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## PRIMARY RESEARCH AREAS

**Trustworthy AI:** Adversarial attack & defense, Explainability, Fairness, Security, and Privacy  
**Predictive analytics:** Healthcare, CXR/CT/MRI, Geospatial data, Deep sequencing data

## EMPLOYMENTS

Associate/Assistant Professor, Wayne State University, Detroit, MI	August 2011 – Present
Assistant Professor, University of New Orleans, New Orleans, LA	January 2008 – July 2011
Biostatistician, Stowers Institute for Medical Research, Kansas City, MO	June 2006 – December 2007

## EDUCATION

Ph.D. in Bioinformatics, <b>University of Michigan, Ann Arbor</b>	2006
M.A. in Statistics, <b>University of Michigan, Ann Arbor</b>	2005
M.S. in Microbiology, <b>Peking University, China</b>	1999
B.S. in Microbiology, <b>Shandong University, China</b>	1996

## HONORS AND RECOGNITION

- **Best Student Paper Award**, AMIA-2020 Informatics Summit
- **Best Paper Award top 3 finalist**, ICMLA-2017
- **Best Poster Award top 3 finalist**, ICMLA-2017
- **Excellence in Teaching Award**, College of Engineering, Wayne State University, 2016

## SELECTED GRANT AWARDS

- **Henry Ford Health Sciences**, “*AI approaches to estimate uncertainties in adaptive radiotherapy of lung cancer.*”, Total Amount: \$220,000, 2021-2025, **PI**.
- **NIH/R61HD105610**, “*Severity Predictors Integrating salivary Transcriptomics and proteomics with Multi neural network Intelligence in SARS-CoV2 infection in Children (SPITS MISC)*”, Total Amount: \$1,433,469, 2021 – 2022, **MPI** with Usha Sethuraman and Steve Hicks.
- **NSF/CNS 2043611**, “*SCC-CIVIC-PG Track A: Leveraging AI-assist Microtransit to Ameliorate Spatiotemporal Mismatch between Housing and Employment.*”, Total Amount: \$49,898, 2021, **PI**.
- **NSF/CNS 1724227**, “*SEAS: INT: Autonomous Battery Operating System (ABOS): An Adaptive and Comprehensive Approach to Efficient, Safe, and Secure Battery System Management.*”, Total Amount: \$1,249,998, 2017-2021, **Senior Personnel**.
- **NSF/CNS 1637312**, “*SECC: Promoting a Healthier Urban Community: Prioritization of Risk Factors for the Prevention and Treatment of Pediatric Obesity.*”, Total Amount: \$199,996, 2016-2018, **co-PI**.
- **NSF/CCF 1451316**, “*EAGER: A novel algorithmic framework for discovering subnetworks from big biological data.*”, Total Amount: \$179,989, 2014-2016, **co-PI**.
- **NIH/R21LM010137**, “*A new informatics paradigm for reconstructing signaling pathways in human disease.*”, Total Amount: \$440,989, 2009-2011, **PI**.
- **NSF/NSF/CCF 0939108**, “*CPATH: A verification based learning model that enriches CS and related undergraduate programs.*”, Total Amount: \$300,000, 2009-2012, **co-PI**.

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SELECTED RECENT PUBLICATIONS

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**Full** publications can be found at [Google Scholar](#)

† denotes student authors under my supervision.

AI/Machine learning

- [1] D. Pan<sup>†</sup>, X. Li<sup>†</sup>, and **D. Zhu**, “Explaining deep neural network models with adversarial gradient integration,” *IJCAI-21*.
- [2] X. Li<sup>†</sup>, X. Li<sup>†</sup>, D. Pan<sup>†</sup>, and **D. Zhu**, “Improving adversarial robustness via probabilistically compact loss with logit constraints,” *AAAI-21*.
- [3] L. Wang<sup>†</sup> and **D. Zhu**, “Tackling ordinal regression problem for heterogeneous data: sparse and deep multi-task learning approaches,” *Data Mining and Knowledge Discovery*, pp. 1–28, 2021.
- [4] D. Pan<sup>†</sup>, X. Li<sup>†</sup>, X. Li<sup>†</sup>, and **D. Zhu**, “Explainable recommendation via interpretable feature mapping and evaluation of explainability,” *IJCAI-20*.
- [5] X. Li<sup>†</sup>, X. Li<sup>†</sup>, D. Pan<sup>†</sup>, and **D. Zhu**, “On the learning property of logistic and softmax losses for deep neural networks,” *AAAI-20*.
- [6] Y. Qiang<sup>†</sup>, X. Li<sup>†</sup>, and **D. Zhu**, “Toward tag-free aspect based sentiment analysis: A multiple attention network approach,” *IJCNN-20*.
- [7] L. Wang<sup>†</sup>, Y. Li, J. Zhou, **D. Zhu**, and J. Ye, “Multi-task survival analysis,” *ICDM-17*.
- [8] X. Li<sup>†</sup> and **D. Zhu**, “Robust feature selection via l2, 1-norm in finite mixture of regression,” *Pattern Recognition Letters*, vol. 108, pp. 15–22, 2018.
- [9] X. Li<sup>†</sup>, **D. Zhu**, and M. Dong, “Multinomial classification with class-conditional overlapping sparse feature groups,” *Pattern Recognition Letters*, vol. 101, pp. 37–43, 2018.
- [10] L. Wang<sup>†</sup>, **D. Zhu**, and M. Dong, “Clustering over-dispersed data with mixed feature types,” *Statistical Analysis and Data Mining: The ASA Data Science Journal*, vol. 11, no. 2, pp. 55–65, 2018.

Predictive Analytics

- [11] X. Li<sup>†</sup>, **D. Zhu**, and P. D. Levy, “Predicting clinical outcomes with patient stratification via deep mixture neural networks,” *AMIA Summits on Translational Science Proceedings*, vol. 2020, p. 367, 2020.
- [12] X. Li<sup>†</sup>, J. Hect, M. Thomason, and **D. Zhu**, “Interpreting age effects of human fetal brain from spontaneous fmri using deep 3d convolutional neural networks,” in *2020 IEEE 17th International Symposium on Biomedical Imaging (ISBI)*. IEEE, 2020, pp. 1424–1427.
- [13] X. Li<sup>†</sup>, R. Cao, and **D. Zhu**, “Vispi: Automatic visual perception and interpretation of chest x-rays,” in *International Conference on Medical Imaging with Deep Learning: MIDL 2020*. IEEE, 2020.
- [14] X. Li<sup>†</sup>, C. Li, and **D. Zhu**, “Covid-mobilexpert: On-device covid-19 patient triage and follow-up using chest x-rays,” in *2020 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*. IEEE, 2020, pp. 1063–1067.
- [15] X. Li<sup>†</sup>, D. Pan<sup>†</sup>, and **D. Zhu**, “Defending against adversarial attacks on medical imaging ai system, classification or detection?” in *2021 IEEE 18th International Symposium on Biomedical Imaging (ISBI)*. IEEE, 2021.
- [16] X. Li<sup>†</sup> and **D. Zhu**, “Robust detection of adversarial attacks on medical images,” in *2020 IEEE 17th International Symposium on Biomedical Imaging (ISBI)*. IEEE, 2020, pp. 1154–1158.

- [17] M. Z. Nezhad<sup>†</sup>, N. Sadati, K. Yang, and **D. Zhu**, “A deep active survival analysis approach for precision treatment recommendations: Application of prostate cancer,” *Expert Systems with Applications*, vol. 115, pp. 16–26, 2019.
- [18] L. Wang<sup>†</sup>, M. Dong, E. Towner, and **D. Zhu**, “Prioritization of multi-level risk factors for obesity,” in *2019 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*. IEEE, 2019.
- [19] X. Li<sup>†</sup>, **D. Zhu**, and P. D. Levy, “Leveraging auxiliary measures: a deep multi-task neural network for predictive modeling in clinical research,” *BMC medical informatics and decision making*, vol. 18, no. 4, p. 126, 2018.
- [20] L. Wang<sup>†</sup>, **D. Zhu**, E. Towner, and M. Dong, “Obesity risk factors ranking using multi-task learning,” in *Biomedical & Health Informatics (BHI), 2018 IEEE EMBS International Conference on*. IEEE, 2018, pp. 385–388.
- [21] X. Li<sup>†</sup>, **D. Zhu**, M. Dong, M. Z. Nezhad, A. Janke, and P. D. Levy, “Sdt: A tree method for detecting patient subgroups with personalized risk factors,” *AMIA Summits on Translational Science Proceedings*, vol. 2017, p. 193, 2017.
- [22] M. Z. Nezhad<sup>†</sup>, **D. Zhu**, N. Sadati, K. Yang, and P. Levi, “Subic: A supervised bi-clustering approach for precision medicine,” in *2017 16th IEEE International Conference on Machine Learning and Applications (ICMLA)*. IEEE, 2017, pp. 755–760.
- [23] X. Li<sup>†</sup>, **D. Zhu**, and P. Levy, “Predictive deep network with leveraging clinical measure as auxiliary task,” in *2017 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*. IEEE, 2017, pp. 786–791.
- [24] L. Wang<sup>†</sup>, **D. Zhu**, M. Dong, and Y. Li, “Modeling over-dispersion for network data clustering,” in *Machine Learning and Applications (ICMLA), 2017 16th IEEE International Conference on*. IEEE, 2017, pp. 42–49.
- [25] M. Z. Nezhad<sup>†</sup>, **D. Zhu**, X. Li, K. Yang, and P. Levy, “Safs: A deep feature selection approach for precision medicine,” in *Bioinformatics and Biomedicine (BIBM), 2016 IEEE International Conference on*. IEEE, 2016, pp. 501–506.

## PRESS COVERAGE

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- **Scientific American:** [AI assisted diagnosis](#) February 2019
- **DBusiness:** [AI to Bring Micro-transit to Hourly Workers](#) February 2021
- **EurekAlert:** [AI to Aid Early Detection of SARS-CoV2 in Children](#) February 2021

## TEACHING EXPERIENCE

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- *CSC 5825 Introduction to Machine learning and Applications*, Wayne State University, Winter 2017, Fall 2017/2018/2019/2020/2021
- *CSC 7825 Machine learning*, Wayne State University, Winter 2019/2020/2021/2022
- *CSC 8800 Seminars in Machine learning and AI*, Wayne State University, Winter 2021/2022
- *CSC 8860 Seminars in Computer Vision and Pattern Recognition*, Fall 2017
- *CSC 6580 Design and Analysis of Algorithms*. Winter 2015/2016/2017

## SELECTED SERVICE

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- **Founding Director** [Wayne AI Research Initiative](#), 2021-Present
- **Graduate Program Director** [Wayne Computer Science Graduate Programs](#), 2018-2020
- **AI Conference SPC/PC NuerIPS/ICML/ICLR/AAAI/IJCAI/ACL/EMNLP/MICCAI/AMIA**
- **Journal editorship** *BMC Genomics*, *Frontiers in Genetics*, *Scientific Reports*, *Plos One*.