, C. Duffy, J. Nieber, and V. Kumar. "Mini-Batch Learning Strategies for modeling long term temporal dependencies: A study in environmental applications." In Proceedings of the 2023 SIAM International Conference on Data Mining (**SDM**), pp. 649-657, 2023. Acceptance rate: 27.4%. 9 pages. DOI link

[58] Z. Jiang, Y. Zhang, S. Adhikari, D. Yan, A. M Sainju, X. Jia, and Y. Xie. "A Hidden Markov Forest Model for Terrain-Aware Flood Inundation Mapping from Earth Imagery." In Proceedings of the 2023 SIAM International Conference on Data Mining (**SDM**), pp. 316-324, 2023. Acceptance rate: 27.4%. 9 pages. DOI link

[57] X. Zhao, K. Jia, B. Letcher, J. Fair, Y. Xie, **X. Jia**. "VIMTS: Variational-based Imputation for Multi-modal Time Series", In 2022 IEEE International Conference on Big Data (**BigData**), pp. 349-358, 2022. Acceptance rate: 19.2%. 10 pages. DOI link

[56] E. He, Y. Xie, L. Liu, W. Chen, Z. Jin, and **X. Jia**. "Physics Guided Neural Networks for Time-aware Fairness: An Application in Crop Yield Prediction". AAAI Conference on Artificial Intelligence (**AAAI**), pp. 14223-14231. 2023. Acceptance rate: 19.6%. 9 pages. DOI link

[55] Z. Liu, L. Liu, Y Xie, Z. Jin, and **X. Jia**. "Task-Adaptive Meta-Learning Framework for Advancing Spatial Generalizability." AAAI Conference on Artificial Intelligence (**AAAI**), pp. 14365-14373. 2023. Acceptance rate: 19.6%. 9 pages. DOI link

[54] Z. Li, Y. Xie, **X. Jia**, K. Stuart, C. Delaire, and S. Skakun. "Point-to-Region Co-Learning for Poverty Mapping at High Resolution Using Satellite Imagery." AAAI Conference on Artificial Intelligence (**AAAI**), pp. 14321-14328. 2023. Acceptance rate: 19.6%. 9 pages. DOI link

[53] Y. Xie, Z. Li, H. Bao, **X. Jia**, D. Xu, X. Zhou, S. Skakun. "Auto-CM: Unsupervised Deep Learning for Satellite Imagery Composition and Cloud Masking Using Spatio-Temporal Dynamics". AAAI Conference on Artificial Intelligence (**AAAI**), pp. 14575-14583. 2023. Acceptance rate: 19.6%. 9 pages. DOI link

[52] R. Ghosh*, B. Li*, K. Tayal, V. Kumar, and **X. Jia**. "Meta-Transfer Learning: An application to Streamflow modelling in River-streams". IEEE International Conference on Data Mining (**ICDM**), pp. 161-170. 2022. Acceptance rate: 9.77% (full paper), 20% (overall). 10 pages. DOI link

[51] H. Bao, X. Zhou, Y. Xie, Y. Li, and **X. Jia**. "STORM-GAN: Spatio-Temporal Meta-GAN for Cross-City Estimation of Human Mobility Responses to COVID-19". IEEE International Conference on Data Mining (**ICDM**), pp. 1-10. 2022. Acceptance rate: 9.77% (full paper), 20% (overall). 10 pages. DOI link

[50] E. He*, Y Xie*, **X. Jia**, W. Chen, H. Bao, X. Zhou, Z. Jiang, R. Ghosh, and P. Ravirathinam. "Sailing in the location-based fairness-bias sphere." In Proceedings of the 30th International Conference on Advances in Geographic Information Systems (**SIGSPATIAL**), 2022. Acceptance rate: 23.8%. 10 pages. DOI link

[49] R. Ghosh, **X. Jia**, L. Yin, C. Lin, Z. Jin, and V. Kumar. "Clustering augmented self-supervised learning: an application to land cover mapping." In Proceedings of the 30th International Conference on Advances in Geographic Information Systems (**SIGSPATIAL**), 2022. Acceptance rate: 23.8%. 10 pages. DOI link

[48] W. Chen, Z. Wang, Z. Li, Y. Xie, **X. Jia**, and A. Li. "Deep semantic segmentation for building detection using knowledge-informed features from LiDAR point clouds." In Proceedings of the 30th International Conference on Advances in Geographic Information Systems (**SIGSPATIAL**), 2022. Acceptance rate: 23.8%. 4 pages. DOI link

[47] S. Chen, J. A Zwart, **X. Jia**. "Physics-Guided Graph Meta Learning for Predicting Water Temperature and Streamflow in Stream Networks". The 28th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**), pp. 2752-2761. 2022. Applied data science track acceptance rate: 25.9%. 10 pages. DOI link

[46] R. Ghosh, A. Renganathan, K. Tayal, X. Li, A. Khandelwal, **X. Jia**, C. Duffy, J. L Nieber, V. Kumar. "Robust Inverse Framework using Knowledge-guided Self-Supervised Learning: An application to Hydrology". The 28th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**), pp. 465-474. 2022. Research track acceptance rate: 15%. 10 pages. DOI link

[45] W. He, Z. Jiang, M. Kriby, Y. Xie, **X. Jia**, D. Yan, Y. Zhou. "Quantifying and Reducing Registration Uncertainty of Spatial Vector Labels on Earth Imagery". The 28th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**), pp. 554-564. 2022. Research track acceptance rate: 15%. 11 pages. DOI link

[44] T. Bao*, S. Chen*, T. T Johnson, P. Givi, S. Sammak, and **X. Jia**. "Physics Guided Neural Networks for Spatio-temporal Super-resolution of Turbulent Flows." In The 38th Conference on Uncertainty in Artificial Intelligence (**UAI**), pp. 118-128. 2022. Acceptance rate: 32.3%. 11 pages. Link

[43] Y. Xie, E. He, **X. Jia**, H. Bao, X. Zhou, R. Ghosh, and P. Ravirathinam. Statistically-Guided Deep Network Transformation to Harness Heterogeneity in Space. The 31st International Joint Conference on Artificial Intelligence (**IJCAI**), pp. 5364-5368. 5 pages. 2022. DOI link

[42] **X. Jia**, S. Chen, Y. Xie, H. Yang, A. Appling, S. Oliver, and Z. Jiang. Modeling Reservoir Release Using Pseudo-Prospective Learning and Physical Simulations to Predict Water Temperature. SIAM International Conference on Data Mining (**SDM**), pp. 91-99. 2022. Acceptance rate: 27.8%. 9 pages. DOI link

[41] K. Tayal, **X. Jia**, R. Ghosh, J. Willard, J. Read, and V. Kumar. Invertibility aware Integration of Static and Time Series Data: An Application to Lake Temperature Modeling. SIAM International Conference on Data Mining (**SDM**), **Best Applied Data Science Paper Award**, pp. 702-710. 2022. Acceptance rate: 27.8%. 9 pages. DOI link

[40] C. Zheng, Y. Wang, **X. Jia**. Graph-Augmented Cyclic Learning Framework for Similarity Estimation for Medical Clinical Notes. IEEE International Conference on Healthcare Informatics (**ICHI**), pp. 97-103. 2022. 7 pages. DOI link

[39] Y. Xie*, E. He*, **X. Jia**, W. Chen, S. Skakun, H. Bao, Z. Jiang, R. Ghosh, and P. Ravirathinam. Fairness by "Where": A Statistically-Robust and Model-Agnostic Bi-Level Learning Framework. AAAI Conference on Artificial Intelligence (**AAAI**), pp. 12208-12216. 2022. Acceptance rate: 15%. 9 pages. DOI link

[38] Y. Xie*, E. He*, **X. Jia**, H. Bao, X. Zhou, R. Ghosh, and P. Ravirathinam. A Statistically-Guided Deep Network Transformation and Moderation Framework for Data with Spatial Heterogeneity. IEEE International Conference on Data Mining (**ICDM**), pp. 767-776. 2021. **Best Paper Award**. Acceptance rate: 9.9% (full paper), 20% (overall). 10 pages. DOI link

[37] **X. Jia**, Y. Xie, S. Li, S. Chen, J. Zwart, J. Sadler, A. Appling, S. Oliver, and J. Read. Physics-Guided Machine Learning from Simulation Data: An Application in Modeling Lake and River Systems. IEEE International Conference on Data Mining (**ICDM**), pp. 270-279. 2021. Acceptance rate: 9.9% (full paper), 20% (overall). 10 pages. DOI link

[36] T. Bao, **X. Jia**, J. Zwart, J. Sadler, A. Appling, S. Oliver, and T. Johnson. Partial Differential Equation Driven Dynamic Graph Networks for Predicting Stream Water Temperature. IEEE International Conference on Data Mining (**ICDM**), pp. 11-20. 2021. Acceptance rate: 9.9% (full paper), 20% (overall). 10 pages. DOI link

[35] S. Chen, A. Appling, S. Oliver, H. Corson-Dosch, J. Read, J. Sadler, J. Zwart, and **X. Jia**. Heterogeneous Stream-reservoir Graph Networks with Data Assimilation. IEEE International Conference on Data Mining (**ICDM**), pp. 1024-1029. 2021. Acceptance rate: 20% (overall). 6 pages. DOI link

[34] S. Chen, S. Sammak, P. Givi, J. P Yurko, **X. Jia**. Reconstructing High-resolution Turbulent Flows Using Physics-Guided Neural Networks. IEEE International Conference on Big Data (**BigData**), pp. 1369-1379. 2021. Acceptance rate: 19.9%. 11 pages. DOI link

[33] R. Ghosh, P. Ravirathinam, **X. Jia**, C. Lin, Z. Jin, V. Kumar. Attention-augmented Spatio-Temporal Segmentation for Land Cover Mapping. IEEE International Conference on Big Data (**BigData**), pp. 1399-1408. 2021. Acceptance rate: 19.9%. 10 pages. DOI link

[32] R. Ghosh, P. Ravirathinam, **X. Jia**, A. Khandelwal, D. Mulla, and V. Kumar. CalCROP21: A Georeferenced multi-spectral dataset of Satellite Imagery and Crop Labels. IEEE International Conference on Big Data (**BigData**), pp. 1625-1632. 2021. Acceptance rate: 19.9%. 10 pages. DOI link

[31] Y. Xie*, **X. Jia***, H. Bao, X. Zhou, J. Yu, R. Ghosh and P. Ravirathinam. Spatial-Net: A Self-Adaptive and Model-Agnostic Deep Learning Framework for Spatially Heterogeneous Datasets. The 29th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (**SIGSPATIAL**), pp. 313-323. 2021. Acceptance rate: 22.4%. 11 pages. DOI link

[30] W. Zhong, Q. Suo, A. Gupta, **X. Jia**, C. Qiao, L. Su. MetaTP: Traffic Prediction with Unevenly-Distributed Road Sensing Data via Fast Adaptation. ACM International Joint Conference on Pervasive and Ubiquitous Computing (**Ubicomp**), pp. 1-28. 2021. 28pages. DOI link

[29] W. Zhong, Q. Suo, **X. Jia**, A. Zhang, L. Su. Heterogeneous Spatio-Temporal Graph Convolution Network for Traffic Forecasting with Missing Values. IEEE International Conference on Distributed Computing Systems (**ICDCS**), pp. 707-717. 2021. Acceptance rate: 19.8%. 11 pages. DOI link

[28] **X. Jia**, J. Zwart, J. Sadler, A. Appling, S. Oliver, S. Markstrom, J. Willard, S. Xu, M. Steinbach, and V. Kumar. Physics-Guided Recurrent Graph Model for Predicting Flow and Temperature in River Networks. SIAM International Conference on Data Mining (**SDM**), pp. 612-620. 2021. Acceptance rate: 21.3%. 9 pages. DOI link

[27] **X. Jia**, B. Lin, J. Zwart, J. Sadler, A. Appling, S. Oliver, and J. Read. Graph-based Reinforcement Learning for Active Learning in Real Time: An Application in Modeling River Networks. SIAM International Conference on Data Mining (**SDM**), **Best Applied Data Science Paper Award**, pp. 621-629. 2021. Acceptance rate: 21.3%. 9 pages. DOI link

[26] **X. Jia**, H. Zhao, Z. Lin, A. Kale, and V. Kumar. Personalized Image Retrieval with Sparse Graph Representation Learning. The 26th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**), pp. 2735-2743. 2020. Acceptance rate: 16%. 9 pages. DOI link

[25] H. Yao, **X. Jia**, V. Kumar, and Z. Li. "Learning with Small Data." In Proceedings of the 26th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (**KDD tutorial**), pp. 3539-3540. 2020. DOI link

[24] K. Tayal, S. Agrawal, N. Rao, **X. Jia**, K. Subbian, and V. Kumar. Regularized Graph Convolutional Networks for Short Text Classification. The 28th International Conference on Computational Linguistics (**COLING**), pp. 236-242. 2020. Acceptance rate: 32.9%. 7pages. DOI link

[23] G. Nayak, R. Ghosh, **X. Jia**, V. Mithal and V. Kumar. Multi-view Semi-supervised Classification using Attention-based Regularization on Coarse-resolution Data. SIAM International Conference on Data Mining (**SDM**), pp. 253-261. 2020. Acceptance rate: 19.3%. 9 pages. DOI link

[22] **X. Jia**, S. Li, H. Zhao, S. Kim and V. Kumar. Towards Robust and Discriminative Sequential Data Learning: When and How to Perform Adversarial Training? The 25th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**), pp. 1665-1673, 2019. Acceptance rate: 14.2%. 9 pages. DOI link

[21] **X. Jia**, M. Wang, A. Khandalwel, A. Karpatne and V. Kumar. Recurrent Generative Networks for Multi-Resolution Satellite Data. The 28th International Joint Conference on Artificial Intelligence (**IJCAI**), pp. 2628-2634, 2019. Acceptance rate: 17.9%. 9 pages. DOI link

[20] **X. Jia**, S. Li, A. Khandelwal, G. Nayak, A. Karpatne and V. Kumar. Spatial Context-Aware Networks for Mining Temporal Discriminative Period in Land Cover Detection. SIAM International Conference on Data Mining (**SDM**), pp. 513-521, 2019. Acceptance rate: 22.7%. 9 pages. DOI link

[19] **X. Jia***, J. Willard*, A. Karpatne, J. S Read, J. Zwart, M. Steinbach and V. Kumar. Physics Guided RNNs for Modeling Dynamical Systems: A Case Study in Simulating Lake Temperature Profiles. SIAM International Conference on Data Mining (**SDM**), pp. 558-566, 2019 (*equal contribution). Acceptance rate: 22.7%. 9 pages. DOI link

[18] **X. Jia**, G. Nayak, A. Khandelwal, A. Karpatne and V. Kumar. Classifying Heterogeneous Sequential Data by Cyclic Domain Adaptation: An Application in Land Cover Detection. SIAM International Conference on Data Mining (**SDM**), pp. 540-548, 2019. Acceptance rate: 22.7%. 9 pages. DOI link

[17] G. Nayak, V. Mithal, **X. Jia**, and V. Kumar. Classifying Multivariate Time Series by Learning Sequence-level Discriminative Patterns. SIAM International Conference on Data Mining (**SDM**), pp. 252-260, 2018. Acceptance rate: 23.2%. 9 pages. DOI link

[16] **X. Jia**, A. Khandelwal, G. Nayak, J. Gerber, K. Carlson, P. West and V. Kumar. Incremental Dual-memory LSTM in Land Cover Prediction. In Proceedings of the 23rd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD**), pp. 867-876, 2017. Acceptance rate: 17.5%. 10 pages. DOI link

[15] **X. Jia**, A. Khandelwal, G. Nayak, J. Gerber, K. Carlson, P. West and V. Kumar. Predict Land Covers with Transition Modeling and Incremental Learning. SIAM International Conference on Data Mining (**SDM**), pp. 171-179, 2017. Acceptance rate: 26.0%. 9 pages. DOI link

[14] **X. Jia**, Y. Hu, A. Khandelwal, A. Karpatne and V. Kumar. Joint Sparse Auto-encoder: A Semi-supervised Spatio-temporal Approach in Mapping Large-scale Croplands. IEEE International Conference on Big Data (**BigData**), pp. 1173-1182, 2017. Regular paper acceptance rate: 17.8%. 10 pages. DOI link

[13] **X. Jia**, A. Khandelwal, James Gerber, Kimberly Carlson, P. West and V. Kumar. Learning Large-scale Plantation Mapping from Imperfect Annotators. IEEE International Conference on Big Data (**BigData**), pp. 1192-1201, 2016. Regular paper acceptance rate: 18.7%. 10 pages. DOI link

[12] **X. Jia**, X. Chen, A. Karpatne and V. Kumar. Identifying Dynamic Changes with Noisy Labels in Spatial-temporal Data: A Study on Large-scale Water Monitoring Application. IEEE International Conference on Big Data (**BigData**), pp. 1328-1333, 2016. 6 pages. DOI link

[11] **X. Jia**, X. Li, N. Du, Y. Zhang, V. Gopalakrishnan, G. Xun, and A. Zhang. Influence based Analysis of Community Consistency in Dynamic Networks. The International Conference on Advances in Social Network Analysis and Mining (**ASONAM**), pp. 1-8, **Best Conference Paper Award**, 2016. Regular paper acceptance rate: 13.0%. 8 pages. DOI link

[10] **X. Jia**, N. Du, K. Li, V. Gopalakrishnan, G. Xun, and A. Zhang. Collaborative Restricted Boltzmann Machine for Social Event Recommendation. The International Conference on Advances in Social Network Analysis and Mining (**ASONAM**), pp. 402-405, 2016. 4 pages. DOI link

[9] X. Li, **X. Jia**, H. Li, H. Xiao, J. Gao and A. Zhang. DRN: Bringing Greedy Layer-wise Training into Time Dimension. IEEE International Conference on Data Mining (**ICDM**), pp. 859-864, 2015. Acceptance rate: 18.1%. 6 pages. DOI link

[8] G. Xun, **X. Jia**, and A. Zhang. Context-learning Based Electroencephalogram Analysis for Epileptic Seizure Detection. IEEE International Conference on Bioinformatics & Biomedicine (**BIBM**), pp. 325-330, 2015. Acceptance rate: 19.6%. 6 pages. DOI link

[7] **X. Jia**, A. Wang, X. Li, G. Xun, W. Xu, and A. Zhang. Multi-modal Learning for Video Recommendation based on Mobile Application Usage. IEEE International Conference on Big Data (**BigData**), pp. 837-842, 2015. 6 pages. DOI link

[6] X. Li, **X. Jia**, G. Xun, and A. Zhang. Improving EEG Feature Learning via Synchronized Facial Video. IEEE International Conference on Big Data (**BigData**), pp. 843-848, 2015. 6 pages. DOI link

[5] H. Li, X. Li, **X. Jia**, M. Ramanathan, and A. Zhang. Bone Disease Prediction and Phenotype Discovery using Feature Representation over Electronic Health Records. The 6th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics (**ACM-BCB**), pp. 212-221, 2015. Acceptance rate: 34.0%. 10 pages. DOI link

[4] N. Du, J. Gao, L. Ge, V. Gopalakrishnan, **X. Jia**, K. Li, and A. Zhang. Significant Edge Detection in Target Network by Exploring Multiple Auxiliary Networks. The International Conference on Advances in Social Network Analysis and Mining (**ASONAM**), pp. 210-217, 2015. 18 pages. DOI link

[3] **X. Jia**, K. Li, X. Li, and A. Zhang. A Novel Semi-supervised Deep Learning Framework for Affective State Recognition on EEG Signals with Two-level Channel Selection. The 14th IEEE International Conference on BioInformatics and BioEngineering (**BIBE**), pp. 30-37, **Best Student Paper Award**, 2014. 38 pages. DOI link

[2] **X. Jia**, N. Du, J. Gao, and A. Zhang. Analysis on Community Variational Trend in Dynamic Networks. The 23rd ACM International Conference on Information and Knowledge Management (**CIKM**), pp. 151-160, 2014. Acceptance rate: 20.0%. 10 pages. DOI link

[1] Y. Hou, X. Li, Y. Zhao, **X. Jia**, A. Sadek, K. Hulme and C. Qiao. Towards Efficient Vacant Taxis Cruising Guidance. IEEE Global Communications Conference (**GLOBECOM**), pp. 54-59, 2013. 6 pages. DOI link

BOOK CHAPTERS

[5] G. Mai, Y. Xie, **X. Jia**, N. Lao, J. Rao, Q. Zhu, and Z. Liu. "The evolution of geospatial artificial intelligence." In GeoAI and human geography: the dawn of a new spatial intelligence era, pp. 13-27. Cham: Springer Nature Switzerland, 2025.

[4] E. He, W. Chen, Y. Xie, **X. Jia**. "Fairness-aware Deep Learning in Space." In Big Data: Techniques and Technologies in Geoinformatics, pp. 293-315. CRC Press, 2024. DOI link

[3] W. Chen, Y. Xie, **X. Jia**, E. He. "Deep Learning for Spatial Data Heterogeneity and Adaptation." In Big Data: Techniques and Technologies in Geoinformatics, pp. 254-270. CRC Press, 2024. DOI link

[2] Y. Xie, **X. Jia**, W. Chen, and E. He. "Heterogeneity-Aware Deep Learning in Space: Performance and Fairness." In Handbook of Geospatial Artificial Intelligence, pp. 151-176. CRC Press, 2023. DOI link

[1] **X. Jia**, J. D. Willard, A. Karpatne, J. S. Read, J. A. Zwart, M. Steinbach, and V. Kumar. "Physics-guided recurrent neural networks for predicting lake water temperature." In Knowledge Guided Machine Learning, pp. 373-398. Chapman and Hall/CRC, 2022. DOI link

PATENTS AND SOFTWARE COPYRIGHTS

• US Patent, Discovery of Shifting Patterns in Sequence Classification, 11037022.

• US Patent, Predicting Land Covers from Satellite Images Using Temporal and Spatial Contexts, 11068737.

• US Patent, Electronic Media Retrieval, 11681737.

• US Patent, Adversarial Training for Event Sequence Analysis, 11507878.

INVITED TALKS

• Keynote speaker, AI for Time Series Analysis — Theory, Algorithms, and Applications (AI4TS) workshop at SDM 2025, May 2025. https://ai4ts.github.io/sdm2025.html

• Invited speaker, Statistics and Data Science Seminar, Northwestern University, February 2025. https://planitpurple.northwestern.edu/event/626465

• Dean's Spotlight Series, School of Computing and Information, University of Pittsburgh, April 2024. https://www.sci.pitt.edu/news/deans-spotlight-24-jia

• Invited speaker, MOST-AM Consortium 2023 Spring Meeting, Ansys, Inc., December 2023.

• Invited speaker, CEE Graduate Seminar, Civil and Environmental Engineering, University of Pittsburgh, September 2023.

• Invited speaker, University of Maryland GEOG Seminar, April 2023. https://geog.umd.edu/event/geog-seminar-46-xiaowei-jia-knowledge-guided-machine-learning-challenges-and-opportunities

• Keynote speaker, 2022 International Conference on Neural Computing for Advanced Applications, July 2022. https://dl2link.com/ncaa2022/program/keynoteSpeakers#page-anchor

• Invited speaker, ChE-650 Seminar, Swiss Federal Institute of Technology Lausanne (EPFL), Dec 2021. https://memento.epfl.ch/event/machine-learning-in-chemistry-and-beyond-che-650-8/

• Invited speaker, ExxonMobil, July 2021.

• Invited speaker, Midwest Big Data Summer School, Iowa State University, May 2021.

• Invited speaker, IJCAI 2020 Workshop on Bringing Semantic Knowledge into Vision and Text Understanding, January 2021. https://cobweb.cs.uga.edu/~shengli/Tusion2020.html

• Invited speaker, AAAI Fall 2020 Symposium on Physics-Guided AI to Accelerate Scientific Discovery, November 2020.

• Invited speaker, Gradate Seminar, Mechanical and Materials Science, University of Pittsburgh, September 2020.

• Invited speaker, OpenNEX Seminar, NASA's Ames Research Center, July 2018.
https://www.youtube.com/watch?v=p6_KwUS9rL8

CONFERENCE & WORKSHOP ORGANIZATION

• 2025 AAAI Bridge Program on Knowledge-Guided Machine Learning. February 2025. Role: Organizer.
https://sites.google.com/vt.edu/kgml-bridge-aaai-25/

• 2024 Workshop on Knowledge Guided Machine Learning, August 2024. Role: Organizer. https://sites.google.com/umn.edu/kgml2024/

• AAAI Fall Symposium 2022 on Knowledge-Guided Machine Learning, November 2022. Role: Organization committee member. Lead organizer: Anuj Karpatne, Virginia Tech. https://sites.google.com/vt.edu/kgml-aaai-22/committee

• The 2nd Annual Workshop on Knowledge Guided Machine Learning, August 2021. Role: Organization committee member. Lead organizer: Vipin Kumar, University of Minnesota. https://sites.google.com/umn.edu/kgmlworkshop/workshop#h.9xvhuxkwlflo

• Google exploreCSR Workshop on Computing Research, May 2021. Role: Organization committee member. Lead organizer: Beiyu Lin, University of Texas Rio Grande Valley. https://workshoputrgv.github.io/google.explorecsr.html

• ACM BCB, September 2014. Role: Organization committee member and web master. Lead organizer: Aidong Zhang, University of Virginia. https://cse.buffalo.edu/ACM-BCB2014/organization.html

INVITED PANELS

• MOST-AM Consortium 2023 Spring Meeting, Ansys, Inc., 2023.

• International Workshop on Resource-Efficient Learning for Knowledge Discovery (RelKD 2023@KDD), 2023.

• AAAI Fall 2020 Symposium on Physics-guided AI to Accelerate Scientific Discovery, 2020.

PRESS

• ACM TechNews, "ML Methods Could Improve Environmental Predictions", June 2021. https://technews.acm.org/archives.cfm?fo=2021-06-jun/jun-25-2021.html

• EurekAlert, "ML Methods Could Improve Environmental Predictions", June 2021. https://www.eurekalert.org/news-releases/637676

COURSES TAUGHT

Undergraduate Course "CS 1656/2056: Introduction to Data Science", University of Pittsburgh.

- Semester taught: Spring 2021 (enrolled: 53), Spring 2022 (enrolled: 57), Fall 2022 (enrolled: 58), Fall 2023 (enrolled: 50), Fall 2024 (enrolled: 42)
- Student evaluations: 3.36 (Spring 2021), 4.13 (Spring 2022), 3.53 (weighted average, Fall 2022), 3.00 (weighted average, Fall 2023), 4.04 (Fall 2024)

Graduate Course "CS 2756: Principles of Data Mining", developed new course, University of Pittsburgh

- Semester taught: Spring 2022 (enrolled: 25), Spring 2024 (enrolled: 33), Fall 2024 (enrolled: 10)
- Student evaluations: 4.5 (Spring 2022), 4.75 (Spring 2024), 4.83 (Fall 2024)

Graduate Course "CS 3750: Advanced Topics in Machine Learning", University of Pittsburgh.

- Semester taught: Fall 2020 (enrolled: 16), Spring 2025 (enrolled: 18)
- Student evaluations: 4.00 (Fall 2020), 4.71 (Spring 2025)

Guest Lecturer for the "Scientific Machine Learning Mini-Course" in 2020 at Carnegie Mellon University.

Guest Lecturer for the course "Computer Science Seminar 6175" in 2020 at the University of Texas Rio Grande Valley.

Guest Lecturer for the course "CMSC 691" in 2020 at the University of Maryland, Baltimore County.

Guest Lecturer for the course "CSCI 8980: Advanced Topics in Computer Science – AI for Earth" in 2017 and 2019 at the University of Minnesota.

PHD STUDENTS SUPERVISED at the University of Pittsburgh

• Xiaoting Li (CS, 2022-present, committee: Alexandros Labrinidis, Panos Chrysanthis, Konstantinos Pelechrinis, Xiaowei Jia). Status: Ph.D. proposal passed April 2024, expected graduation December 2025.

• Yue Wan (CS, 2022-present)

• Can Zheng (CS, 2021-present)

• Nasrin Kalanat (CS, 2022-present)

• Shiyuan Luo (CS, 2023-present)

• Yingda Fan (CS, 2023-present)

• Qi Cheng (CS, 2023-present)

• Yiming Sun (CE, 2023-present)

• Chonghao Qiu (CS, 2025-present)

• Rongchao Dong (CS, 2024-present)

• Erhu He (CS, 05/2021-03/2026, committee: Xiaowei Jia, Diane Litman, Stephen Lee, Yiqun Xie). Current position: Machine Learning Engineer, Samsung Ads.

• Shengyu Chen (CS, 09/2020-05/2025, committee: Xiaowei Jia, Milos Hauskrecht, Longfei Shangguan, Peyman Givi, Vipin Kumar). Current position: Research Scientist, NEC Laboratories America, Inc.

POST-DOC SUPERVISED at the University of Pittsburgh

• Runlong Yu (09/2023-09/2025). Current position: Assistant Professor, University of Alabama.

GRADUATE STUDENT COMMITTEE MEMBERSHIP

• Sabit Hassan (Ph.D., Chair: Malihe Alikhani, University of Pittsburgh)

• Jun Luo (Ph.D., Chair: Shandon Wu, University of Pittsburgh)

• Jiayi Yuan (Ph.D., Chair: Zhiwei Feng, University of Pittsburgh)

• Yang Zhong (Ph.D., Chair: Diane Litman, University of Pittsburgh)

• Tahereh Arabghalizi (Ph.D., Chair: Alexandros Labrinidis, University of Pittsburgh)

• Brian T. Nixon (Ph.D., Chair: Panos Chrysanthis, University of Pittsburgh)

• Sumedha Singla (Ph.D., Chair: Kayhan Batmanghelich, University of Pittsburgh)

• Bradly Wheeler (Ph.D., Chair: Hassan Karimi, University of Pittsburgh)

• Yang Wang (Ph.D., Chair: Hassan Karimi, University of Pittsburgh)

• Meirman Syzdykbayev (Ph.D., Chair: Hassan Karimi, University of Pittsburgh)

• Mehdi Ramezanpour Koomleh (Ph.D., Chair: Anne M Robertson, University of Pittsburgh)

• Kai Huang (Ph.D., Chair: Wei Gao, University of Pittsburgh)

• Yuxuan Zhang (M.S., Chair: Longfei Shangguan, University of Pittsburgh)

• Tianshu Bao (Ph.D., Chair: Taylor Johnson, Vanderbilt University)

• Zhihao Wang (Ph.D., Chair: Yiqun Xie, University of Maryland)

• Zhili Li (Ph.D., Chair: Yiqun Xie, University of Maryland)

MASTERS & UNDERGRADUATE STUDENTS SUPERVISED

• Bangyan Li (University of Pittsburgh)

• Fengyi Gao (University of Pittsburgh)

• Haonan Duan (University of Pittsburgh)

• Declan Kutscher (University of Pittsburgh)

• Adarsha Ruwali (University of Pittsburgh)

• Hongtao Wang (University of Pittsburgh)

PROFESSIONAL SERVICE

Senior Program Committee Member in AAAI (2024), IJCAI (2023, 2024), SDM (2023, 2024), PAKDD (2024).

Program Committee Member in SIGKDD (2022, 2023), AAAI (2019-2022), NeurIPS (2021, 2023, 2024), ICML (2022), ICLR (2020-2024), IJCAI (2016) and ECML/PKDD workshop on Machine Learning for Earth Observation Data (2019-2020)**.**

Organization Committee Member in ICDM 2025, ACM-BCB 2014.

Editorial Panel for the special issue on Sustainability and Computing in the **Communications of the ACM** journal.

Guest Editor for the special issue "Advancing Machine Learning for Remote Sensing to Enhance Spatio-temporal Generalizability" in the **Remote Sensing** journal.

Reviewer for journals TKDE, TPAMI, JAMIA, Nature Scientific Reports, Remote Sensing of Environment (RSE), Remote Sensing, IEEE TNSRE, and IEEE JBHI.

COMPUTER SCIENCE SERVICE AT the University of Pittsburgh

Member, Graduate Admissions and Financial Aid (GAFA), 09/2020 – 04/2024.

Member, Graduate Programs and Exams Committee (GPEC), 09/2021 – 04/2022, 09/2024-04/2025.

Member, Tenure-Stream Recruiting Committee (REC-TS), 09/2022-04/2023.