

Xiaowei JIA

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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

Assistant Professor <i>Department of Computer Science, University of Pittsburgh</i>	2020-present
Data Science Research Intern <i>System Technology Lab, Adobe Research</i>	Summer 2018, 2019
Research Intern <i>Siemens Corporate Technology, China</i>	2011-2012

HONORS & AWARDS

Best Dissertation Award, University of Minnesota	2022
SIGSPATIAL Best Paper Finalist	2022
Top 3 Performance in the SIGSPATIAL Cup competition	2022
ICDM Best Paper Award	2021
SDM Best Applied Data Science Paper Award	2021, 2022, 2023
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	2019-2020
UMII MnDRIVE Graduate Fellowship, University of Minnesota	2017-2018
College of Science and Engineering Fellowship, University of Minnesota	2015-2017
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

- [12] NSF Awards 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. (Principal Investigator)
- [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. (Principal Investigator)
- [10] NE CASC with USGS, "Beyond Temperature-only Coldwater Climate Refugia: Integration of Process-guided Deep Learning Models for Flow and Temperature into Assessments for Coldwater Streams", \$472,221.44, 07/15/2023-07/14/2025. (Co-PI with Jenn Fair, Amrita Gupta, Scott Jackson, Benjamin Letcher, and Jeffrey Walker, Personal share \$78,888)
- [9] NEC Lab Gift Funding, "Machine Learning in Supply Chain and Carbon Emission", \$45,000.
- [8] Pitt Momentum Grant, "Preserving Fairness of Deep Learning Under Environmental Changes", \$24,675, 06/30/2023-06/30/2024. (Principal Investigator)
- [7] NASA AIST Grant, "Coupled Statistics-Physics Guided Learning to Harness Heterogeneous Earth Data at Large Scales", \$599,955, 07/01/2022-12/31/2023. (co-PI with Yiqun Xie and Sergii Skakun from the University of Maryland, personal share: \$188,697)
- [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. (Principal Investigator)
- [5] NSF Award OAC-2203581, "CDS&E: Physics Guided Super-Resolution for Turbulent Transport", \$499,624, 08/01/2022-07/31/2025. (Principal Investigator)
- [4] NSF Award IIS-2147195, "FAI: Advancing Deep Learning Towards Spatial Fairness", \$755,098, 06/01/2022-05/31/2025. (Principal Investigator)
- [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. (Principal Investigator)
- [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. (Principal Investigator)
- [1] Pitt Momentum Grant, "Physics-guided Machine Learning for Scientific Knowledge Discovery", \$15,725, 06/30/2021-06/30/2022. (Principal Investigator)

PUBLICATIONS

JOURNAL PAPERS

- [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 (ACM TIST)*. (accepted)
- [32] 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)*.
- [31] 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)*, 65, no. 8 (2023): 3223-3250, 2023.
- [30] 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.
- [29] 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)* 59, no. 2 (2023): 317-337, 2023.
- [28] 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.

- [27] 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.
- [26] 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.
- [25] Y. Ma, J. Zhang, P. Liu, Z. Wei, L. Zhang, and **X. Jia**. Remote Sensing Plateau Forest Segmentation with Boundary Preserving Double Loss Function Collaborative Learning. *Journal of New Media* 4, no. 4, 2022.
- [24] 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.
- [23] 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).
- [22] 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*, 15, no. 7 (2022): 2839-2858.
- [21] 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.
- [20] 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.
- [19] 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.
- [18] 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.
- [17] 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.
- [16] 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.
- [15] 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.
- [14] 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.
- [13] **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*, 2021.
- [12] 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.
- [11] Z. Wei, K. Jia, **X. Jia**, Ankush Khandelwal, and Vipin Kumar. Global River Monitoring Using Semantic Fusion Networks. *Water*, 12, no. 8, 2258, 2020.
- [10] **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.
- [9] **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.
- [8] C. Wang, P. Liu, K. Jia, **X. Jia**, and Y. Li. Identification of Weather Phenomena Based on Lightweight Convolutional Neural Networks. *Computers, Materials and Continua*, 64 (3), pp. 2043-2055, 2020.

- [7] 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.
- [6] **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.
- [5] **X. Jia**, A. Khandelwal, J. Gerber, K. Carlson, P. West and V. Kumar. Plantation Mapping in Southeast Asia. **Frontiers in Big Data**, 2019.
- [4] 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.
- [3] 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.
- [2] 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.
- [1] **X. Jia**, W. Wei, K. Jia. Primitive-based Accelerated Parallel Algorithm for DRR Generation on Mesh Structure Using GPU. **Journal of Jilin University**, 43(S):34-38, 2013.

CONFERENCE PAPERS

- [69] 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**), 2023. (accepted)
- [68] 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**), 2023. (accepted)
- [67] 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**), 2023. (accepted)
- [66] 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**), 2023.
- [65] 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**), 2023.
- [64] **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.
- [63] 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.
- [62] 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.
- [61] 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.
- [60] 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.
- [59] 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**), 2023.
- [58] 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**), 2023.

- [57] 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**), 2023.
- [56] 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**), 2023.
- [55] 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**), 2022.
- [54] 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**), 2022.
- [53] X. Zhao, K. Jia, B. Letcher, J. Fair, Y. Xie, and **X. Jia**. "VIMTS: Variational-based Imputation for Multi-modal Time Series". IEEE International Conference on Big Data (**BigData**), 2022.
- [52] 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.
- [51] 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.
- [50] 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.
- [49] 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**), 2022.
- [48] 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**), 2022.
- [47] 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**), 2022.
- [46] 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**). 2022.
- [45] 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**), 2022.
- [44] **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**), 2022. (Acceptance rate: 27.8%).
- [43] 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**, 2022. (Acceptance rate: 27.8%).
- [42] 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**), 2022.
- [41] 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**), 2022. (*equal contribution)
- [40] 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**), 2021 (*equal contribution). **Best Paper Award**. (Regular paper acceptance rate: 9.9%)

- [39] **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**), 2021. (Regular paper acceptance rate: 9.9%)
- [38] 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**), 2021. (Overall paper acceptance rate: 20%)
- [37] 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**), 2021. (Regular paper acceptance rate: 9.9%)
- [36] 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**), 2021.
- [35] 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**), 2021.
- [34] 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**), 2021.
- [33] 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**), 2021 (*equal contribution).
- [32] 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**), 2021.
- [31] 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**), 2021.
- [30] **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**), 2021. (Acceptance rate: 21.3%)
- [29] **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**), 2021. (Acceptance rate: 21.3%)
- [28] **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**), 2020. (Acceptance rate: 16%)
- [27] 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.
- [26] 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**), 2020.
- [25] 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**), 2020. (Acceptance rate: 19.3%)
- [24] **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%)
- [23] **X. Jia**, M. Wang, A. Khandelwal, 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%)
- [22] **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%)

- [21] **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%)
- [20] **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%)
- [19] 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%)
- [18] **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%)
- [17] **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%)
- [16] **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%)
- [15] **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%)
- [14] **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.
- [13] **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%)
- [12] **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.
- [11] 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%)
- [10] 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%)
- [9] **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.
- [8] 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.
- [7] 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%)
- [6] 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.
- [5] **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.
- [4] **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%)

- [3] 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.
- [2] **X. Jia**, W. Wei, K. Jia. A GPU-Based DRR Generation Method Using Cubic Window. The Eighth International Conference on Intelligent Information Hiding and Multimedia Signal Processing (**IHH-MSP**), pp. 403-406, 2012.
- [1] J. Feng, **X. Jia**, K. Jia, C. Qin, and J. Tian. Total Variation Regularization for Bioluminescence Tomography with an Adaptive Parameter Choice Approach. Annual International Conference of the IEEE Engineering in Medicine and Biology Society (**EMBC**), pp. 3946-3949, 2011.

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.
- Software Copyright of China, System of a Motion Feature Based Abrupt Cut Detection Algorithm.
- Patent of China, A Cuda-Based DRR Projective Image Generation Method, No.201110417500.1, 2011.
- Patent of China, An Accelerated Raycasting Method on DRR Generation, No. 201210109477.4, 2012.
- Patent of China, A Robust 2D-3D Image Registration Method on Fourier-Mellin Space, No.201210015232.5, 2012.

INVITED TALKS

- “Knowledge Guided Machine Learning: Challenges and Opportunities,” University of Maryland GEOG Seminar, 2023.
- “Physics Guided Machine Learning for Scientific Knowledge Discovery,” Keynote talk, 2022 International Conference on Neural Computing for Advanced Applications.
- “Physics Guided Machine Learning for Scientific Knowledge Discovery”, Invited Talk at EPFL, Dec 2021.
- “Physics Guided Machine Learning: A New Paradigm for Scientific Knowledge Discovery”, Invited Talk in ExxonMobil, Jul 2021.
- “Physics Guided Machine Learning: A New Paradigm for Scientific Knowledge Discovery”, Invited Talk at Midwest Big Data Summer School, May 2021.
- “Physics Guided Machine Learning: A New Paradigm for Scientific Knowledge Discovery”, Invited Talk in IJCAI 2020 Workshop on Bringing Semantic Knowledge into Vision and Text Understanding, Jan 2021.
- “Integrating Physics into Machine Learning for Modeling River Networks”, Invited Talk in AAAI Fall 2020 Symposium on Physics-Guided AI to Accelerate Scientific Discovery, Nov 2020.
- “Physics Guided Machine Learning: A New Paradigm for Scientific Knowledge Discovery”, Invited Talk in Invited Graduate Seminar, Mechanical and Materials Science, University of Pittsburgh, Sep 2020.
- “Science-guided Applications of Machine Learning in the Earth Sciences”, Invited Seminar Talk at NASA’s Ames Research Center, July 2018.
- “Big Data for Social Good: Opportunities and Challenges”, Invited Talk in Minnesota AI and Big Data Forum, Feb 2018.

EDUCATIONAL ACTIVITIES

Undergraduate Course “CS 1656: Introduction to Data Science” at the University of Pittsburgh.

Graduate Course “CS 2756: Principles of Data Mining”, “CS 3750: Advanced Topics in Machine Learning” at the University of Pittsburgh.

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.

Teaching Assistant for courses “CSE 111: Great Ideas in Computer Science” and “EAS 230: Engineering Computations” at the State University of New York at Buffalo.

Mentored following students:

University of Pittsburgh:

Graduate: Shengyu Chen; Erhu He; Can Zheng; Yue Wan; Nasrin Kalanat; Shiyuan Luo; Xiaoting Li; Qi Cheng; Zhexiong Liu; Bangyan Li; Haonan Duan.

Undergraduate: Declan T Kutscher

Post-doc: Runlong Yu

University of Minnesota:

Graduate: Jared Willard; Kshitij Tayal; Shaoming Xu; Mengdie Wang; Rahul Ghosh; Zhihao Wei (visiting scholar).

Undergraduate: Yifan Hu.

University at Buffalo, SUNY:

Graduate: Guangxu Xun; Tianle Ma.

PROFESSIONAL SERVICE

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).

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

Organization Committee Member in 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.