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Date of Birth: Jan. 24, 1993.

EDUCATION

Ph.D. Mechanical Engineering, Xi'an Jiaotong University (XJTU) (2015-2021)

Adviser: Prof. Xuefeng Chen

The topics of doctoral thesis: Research on Sparse Prior Modelling Principle and Application of Aero-engine Vibration Monitoring and Diagnosis.

Joint Ph.D. Health Informatics, The University of Manchester (2019-2020)

Adviser: Prof. David Wong and Prof. David Clifton

Research topic: AI for healthcare, especially for ECG and Parkinson

B.E. Mechanical Engineering (Hsue-Shen Tsien), Xi'an Jiaotong University (XJTU) (2011-2015)

Adviser: Prof. Xuefeng Chen

RESEARCH AND PROFESSIONAL EXPERIENCE

Assistant Professor, School of Mechanical Engineering, XJTU (Jan. 2021-Present)

Visiting Scholar, Health Informatics Centre, The University of Manchester (Oct. 2019-Nov. 2020)

Research Interests: Sparse Signal Processing, Machinery Fault Diagnosis, Machine Learning and Deep Learning, AI for Healthcare, Anomaly Detection, RUL Prediction.

RESEARCH PROJECTS

2022-2026 National Key R&D Program of China (No.2022YFB4600800): Online Monitoring and Quality Evaluation Technology for Laser Powder Bed Melting Additive Manufacturing

2021-2024 NSFC Project (No.92060302): Research on Intelligent Fault Diagnosis for Aero-Engine Main Shaft Bearing and Drive System

2022-2024 NSFC Project (No.52105116): Research on Physics-Driven Deep Transfer Intelligent Diagnosis of Helicopter Transmission System

2021-2023 The China Postdoctoral Science Foundation of General Funding (No. 2021M692557) and Special Funding (No.2021TQ0263)

PUBLICATIONS (JOURNAL PAPERS)

• Google Scholar Citations: over 3,000 as of July, 2023, with H-index at 29.

- [1] Ruqiang Yan, Zuogang Shang, Hong Xu, Jingcheng Wen, **Zhibin Zhao**, Xuefeng Chen, Robert X Gao. Wavelet transform for rotary machine fault diagnosis: 10 years revisited[J]. Mechanical Systems and Signal Processing, 2023, 200: 110545.
- [2] Xiaolei Yu, **Zhibin Zhao**, Xingwu Zhang, Shaohua Tian, Chee-Keong Kwoh, Xiaoli Li, Xuefeng Chen. A universal transfer network for machinery fault diagnosis[J]. Computers in Industry, 2023, 151: 103976.
- [3] Zuogang Shang, **Zhibin Zhao***, Ruqiang Yan, Xuefeng Chen. Core loss: Mining core samples

- efficiently for robust machine anomaly detection against data pollution[J]. *Mechanical Systems and Signal Processing*, 2023, 189: 110046.
- [4] Fujin Wang, **Zhibin Zhao***, Zhi Zhai, Zuogang Shang, Ruqiang Yan, Xuefeng Chen. Explainability-driven model improvement for SOH estimation of lithium-ion battery[J]. *Reliability Engineering & System Safety*, 2023, 232: 109046.
- [5] Xiaolei Yu, **Zhibin Zhao**, Xingwu Zhang, Xuefeng Chen, Jianbing Cai. Statistical identification guided open-set domain adaptation in fault diagnosis[J]. *Reliability Engineering & System Safety*, 2023, 232: 109047.
- [6] Te Han, Ruonan Liu, **Zhibin Zhao**, Pradeep Kundu. Fault Diagnosis and Health Management of Power Machinery[J]. *Machines*, 2023, 11(4): 424.
- [7] Botao An, Shibin Wang, Fuhua Qin, **Zhibin Zhao**, Ruqiang Yan, Xuefeng Chen. Adversarial Algorithm Unrolling Network for Interpretable Mechanical Anomaly Detection[J]. *IEEE Transactions on Neural Networks and Learning Systems*, 2023.
- [8] Jing Qin, Fujie Gao, Zumin Wang, David C Wong, **Zhibin Zhao**, Samuel D Relton, Hui Fang. A novel temporal generative adversarial network for electrocardiography anomaly detection[J]. *Artificial Intelligence in Medicine*, 2023, 136: 102489.
- [9] Zuogang Shang, **Zhibin Zhao**, Ruqiang Yan. Denoising Fault-Aware Wavelet Network: A Signal Processing Informed Neural Network for Fault Diagnosis[J]. *Chinese Journal of Mechanical Engineering*, 2023, 36(1): 9.
- [10] Shibin Wang, Chuanyi Cheng, Jianghan Zhou, Fuhua Qin, Yining Feng, Baoqing Ding, **Zhibin Zhao**, Xuefeng Chen. Reassignment-enable reweighted sparse time-frequency analysis for sparsity-assisted aeroengine rub-impact fault diagnosis[J]. *Mechanical Systems and Signal Processing*, 2023, 183: 109602.
- [11] Yanjie Guo, Jiafeng Tang, Lei Yang*, **Zhibin Zhao***, Miao Wang, Peng Shi. RobustFlow: An unsupervised paradigm toward real-world wear detection and segmentation with normalizing flow[J]. *Tribology International*, 2023, 179: 108173.
- [12] Zheng Zhou, Tianfu Li, **Zhibin Zhao**, Chuang Sun, Xuefeng Chen, Ruqiang Yan, Jide Jia. Time-varying trajectory modeling via dynamic governing network for remaining useful life prediction[J]. *Mechanical Systems and Signal Processing*, 2023, 182: 109610.
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- [14] Zhiyuan Li, Yu Sun, Laihao Yang, **Zhibin Zhao**, Xuefeng Chen. Unsupervised machine anomaly detection using autoencoder and temporal convolutional network[J]. *IEEE Transactions on Instrumentation and Measurement*, 2022, 71: 1-13.
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- [16] Miao Wang, Lei Yang, **Zhibin Zhao**, Yanjie Guo. Intelligent prediction of wear location and mechanism using image identification based on improved Faster R-CNN model[J]. *Tribology International*, 2022, 169: 107466.
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- [18] Fujin Wang, **Zhibin Zhao***, Zhi Zhai, Yanjie Guo, Huan Xi, Shibin Wang Xuefeng Chen. "Feature disentanglement and tendency retainment with domain adaptation for Lithium-ion battery capacity estimation," *Reliability Engineering & System Safety*, 2023, 230(108897).
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- [22] **Zhibin Zhao**, Tianfu Li, Botao An, Shibin Wang, Baoqing Ding, Xuefeng Chen. "Model-driven deep unrolling: Towards interpretable deep learning against noise attacks for intelligent fault diagnosis," *ISA transactions*, 2022.
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- [29] **Zhibin Zhao**, Jingyao Wu, Tianfu Li, Chuang Sun, Ruqiang Yan, Xuefeng Chen. "Challenges and Opportunities of AI-Enabled Monitoring, Diagnosis & Prognosis: A Review," *Chinese Journal of Mechanical Engineering*, 2021, 34(1): 1-29.
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- [34] Tianfu Li, **Zhibin Zhao**, Chuang Sun, Li Cheng, Xuefeng Chen, Ruqiang Yan, Robert X Gao. "WaveletKernelNet: An Interpretable Deep Neural Network for Industrial Intelligent Diagnosis," *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, 2021.
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- [43] **Zhibin Zhao**, Tianfu Li, Jingyao Wu, Chuang Sun, Shibin Wang, Ruqiang Yan, Xuefeng Chen. “Deep Learning Algorithms for Rotating Machinery Intelligent Diagnosis: An Open Source Benchmark Study,” *ISA Transactions*, 2020, 107: 224-255.
- [44] Lei Yang, Yunfei Wang, **Zhibin Zhao**, Yanjie Guo, Sicheng Chen, Weiqiang Zhang, Xiao Guo. “Particle-Laden Droplet-Driven Triboelectric Nanogenerator for Real-Time Sediment Monitoring using Deep Learning Method,” *ACS Applied Materials & Interfaces*, 2020, 12(34): 38192-38201.
- [45] Jingyao Wu, **Zhibin Zhao**, Chuang Sun, Ruqiang Yan, Xuefeng Chen. “Few-shot Transfer Learning for Intelligent Fault Diagnosis of Machine,” *Measurement*, 2020, 108202.
- [46] Stefan Williams, **Zhibin Zhao**, Awais Hafeez, David C. Wong, Samuel D. Relton, Hui Fang, Jane E. Alty. “The discerning eye of computer vision: Can it measure Parkinson’s finger tap bradykinesia?” *Journal of the Neurological Sciences*, 2020 416: 117003.
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- [58] Yanjie Guo, **Zhibin Zhao**, Ruobin Sun, Xuefeng Chen. "Data-driven multiscale sparse representation for bearing fault diagnosis in wind turbine," *Wind Energy*, 2019, 22(4): 587-604.
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PUBLICATIONS (CONFERENCE PAPERS)

- [1] Zhi Zhai, Jingcheng Wen, Fujin Wang, **Zhibin Zhao**, Yanjie Guo, Xuefeng Chen. Remaining Useful Life Prediction of Aero-Engine Based on Transformer with Tendency Retainment[C]//2022 International Conference on Sensing, Measurement & Data Analytics in the era of Artificial Intelligence (ICSMD). IEEE, 2022: 1-6.
- [2] Chang Guo, Zuogang Shang, Jiaxin Ren, **Zhibin Zhao**, Shibin Wang, Xuefeng Chen. Instance-Wise Causal Feature Selection Explainer for Rotating Machinery Fault Diagnosis[C]//2022 International Conference on Sensing, Measurement & Data Analytics in the era of Artificial Intelligence (ICSMD). IEEE, 2022: 1-6.
- [3] Zhi Zhai, Yi Di, Fujin Wang, Zhenjiang Leng, **Zhibin Zhao**, Xuefeng Chen. Adversarially-trained Graph Convolutional Recurrent Autoencoder for Spacecraft Anomaly Detection with Missing Data[C]//2022 International Conference on Sensing, Measurement & Data Analytics in the era of Artificial Intelligence (ICSMD). IEEE, 2022: 1-7.
- [4] Zuogang Shang, **Zhibin Zhao**, Zheng Zhou, Chuang Sun, Yu Sun, Ruqiang Yan. Denoising Fused Wavelets Net for Aeroengine Bevel Gear Fault Diagnosis[C]//2021 International Conference on Sensing, Measurement & Data Analytics in the era of Artificial Intelligence (ICSMD). IEEE, 2021: 1-6.
- [5] Zuogang Shang, **Zhibin Zhao**, Hui Fang, Samuel Relton, Darcy Murphy, Zoe Hancox, Ruqiang Yan, David Wong. Deep discriminative domain generalization with adversarial feature learning for classifying ECG signals[C]//2021 Computing in Cardiology (CinC). IEEE, 2021, 48: 1-4.
- [6] Jingyao Wu, **Zhibin Zhao**, Hongbing Shang, Chuang Sun, Ruqiang Yan, Xuefeng Chen. Machine anomaly detection under changing working condition with syncretic self-regression

- auto-encoder[C]//2021 IEEE International Instrumentation and Measurement Technology Conference (I2MTC). IEEE, 2021: 1-5.
- [7] Fujin Wang, **Zhibin Zhao**, Zhi Zhai, Shibin Wang, Baoqing Ding, Xuefeng Chen. Remaining useful life prediction of lithium-ion battery based on cycle-consistency learning[C]//2021 International Conference on Sensing, Measurement & Data Analytics in the era of Artificial Intelligence (ICSMD). IEEE, 2021: 1-6.
- [8] Jianghan Zhou, Shibin Wang, Chaowei Tong, **Zhibin Zhao**, Xuefeng Chen. Weighted Basis Pursuit Denoising Algorithm and Its Application in Gear Fault Diagnosis[C]//2021 International Conference on Sensing, Measurement & Data Analytics in the era of Artificial Intelligence (ICSMD). IEEE, 2021: 1-5.
- [9] Xiaolei Yu, **Zhibin Zhao**, Xingwu Zhang, Chuang Sun, Qiyang Zhang, Xuefeng Chen. Coupling deep models and extreme value theory for open set fault diagnosis[C]//2020 International Conference on Sensing, Measurement & Data Analytics in the era of Artificial Intelligence (ICSMD). IEEE, 2020: 118-123.
- [10] Zheng Zhou, Tianfu Li, **Zhibin Zhao**, Chuang Sun, Ruqiang Yan, Xuefeng Chen. Differentiable architecture search for aeroengine bevel gear fault diagnosis[C]//2020 International Conference on Sensing, Measurement & Data Analytics in the era of Artificial Intelligence (ICSMD). IEEE, 2020: 270-274.
- [11] **Zhibin Zhao**, Hui Fang, Samuel D Relton, Ruqiang Yan, Yuhong Liu, Zhijing Li, Jing Qin, David C Wong. Adaptive lead weighted ResNet trained with different duration signals for classifying 12-lead ECGs[C]//2020 Computing in Cardiology. IEEE, 2020: 1-4.
- [12] **Zhibin Zhao**, Jingyao Wu, David Wong, Chuang Sun, Ruqiang Yan. Probabilistic Remaining Useful Life Prediction Based on Deep Convolutional Neural Network[C]//9th International Conference on Through-life Engineering Service. 2020.
- [13] **Zhibin Zhao**, Hui Fang, Stefan Williams, Samuel D Relton, Jane Alty, Alex J Casson, David C Wong. Time series clustering to examine presence of decrement in Parkinson's finger-tapping bradykinesia[C]//2020 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC). IEEE, 2020: 780-783.
- [14] **Zhibin Zhao**, Shibin Wang, David Wong, Yanjie Guo, Xuefeng Chen. The sparse and low-rank interpretation of SVD-based denoising for vibration signals[C]//2020 IEEE international instrumentation and measurement technology conference (I2MTC). IEEE, 2020: 1-6.
- [15] Tianfu Li, **Zhibin Zhao**, Chuang Sun, Ruqiang Yan, Xuefeng Chen. Multi-scale CNN for multi-sensor feature fusion in helical gear fault detection[J]. Procedia Manufacturing, 2020, 49: 89-93.
- [16] Jingyao Wu, **Zhibin Zhao**, Chuang Sun, Ruqiang Yan, Xuefeng Chen. Ss-InfoGAN for class-imbalance classification of bearing faults[J]. Procedia Manufacturing, 2020, 49: 99-104.
- [17] Shuming Wu, Xuefeng Chen, Pete Russhard, Ruqiang Yan, Shaohua Tian, Shibin Wang, **Zhibin Zhao**. Blade tip timing: from raw data to parameters identification[C]//2019 IEEE International Instrumentation and Measurement Technology Conference (I2MTC). IEEE, 2019: 1-5.
- [18] **Zhibin Zhao**, Xuefeng Chen, Baoqing Ding, Shuming Wu. TQWT-based multi-scale dictionary learning for rotating machinery fault diagnosis[C]//2017 13th IEEE Conference on Automation Science and Engineering (CASE). IEEE, 2017: 554-559.
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- [20] **Zhibin Zhao**, Botao An, Shibin Wang, Baijie Qiao, Chuang Sun, Xuefeng Chen. Bearing fault diagnosis using hyper-laplacian priors and non-convex optimization[C]//2018 Prognostics and System Health Management Conference (PHM-Chongqing). IEEE, 2018: 1239-1244.
- [21] Shuming Wu, Xuefeng Chen, Pete Russhard, Shibin Wang, Zhi Zhai, **Zhibin Zhao**. Foreign object damage diagnosis of aero-engine compressor based on damping averaging built-in matrix

method[C]//Turbo Expo: Power for Land, Sea, and Air. American Society of Mechanical Engineers, 2018, 50985: V001T01A017.

- [22] Junwei Wang, Chuang Sun, **Zhibin Zhao**, Xuefeng Chen. Feature ensemble learning using stacked denoising autoencoders for induction motor fault diagnosis[C]//2017 Prognostics and System Health Management Conference (PHM-Harbin). IEEE, 2017: 1-6.
- [23] Shuming Wu, Xuefeng Chen, **Zhibin Zhao**, Ruonan Liu. Data-driven discriminative K-SVD for bearing fault diagnosis[C]//2017 Prognostics and System Health Management Conference (PHM-Harbin). IEEE, 2017: 1-6.
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PRESENTATIONS

- **Oral Presentation.** “Probabilistic Remaining Useful Life Prediction Based on Deep Convolutional Neural Network,” TESConf 2020 - 9th International Conference on Through-life Engineering Services, Cranfield, UK, Nov. 3rd-4th, 2020.
 - **Oral Presentation.** “Adaptive lead weighted ResNet trained with different duration signals for classifying 12-lead ECGs,” Computing in Cardiology 2020, Rimini, Italy, Sep. 13th-16th, 2020.
 - **Oral Presentation.** “Time series clustering to examine presence of decrement in finger tapping bradykinesia,” 42nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Montreal, Canada, July 20th-24th, 2020.
 - **Oral Presentation.** “The sparse and low-rank interpretation of SVD-based denoising for vibration signals,” 2020 International Instrumentation and Measurement Technology Conference (I2MTC 2020), Dubrovnik, Croatia, May 25th-28th, 2020.
 - **Oral Presentation.** “Bearing Fault Diagnosis Using Hyper-Laplacian Priors and Non-convex Optimization,” 2018 Prognostics and System Health Management Conference, Chongqing, China, Oct. 26th-28th, 2018.
 - **Oral Presentation.** “Periodic Overlapping Group Elastic Net for Fault Diagnosis,” 2018 International Instrumentation and Measurement Technology Conference (I2MTC 2018), Huston, TX, USA, May 14th-17th, 2018.
 - **Oral Presentation.** “TQWT-based multi-scale dictionary learning for rotating machinery fault diagnosis,” The 13th IEEE International Conference on Automation Science and Engineering, Xi'an, China, Aug. 20th-23rd, 2017.
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HONORS AND AWARDS

- 2023 Special Prize for Higher Education Institution Scientific Research Outstanding Achievement Award, Shaanxi, China
- 2023 “Top Ten Young Scholar of Distinction”, Xi’an Jiaotong University
- 2023 NSFC-RGC2023, Best Student Conference Paper
- 2022 Doctoral Dissertation Award, Xi’an Jiaotong University
- 2021 Outstanding Young Talents, Xi’an Jiaotong University
- 2020 Second Prize, “Classification of 12-lead ECGs” in Cinc2020
- 2020 “Xu Zongben Applied Mathematics Paper Award”, Xi’an Jiaotong University
- 2019, 2020 National Scholarships, Xi’an Jiaotong University
- 2019 China Scholarship Council Scholarship, China Scholarship Council

- 2019 Second Prize, “Tianyi Cup” Artificial Intelligence–Garbage Classification
- 2018 Merit Awards, 2018 Global Artificial Intelligence Application Competition
- 2018 Top1, Fault Prediction on Engineering Machinery Based on Machine Learning
- 2016 Outstanding Graduate Students, Xi’an Jiaotong University
- 2012~2015 Four Cyrus Tang Scholarships, Cyrus Tang Foundation, China

ACADEMIC SERVICES

- **Associate Editor**, IEEE Transactions on Instrumentation & Measurement
- **Associate Editor**, Transactions of the Institute of Measurement and Control
- **Associate Editor**, Frontiers in Mechanical Engineering
- **Editorial Board Member**, Electronics
- **Guest editor**, Machines: “Fault Diagnosis and Health Management of Power Machinery”
- **Reviewer**, IEEE TNNLS, IEEE TIM, IEEE TIE, IEEE SPL, MSSP, et al.