The 2022 Annual Conference of
The Efficiency and Performance Engineering Network
(TEPEN-2022)

Handbook

Beijing Information Science and Technology University (BISTU)

Inner Mongolia University of Science &Technology (IMUST)

18th - 21st, August 2022

1 General Information

1.1 Conference Theme

We are delighted to announce that the 2022 international conference of The Efficiency and Performance Engineering Network (**TEPEN-2022**) will be held from **18-21 August 2022** in Baotou City, Inner Mongolia Autonomous Region, China. The conference will be jointly organized by Beijing Information Science & Technology University (BISTU) and Inner Mongolia University of Science & Technology (IMUST) with a theme of *Intelligent Condition Monitoring for Enhancing Efficiency and Carbon Neutrality*. As planned, IMUST will host the on-site sessions in Baotou and BISTU will host the online closing session.

The conference aims to provide a common platform for professionals, engineers, practitioners and researchers working in the field of condition monitoring, plant maintenance and reliability. We welcome participations and contributions from those involved in both theoretical research and practical applications of all aspects of fault detection, diagnostics, prognostics in both the operational and manufacturing processes.

The conference is featured with parallel technical sessions, keynote speeches, workshops, special panel forums as well as **Best Paper Awards**, **Best Presentation Awards**, and **International Collaboration Funds (TEPEN-ICF2022)**.

1.2 Date and Access

Date and Time: 18th - 21st, August 2022

Conference Web: https://tepen.net/conference/tepen2022/
Contact Hotline: +86 13848208042 (Prof. Chao Zhang)
Conference Venue: The Rare Earth International Hotel (稀土国际大酒店)

Zoom Online Meeting Link: https://hudac.zoom.us/j/64929788924
Meeting ID: 649 2978 8924
Passcode: 076406

1.3 General Chairman

Chair:
Prof. Shijie Yu
Vice-President of Beijing Information Science & Technology
University, China.

Chair:
Prof. Jianguo Wang
Professor in Department of Mechanical & Electronic
Engineering
Former Vice-President of Inner Mongolia University of Science
& Technology, China

Co-Chair:
Prof. Andrew Ball
Pro-Vice-Chancellor (Research & Enterprise), Professor of
Diagnostic Engineering, University of Huddersfield, UK.

Co-Chair:
Prof. Fulei Chu
Professor in Department of Mechanical Engineering, Tsinghua
University, Vice President of the Chinese Society for Vibration
Engineering (CSVE).

1.4 Executive Committee

Chair: Prof. Fengshou Gu

Co-chair: Prof. Hongjun Wang and Prof. Chao Zhang

2 Programme Schedule

Date	Beijing Time	London Time	Agenda items	Chair	Room
Thursday 18th Aug	09:00-18:00	-	Industrial Visiting to Wind Energy Farm		
Friday 19th Aug	08:00-22:00	-	Registration: Jianjun Li (Tel: +86 13474820085 and +86 13848208042)		
Saturday 20th Aug Keynote speeches	08:30-08:50	01:30-01:50	Welcome Speech by Prof. Huiping Ren Welcome Speech by Prof. Shijie Yu Welcome by Prof. Andrew Ball and Prof. Fulei Chu	Prof. Hongjun Wang	Multi-function Hall
	08:50-09:10	01:50-02:10	Photograph & Tea break	Prof. Chao Zhang	
	09:10-09:50	02:10-02:50	Prof. Weihua Li, Deep transfer learning for fault diagnosis in industrial scenarios: Theories, applications, and challenges	Prof. Fulei Chu	
	09:50-10:30	02:50-03:30	Prof. Surjya K Pal, Artificial Intelligence in Industrial Research	Prof. Yimin Shao	
	10:30-10:50	03:30-03:50	Tea Break		
	10:50-11:20	03:50-04:20	Dr. Xiang Li, Data privacy-preserving collaborative intelligent machinery fault diagnosis	Prof. Shixi Yang	Multi-function Hall
	11:20-11:50	04:20-04:50	Dr. Guojin Feng: On-Rotor Sensing Technology for Rotating Machinery Fault Diagnosis	Prof. Niaoqing Hu	
	12:00-14:00	05:00-07:00	Lunch		
	14:00-14:40	07:00-07:40	Dr. Wenxian Yang, Wind turbine condition monitoring – Challenges, Issues, and potential solutions	Prof. David Mba	Multi-function Hall
	14:40-15:10	07:40-08:10	Dr. Yongjian Ji, Robotic Milling Chatter Stability Prediction	Prof. Hongjun Wang	
	15:10-15:30	08:10-08:30	Tea Break		
	15:30-16:00	08:30-09:00	Prof. Chao Fu, Dynamics of faulted rotor-bearing systems and uncertainty quantification	Prof. Tianran Lin	Multi-function Hall
	16:00-17:30	09:00-10:30	**Senior Academic Forum:** **Insights into the top research groups**	Prof. Andrew Ball	
	18:30-20:30	11:30-13:30	Conference Banquet with a talk about the climbing expedition of Prof. Shixi Yang		
Sunday 21st Aug Parallel sessions	08:30-10:10	01:30-03:10	Session A-1: Condition Monitoring Technologies	Prof. Qingbo He	Room 1
			Session A-2: Vibration Analysis, Fault Detection	Dr. Hao Zhang	Room 2
			Session A-3: Maintenance, Life Prediction, Reliability Analysis	Prof. Guojun Qin	Room 3
			Session A-4: Modelling and Simulation Analysis	Prof. Guoji Shen	Room 4
			Session A-5: Deep learning, Sensing, Digital Manufacturing	Dr. Yunpeng Cao	Room 5
	10:10-10:30	03:10-03:30	Tea Break		
	10:30-12:10	03:30-05:10	Session B-1: Condition Monitoring Technologies	Dr. Kaibo Lu	Room 1
			Session B-2: Vibration Analysis, Fault Detection	Dr. Xingfen Wang	Room 2
			Session B-3: Maintenance, Life Prediction, Reliability Analysis	Dr. Jinxin Wang	Room 3
			Session B-4: Modelling and Simulation Analysis	Prof. Jing Liu	Room 4
			Session B-5: Deep learning, Sensing, Digital Manufacturing	Dr. Dezun Zhao	Room 5
	12:10-13:10	05:10-06:10	Lunch		
	13:30-15:10	06:30-08:10	Session C-1: Condition Monitoring Technologies	Prof. Tianyang Wang	Room 1
			Session C-2: Vibration Analysis, Fault Detection	Prof. Zhe Cheng	Room 2
			Session C-3: Design, Analysis of Control Systems	Prof. Li Zhang	Room 3
			Session C-4: Modelling and Simulation Analysis	Dr. Yi Yang	Room 4
			Session C-5: Deep learning, Sensing, Digital Manufacturing	Dr. Xiaochuan Li	Room 5
	15:10-15:30	08:10-08:30	Tea Break		
	15:30-17:30	08:30-10:30	Session D-1: Condition Monitoring Technologies	Prof. Jigang Wu	Room 1
			Session D-2: Vibration Analysis, Fault Detection	Dr. Guoxing Li	Room 2
			Session D-3: Maintenance, Life Prediction, Reliability Analysis	Prof. Lei Hu	Room 3
			Session D-4: Modelling and Simulation Analysis	Dr. Xiaofeng Guo	Room 4
			Session D-5: Deep Learning, Sensing, Digital Manufacturing	Dr. Bo Yuan	Room 5
	17:40-18:35	10:40-11:35	**The Future of Research Assessment and the Future of Research Itself – Prof. Andrew Ball** **Conference Closing including Prize Giving**	Prof. Fengshou Gu	Room 5
	18:40-19:40	11:40-12:40	Dinner		

2.1 20th August: Keynote Speeches

	Dr. Wenxian Yang: Wind turbine condition monitoring – Challenges, issues and potential solutions. Associate Professor in offshore renewable energy at Newcastle University, United Kingdom. With expertise in machine condition monitoring and fault diagnosis, signal processing, marine and offshore renewable energy. Dr. Yang has been consistently striving to low the leverage cost of offshore renewable power by developing various approaches using the knowledge in multiple disciplines.
	Prof. Surjya K Pal: Artificial Intelligence in Industrial Research. The Lord Kumar Bhattacharyya Chair Professor in Manufacturing in the Department of Mechanical Engineering at IIT Kharagpur, India. He has published 286 research articles, including 176 International and National Journal Papers, 15 International Book Chapters, and 89 Conference papers. He has filed 12 patents. His innovation, "Low-cost AI solution for metrological inspection," is selected in the top 3 by INDIAai Lab2Market (The National AI Portal of India, a MeitY, NeGD, and NASSCOM initiative).
	Prof. Weihua Li: Deep transfer learning for fault diagnosis in industrial scenarios: Theories, applications, and challenges. Deputy Dean and Professor with the Shien-Ming Wu School of Intelligent Engineering, Guangzhou International Campus, South China University of Technology, Guangzhou, China Prof. Li's research interests include Industrial intelligence, Industrial Big Data, Digital Twins, Intelligent Maintenance, and Intelligent Connected Vehicles.
	Dr. Xiang Li: Data privacy-preserving collaborative intelligent machinery fault diagnosis. Associate Professor at School of Mechanical Engineering, Xi'an Jiaotong University, China. Dr. Xiang Li has published more than 30 high-level journal papers, including IEEE Transactions on Industrial Electronics, IEEE Transactions on Industrial Informatics etc. He has published 13 ESI highly cited papers and 4 ESI hot papers. His citations in Google Scholar are beyond 3000 with an H-index of 24. His research works have been successfully applied in the real industries such as intelligent manufacturing. He is the editorial board member of many journals including IEEE/CAA Journal of AutomaticaSinica, etc.
	Dr. Guojin Feng: On-Rotor Sensing Technology for Rotating Machinery Fault Diagnosis. Associate Professor at School of Mechanical Engineering, Hebei University of Technology, China. Dr. Guojin Feng has published more than 30 high-quality journal papers. His research interests include industrial low-power wireless sensor networks, mechanical fault feature extraction and fault identification, rotor dynamic sensing, energy recovery of rotating machinery, intelligent fault diagnosis based on machine/deep learning, etc.
	Dr. Yongjian Ji: Robotic Milling Chatter Stability Prediction. Associate Professor at Key Laboratory of Modern Measurement & Control Technology, Ministry of Education, Beijing Information Science & Technology University, China. His research interests include operation condition analysis of industrial robot, manufacturing process monitoring, and fault diagnosis techniques of High-end CNC equipment.
	Prof. Chao Fu: Dynamics of faulted rotor-bearing systems and uncertainty quantification. Professor and PhD supervisor in Mechanics in the Department of Engineering Mechanics at Northwestern Polytechnical University, China. His research area mainly involves linear and nonlinear vibrations of rotating machines, dynamics with faults and uncertainty quantification.

2.2 20th August: Senior Academic Forum

Insights into the Top Research Groups

16:00-17:30 (BJT)   09:00-10:30 (BST)

Prof. Fulei Chu chufl@mail.tsinghua.edu.cn	The Condition Monitoring Research Group (CMRG), Tsinghua University, China
Prof. Stephan Heyns stephan.heyns@up.ac.za	The Centre for Asset Integrity Management, University of Pretoria, South Africa
Prof. Surjya K Pal surjya.pal@icloud.com	The Centre of Excellence in Advanced Manufacturing Technology, Department of Mechanical Engineering, IIT Kharagpur, India
Prof. Qingbo He qbhe@sjtu.edu.cn	State Key Laboratory of Mechanical Systems and Vibration, Shanghai Jiao Tong University, China
Prof. Jin Zhou and Prof. Xuefeng Chen jin.zhou@xjtu.edu.cn chenxf@xjtu.edu.cn	School of Mechanical Engineering, Xi'an Jiao Tong University, China
Prof. Min Xie minxie@cityu.edu.hk	Department of Advanced Design and Systems Engineering (ADSE), City University of Hong Kong, China
Prof. Hongkun Li lihk@dlut.edu.cn	School of Mechanical Engineering, Dalian University of Technology, China
Prof. Xiaodong Li lxd@mail.ioa.ac.cn	The Institute of Acoustics (IOA), The Chinese Academy of Sciences, China
Prof. Yimin Shao ymshao@cqu.edu.cn	State Key Laboratory of Mechanical Transmission, Chongqing University, China
Prof. Len Gelman l.gelman@hud.ac.uk	The Centre for Efficiency and Performance Engineering (CEPE), University of Huddersfield, UK

2.3 21st August: Session A

Time	Session A-1: Condition Monitoring Technologies Meeting Room 1 Chair: Prof. Qingbo He	Session A-2: Vibration Analysis, Fault Detection Meeting Room 2 Chair: Dr. Hao Zhang	Session A-3: Maintenance, Life Prediction, Reliability Analysis Meeting Room 3 Chair: Prof. Guojun Qin	Session A-4: Modelling and Simulation Analysis Meeting Room 4 Chair: Prof. Guoji Shen	Session A-5: Deep Learning, Sensing, Digital Manufacturing Meeting Room 5 Chair: Dr. Yunpeng Cao
08:30-08:50 (BJT) 01:30-01:50 (BST)	Continuous Vibration Separation for Fault Diagnosis of Planetary Gear in Equipment Transmission *Lun Zhang, Niaoqing Hu, Zhengyang Yin, Jiao Hu and Yi Yang*	Experimental Study on Entropy Features in Machining Vibrations of A Thin-walled Tubular Workpiece *Xin Wang, Zhihao Zhang, Fuqiang Guo, Kaibo Lu and Xinyu Pang*	Research on Bearing Fault Diagnosis based on 1DCNN with Fault Compound Features *Yubin Yue and Hongjun Wang*	Rolling bearing fault diagnosis based on mathematical morphological spectrum *Wenyan Zhu, Wenxing Zhang and Chao Zhang*	Design of Airborne Oxygen Pressure Sensor *Shupeng Guo, Xiaofei Wang, Tao He and Guanhuan Chen*
08:50-09:10 (BJT) 01:50-02:10 (BST)	Numerical study of resistance projection welding of nuts *Libin Yang, Wanzhu Xie and Xuemei Qin*	Early Weak Fault Diagnosis of Rolling Bearing Based on Duffing System and LMCD *Duo Qu, Kai Wang, Xueqing Dai, Yanpeng Chen and Chenxi Yang*	Research on on-line detection technology of lubricating oil moisture *Bin Fan, Ying Jie Gao and Lian Fu Wang*	A Study of a Novel Acoustic Metamaterial Structure for Signal Enhancement based on Fan Blade Fault Diagnosis *Tang Weijie, Huang Shiqing, Deng Rongfeng, David Mba, Gu Fengshou and Andrew Ball*	Research on Performance Audit of Air Pollution Prevention and Control: Data from Beijing *Chunyu Xing and Xinzhu Feng*
09:10-09:30 (BJT) 02:10-02:30 (BST)	Parameterized Doppler Adaptive Correction for Wayside Acoustic Array Signal *Yulan Li, Hongrui Yi, Hao Wang, Xiaoxi Ding, Jiawei Xiao, Huafei Pan and Yimin Shao*	Bearing fault diagnosis based on compressed data and supervised global-local/nonlocal discriminant analysis *Xin Wang, Na Yang and Lingli Cui*	Prediction reliability assessment based on mahalanobis distance and GRU in the application of bearing RUL analysis *Chen Zhenyu, Liu Shenglan, Hongrui Yi, Ding Xiaoxi, Li Xin, Wu Shanshan, Hu Mingli and Shao Yimin*	Dynamic Modeling and Stability Analysis of High-Speed Angular Contact Ball Bearing *Yu Tian, Changfeng Yan, Wei Luo, Yaofeng Liu and Lixiao Wu*	Classification of Sape Soundboard Wood Quality by Employing Machine Learning *Tee Hao Wong, Jia Sheng Ng, Muhammad Afif, Agnes Ayang, Ming Foong Soong, Ahmad Saifizul, and Rahizar Ramli*
09:30-09:50 (BJT) 02:30-02:50 (BST)	Diagnosis of Friction and Wear of RV Reducer used in Industrial Robots based on Vibration Analysis *Huanqing Han, Qirong Xv, Dongqin Li, Bing Li, Xiuquan Sun, Fengshou Gu*	Fault Diagnosis for Gas Turbine Rotor Using Actor-Critic Network *Yingjie Cui and Hongjun Wang*	Rolling bearing fault diagnosis based on BP neural network *Chenglong Yu and Hongjun Wang*	Dynamic Modeling Analysis and Experimental Verification of Blade with Breathing Crack *Jianfang Cao, Yongmin Yang and Guoji Shen*	Knowledge graph construction in logistics based on multi-source data fusion *Xinyu Gao and Li Zhang*
09:50-10:10 (BJT) 02:50-03:10 (BST)	Tool Wear Monitoring in CNC Milling Process based on Vibration Signals from an On-Rotor Sensing Method *Chun Li, Bing Li, Hongjun Wang, Dawei Shi, Fengshou Gu and Andrew David Ball*	Fault diagnosis of rolling bearing based on Laplace wavelet sparse representation and Teager energy operator *Hongfang Li, Rongjia Mo and Zhifei Wu*	Study on unbalance method of rolling bearing fault samples based on adversarial network *Li Han, Hao Chen and Wen Xing Zhang*	The structure optimization of a small linear friction welding machine *Libin Yang, Zeshen Huang, Renjian Su, Mingyou Wu and Changshen Song*	Safety Calculation and Analysis of Flange Sealing Face Bolts of Pressure Vessel *Peng Engao, Wang Dandan, Yongyang Zhang and Luo Zhengkun*

2.4 21st August: Session B

Time	Session B-1: Condition Monitoring Technologies Meeting Room 1 Chair: Dr. Kaibo Lu	Session B-2: Vibration Analysis, Fault Detection Meeting Room 2 Chair: Dr. Xingfen Wang	Session B-3: Maintenance, Life Prediction, Reliability Analysis Meeting Room 3 Chair: Dr. Jinxin Wang	Session B-4: Modelling and Simulation Analysis Meeting Room 4 Chair: Prof. Jing Liu	Session B-5: Deep Learning, Sensing, Digital Manufacturing Meeting Room 5 Chair: Dr. Dezun Zhao
10:30-10:50 (BJT) 03:30-03:50 (BST)	On-line Condition Monitoring of Additive Manufacturing based on Friction Induced Acoustic Emissions *Zhen Li, Xinfeng Zou and Xianzhi Zhang*	Research on Fault Diagnosis Method of Rolling Bearing Based on MobileNet V2 *Ningkang Dong, Chao Zhang and Hao Chen*	The effect of the cage clearance on the lubrication characteristics of a high-speed ball bearing *Hengtai Ni, Jing Liu and Ruyi Zhou*	Study on Performance of Air-foil-bearing with Three-dimensional Eccentricity of Rotor *Zhaoyuan Cai and Xudong Wu*	Application of a New Finite-Time Tracking Differentiator in Stable Platform *Kai Weng, Yan Ren, Chao Zhang, Liyun Zhao, Huimin Wang and Ning Liu*
10:50-11:10 (BJT) 03:50-04:10 (BST)	Weak signal detection method with adaptive three-dimensional coupled bistable stochastic resonance system *Mengdi Li, Peiming Shi, Wenyue Zhang, Fengshou Gu and Dongying Han*	Intelligent Fault Diagnosis Method Based on CA-ResNet Model *Zhenbao Fu, Zhitao Xu, Liuyang Song, Wenwu Chen, Qingfeng Wang and Huaqing Wang*	Fault Diagnosis of Rolling Element Bearings Based on a Second Order Cyclic Autocorrelation and a Deep Auto-encoder *Yajun Shang and Tianran Lin*	Investigation of random vibration response of journal bearings under turbulent boundary layer excitation *Fang Zeng, Hao Zhang, Guojin Feng, Dong Zhen, Xiaoxia Liang, Zhanqun Shi and Hao Zhang*	Research on Production Process Optimization and Improvement Based on a Production Line of Y Company *Jidong Guo, Jianying Lu, Xinfeng Zou, Jianxing Zhang, Liangfang Zhu, Xiaoxin Cui, Weihuai Chen and Dawei Zhou*
11:10-11:30 (BJT) 04:10-04:30 (BST)	Study on Wear Fault Diagnosis of Planetary Gearbox Based on STOA-VMD Combined with 1.5-Dimensional Envelope Spectrum *Jiashuai Zhang, Zhanglei Jiang and Guoxin Wu*	Bearing Fault Diagnosis Method Based on STFT Image and AlexNet Network *Guoxin Wu, Ge Wang, Xiuli Liu and Ruilong Duan*	A method on manufacturing process monitoring of A compony based on VSM *Dongyu Gan, Xinfeng Zou, Xuewei Zhang, Jiaqi Lin, Yongyang Zhang, Jidong Guo and Dawei Zhou*	Research on dynamic characteristics of planetary gear system with pitting fault under impact condition *Bowei Fu, Jie Yang, Junjie He, Xiaoang Liu, Wei Hu and Zhuo Yue*	Analysis on the Application of IE Thought in the Production System of D Company's EM Series Products *Jidong Guo, Xuewei Zhang, Mengjing Chen, Haojun Cai, Wanting Zhang, Mushen Zheng, Rongfeng Deng and Xinfeng Zou*
11:30-11:50 (BJT) 04:30-04:50 (BST)	Summary of Fault Diagnosis of Electric Vehicle Braking System *Ziyang Zhou and Lin Zheng*	Analysis of fault characteristics of planetary gearbox of shearer *Xiaoxue Li, Yu Guo and Saiwei Han*	Rolling bearing remaining useful life prediction based on Wiener process *Wentao Zhao, Chao Zhang, Da Lv and Shuai Wang*	A simulation analysis of the modal characteristics and critical speeds of a turbine rotor system *Xue Lei, Liu Jing and Dang Xiaoyong*	Research on Semantic Map Construction Method of Power Plant Inspection Robot *Yufei Qin and Dongmin Zhang*
11:50-12:10 (BJT) 04:50-05:10 (BST)	Study on fault diagnosis method of key components of gearbox under variable working conditions based on improved VMD algorithm *Tongtong Liu, Lingli Cui and Chao Zhang*	Gas Turbine Blade Passing Frequency Reconstruction and Its Application for Blade Fracturing Fault Diagnosis *Yuan Xiao, Kun Feng, Zhouzheng Li, Fengshou Gu and Zhinong Jiang*	Prediction and Compensation Method of Spindle Thermal Deformation in Five Axis Machining Center *Baisheng Chen, Hongjun Wang, Wei Peng and Zengxin Wang*	A Finite Element Analysis of Static and Dynamic Characteristics of High Speed Motorized Spindle *Ping Ma, Heng Ding, Hao Chen, Weian Wu and Duanneng Li*	Qualitative Detection of Melamine based on Terahertz Spectrum and Analysis of Absorption Peak Study *Miaoyu Zhao, Fang Yan, Yiheng Guo and Xuan Zhuo*
12:10-12:30 (BJT) 05:10-05:30 (BST)		Propeller Imbalance Detection via On-Rotor Sensing Vibration for Industrial Drone *Yubin Lin, Chun Li, Shiqing Huang, Dawei Shi, Rongfeng Deng and Fengshou Gu*	Bearing fault diagnosis method based on sparse group lasso and adaptive TQWT decomposition *Baoguo Wang, Changkun Han, Hongjie Zhang, Huaqing Wang, Wenwu Chen, Qingfeng Wang and Liuyang Song*	Adaptive neural control for chaotic permanent magnet synchronous motor with asymmetric input saturation *Hongshan Liu, Huibo Liu and Yanwei Zhao*	Fault diagnosis method of planetary gear based on FFT-DET and BP neural network *Zheng Wang, Hongjun Wang, Baisheng Chen, Zhuangzhuang Zhang*

2.5 21st August: Session C

Time	Session C-1: Condition Monitoring Technologies Meeting Room 1 Chair: Prof. Tianyang Wang	Session C-2: Vibration Analysis, Fault Detection Meeting Room 2 Chair: Prof. Zhe Cheng	Session C-3: Design, Analysis of Control Systems Meeting Room 3 Chair: Prof. Li Zhang	Session C-4: Modelling and Simulation Analysis Meeting Room 4 Chair: Dr. Yi Yang	Session C-5: Deep Learning, Sensing, Digital Manufacturing Meeting Room 5 Chair: Dr. Xiaochuan Li
13:30-13:50 (BJT) 06:30-06:50 (BST)	Investigation into the Modulation Characteristics of Motor Current Signals in a Belt Transmission System *Zhexiang Zou, Baoshan Huang, Guoji Shen, Robert Cattley, Fengshou Gu and Andrew D. Ball*	An improved method for fault diagnosis of rolling bearings with optimized parameters *Yu Zhang and Xiwei Zhao*	Operational Modal Analysis of Journal Bearings Based on Stochastic Subspace Identification *Xiaopeng Wang, Hao Zhang, Guojin Feng, Xiaoxia Liang, Zhen Dong and Zhanqun Shi*	Multi-Domain Features Fusion Adaptive Neural Network Tool Wear Recognition Model *Hanyang Wang, Ming Luo and Fengshou Gu*	AGV Path Planning for Logistics Warehouse by Using an Improved D*Lite Algorithm *Yongyang Zhang, Junhao Luo, Xiaotong Cai, Ying Chen and Xinfeng Zou*
13:50-14:10 (BJT) 06:50-07:10 (BST)	Research on Wheel Chassis Motion Control of a Full-Wheel Steering Self-Decision Platform *Cao Shaoyong, Chen Jingwei, Tang Weijie and Du Fen*	A Support Vector Machine Fault Diagnosis Method for Gas Turbine Fuel System *Yan Li, Yunpeng Cao, Zhao Tianrui and Li Shuying*	Bearing fault diagnosis method based on EMD and Multi-channel convolutional Neural Network *Fukai Zhao, Dong Zhen, Xiaopeng Yu, Xiaoang Liu, Wei Hu and Jin Ding*	Research on Crack Fault Classification of Planetary Transmission Based on Numerical Model and GAN *Xiuli Zheng and Da Kang*	Quantitative Study of Food Additives Based on Terahertz Spectrum *Yiheng Guo, Fang Yan, Miaoyu Zhao and Xuan Zhuo*
14:10-14:30 (BJT) 07:10-07:30 (BST)	Surface defect recognition of NdFeb raw materials based on improved YOLOX-tiny model *Changhao Dong, Chao Zhang, Jianjun Li and Da Lv*	Fault diagnosis of the ball screw pairs in electromechanical actuators based on empirical mode decomposition and symmetrized dot pattern *Zhengyang Yin, Niaoqing Hu, Yi Yang and Ling Chen*	Securely Similarity Determination of Convex Geometry Graphics under the Malicious Model *Xiaomeng Liu, Xin Liu, Yang Xu and Chao Zhang*	Study of The Dynamic Characteristics of Planetary Gear Systems Under Different Loads *Junjie He, Xiaoang Liu, Bowei Fu, Dong Zhen, Kuihua Lu and Wei Hu*	Low-cost and portable device to monitor heart rate, blood oxygen saturation and body temperature with warning system *Cong Guo, Qianhui Ma, Mingyu Shen, Xinghao Dong, Shuaifei Chen and Fulong Liu*
14:30-14:50 (BJT) 07:30-07:50 (BST)	Boiler Wall Temperature Prediction Based on Temporal Convolution Networks *Fengbiao Qi, Haiguang Li and Chao Zhang*	Research on Fault Diagnosis of Gas Turbine Rotor System Based on Deep Convolution Generative Adversarial *Zhengbo Wang, Hongjun Wang and Jinglei Su*	Optimization Design of Welding Fixture Based on Ergonomics *Yongyang Zhang, Hanhua Mai, Siqi Wang, Hongming Zhang, Zhuofeng San and Ruixin Hu*	Dynamic Modeling and Modal Analysis of the Planetary Gear Set-Bevel Gear Set Coupling System *Yi Yang, Guoji Shen, Lun Zhang, Zhe Cheng, Jiao Hu and Niaoqing Hu*	Intelligent Image Processing for Monitoring Solar Photovoltaic Panels *Xing Wang, Wenxian Yang and Jinxin Wang*
14:50-15:10 (BJT) 07:50-08:10 (BST)	A Study of Electric Current Signal Analysis for Motor Bearing Condition Diagnosis *Yinghang He, Kun Feng, Baoshan Huang, Guoji Shen, Fengshou Gu and Andrew Ball*	Experimental Investigation on the Internal Clearance Induced Vibrations of Tapered Roller Bearings for Condition Monitoring *Zewen Zhou, Bingyan Chen, Fengshou Gu, Rongfeng Deng, Yubin Lin and Yousif Muhamedsalih*	Optimal repair time limit and replacement age for a system with multiple types of failures *Peirui Qiao, Ming Luo and Yizhong Ma*	Preparation and performance testing of InAs/GaAs photodetector *Chunhua Yang, Jie Wen, Hongmei Liu, Guongdong Wei, Zichao Jiang and Lei Huang*	Investigation into defect image segmentation algorithms for galvanized steel sheets under texture background *Rui Pan, Yuda Chen, Guoxin Wu and Xiaoli Xu*

2.6 21st August: Session D

Time	Session D-1: Condition Monitoring Technologies Meeting Room 1 Chair: Prof. Jigang Wu	Session D-2: Vibration Analysis, Fault Detection Meeting Room 2 Chair: Dr. Guoxing Li	Session D-3: Maintenance, Life Prediction, Reliability Analysis Meeting Room 3 Chair: Prof. Lei Hu	Session D-4: Modelling and Simulation Analysis Meeting Room 4 Chair: Dr. Xiaofeng Guo	Session D-5: Deep Learning, Sensing, Digital Manufacturing Meeting Room 5 Chair: Dr. Bo Yuan
15:30-15:50 (BJT) 08:30-08:50 (BST)	The Extraction of Wind Turbine Condition Related Features Using Air-borne Acoustic Signals *Alhussein Albarbar and Rongfeng Deng*	Fault Detection and Diagnosis of Gearbox Oil Shortage using Motor Current Signature *Funso Otuyemi, Xiuquan Sun, Jingyan Zhao, Zhexiang Zou, Jianguo Wang, Fengshou Gu and Andrew Ball*	Blind Deconvolution Based on Modified Smoothness Index for Railway Axle Bearing Fault Diagnosis *Bingyan Chen, Fengshou Gu, Weihua Zhang, Mengying Tan, Yaping Luo, Zuolu Wang and Zewen Zhou*	Modelling and analysis of internal excitation of cracked spur gear considering effects of tooth errors *Lantao Yang, Desheng Zou, Xiuquan Sun, Yimin Shao, Fengshou Gu, Andrew Ball and David Mba*	Research and Application of Deep Reinforcement Learning in Rotating Machinery Fault Diagnosis under Unbalanced Samples Condition *Cheng Zhe, Wei Lei, Cheng Junsheng and Hu Niaoqing*
15:50-16:10 (BJT) 08:50-09:10 (BST)	A Pulse Impedance Technique for Fast State of Health Estimation of EV Lithium-ion Batteries *Xiaoyu Zhao, Zuolu Wang, Eric Li, Fengshou Gu and Andrew Ball*	Diagnosis of Motor Bearing Faults Using the Vibration of An On-Rotor Sensing Method *Dawei Shi, Zuolu Wang, Hongjun Wang, Qianshan Chen, Yinghang He, Guojin Feng and Fengshou Gu*	Temporal convolutional network with attention mechanism for bearing remaining useful life prediction *Shuai Wang, Chao Zhang, Wentao Zhao and Da Lv*	An SOC Estimation Strategy Considering Lithium–ion Battery Degradation Based on Neural-Network and Equivalent Circuit Model *Yuxing Feng, Guojin Feng, Zhaozong Meng, Xiaoxia Liang, Hao Zhang and Dong Zhen*	Time Domain Identification Method of Cutting Forces in Robotic Milling Process *Maxiao Hou, Hongrui Cao and Jianghai Shi*
16:10-16:30 (BJT) 09:10-09:30 (BST)	Advanced neural network with optimized training parameters based on the Cuckoo Search for detecting and classifying faults in PV power systems *Ghedhan Boubakr, Ann Smith, Fengshou Gu and Andrew Ball*	Motor Bearing Fault Diagnosis Based on Stochastic Resonance Enhanced Stator Current Signals *Wenyue Zhang, Peiming Shi, Dongying Han, Yinghang He, Fengshou Gu and Andrew Ball*	Life prediction of wind turbine based on Attention-BiGRU *Lv Da, Chao Zhang, Wentao Zhao, Hongbo Fei, Changhao Dong, Shuai Wang and Yongzhi Pang*	A Simulation Approach for Analysis of the Regenerative Potential of High-Speed Train Suspensions *Ruichen Wang and Zhiwei Wang*	Markov transform field coupled with CNN image analysis technology in NIR detection of alcohols diesel *Shiyu Liu, Shutao Wang, Chunhai Hu and Deming Kong*
16:30-16:50 (BJT) 09:30-09:50 (BST)	Experimental Investigation of Vibration Signals from an On-Rotor Sensing for Diesel Engine Crankshaft Lubrication Monitoring *Solomon Okhionkpamwonyi, Dawei Shi, Fengshou Gu and Andrew Ball*	An Optimized Modulation Signal Bispectrum for Bearing Fault Diagnosis *Yuandong Xu, Yunpeng Cao, Fengshou Gu and Andrew Ball*	CNN-LSTM-based model for predicting the remaining useful life of rolling bearings *Xiaopeng Yu, Hao Zhang, Fukai Zhao, Dong Zhen, Kiuhua Lu and Wei Hu*	Simulation and Optimisation of Piezoelectric Cantilever Configurations for Energy Harvesting with Multi-modal Vibrations *Weiqiang Mo, Yubin Lin, Shiqing Huang, Zuolu Wang, Fengshou Gu, Bo Liang, Hongjun Wang*	Deep Machine Learning with a comparison between Central Difference Kalman Filter (CDKF) and Extended Kalman Filter (EKF) Based Induction motor broken rotor bars diagnosis *Ali Amiri Zaniani, Dong Zhen and Haiyang Li*
16:50-17:10 (BJT) 09:50-10:10 (BST)	An Approaching Method on a 3D Printing Process Condition Monitoring of a Nozzle Temperature based on Vibro-acoustic Signals *Xinfeng Zou, Zhen Li, Lianghua Zeng,Fengshou Gu and Andrew D. Ball*	Vibration Analysis for Diagnosis of Tribo-Dynamic Interaction in Journal Bearings *Khaldoon Brethee, Jiaojiao Ma, Ghalib Ibrahim, Fengshou Gu and Andrew Ball*	Performance degradation evaluation model of rolling bearing based on CAE-SVDD *Xinyang Dong, Yunpeng Cao, Xiaoyu Han and Weixing Feng*	WTBNeRF: Wind Turbine Blade 3D Reconstruction by Neural Radiance Fields *Han YANG, Linchuan TANG, Hui MA, Rongfeng DENG, Hui ZHANG*	Innovative Application of Internal Audit Digitization Based on Portrait Technology: a Case Study of Pumped Storage Enterprises *Fang Xie, Huanqin Chen, Jun Tang, Jiarui Yong and Li Zhang*
17:10-17:30 (BJT) 10:10-10:30 (BST)	Selection of optimal mother wavelet for acoustic emission signal processing of gas pipeline leakage *Lin Gao, Hong Wang, Jiannan Zhou and Xiaojie Zhou*	Fault Diagnostics of AC Motor Bearings based on Envelope Analysis of Vibration Residual Signal *Jingyan Zhao, Xiuquan Sun, Jianguo Wang, Zewen Zhou, Yousif Muhamedsalih,Fengshou Gu, Andrew D. Ball*	Research On Personalized Recommendation of Link Prediction Based on Multi Graph Attention Network *Yuhong Zhao, Hui Li and Yue Yao*	Evaluating The Effect of Angular Misalignment on RV Reducer Based on Motor Current Signature Analysis *Dongqin Li, Zhexiang Zou, Qirong Xu, Bing Li, Huanqing Han, Xiuquan Sun, Xiaoyu Zhao, Baoshan Huang, Fengshou Gu and Andrew Ball*	Sensing with Sound Enhanced Acoustic Metamaterials for Fault Diagnosis *Shiqing Huang, Yubin Lin,Weijie Tang,Rongfeng Deng,Qingbo He, Fengshou Gu,Andrew Ball*

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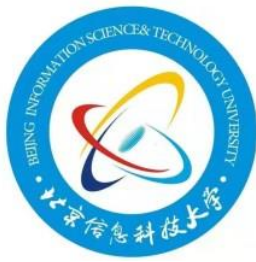

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7   Introduction

Inner Mongolia University of Science and Technology

Inner Mongolia University of Science and Technology (IMUST: https://www.imust.edu.cn) is located in the first batch of national civilized cities, a beautiful grassland steel city Baotou, its predecessor was founded in 1956 Baotou Iron and Steel Industry School and Baotou Construction Engineering School, under the former Ministry of Metallurgical Industry. In 1958, the two schools merged to form the Baotou Institute of Technology. In 1960, it was renamed Baotou Iron and Steel Institute. In 1998, it was placed under the administration of the Inner Mongolia Autonomous Region, and the central and local co-construction was implemented. In 2003, it was renamed Inner Mongolia University of Science and Technology. In 1997, it passed the undergraduate teaching qualification evaluation of the Ministry of Education, and in 2008, it passed the undergraduate teaching level evaluation of the Ministry of Education with excellent grades. In 1986, it jointly trained postgraduate students. In 1991, it became a master's degree awarding unit, and in 2013, it became a doctor's degree awarding unit. In 2016, it successfully passed the examination and evaluation of undergraduate teaching work of the Ministry of Education, and in 2017, it was approved by the Ministry of Education to become a newly added university with the exemption qualification for postgraduate students. The university has developed into a multi-disciplinary university with metallurgy, mining, coal, and rare earth as its features, with engineering as its main subject and coordinated development of engineering, science, arts, management, economics, law, art, and education, integrating postgraduate education, undergraduate education, higher vocational education, continuing education, and international student education.

The School of Mechanical Engineering (SME: https://sme.imust.edu.cn) of Inner Mongolia University of Science and Technology, formerly known as the Department of Mechanical Engineering of Baotou Iron and Steel Institute, was founded in 1956. The college has one provincial collaborative innovation center, two provincial key laboratories, one provincial engineering technology research center, and one university key laboratory. The discipline of Mechanical engineering is a first-level doctoral and master's degree authorized discipline, is the professional engineering master's degree awarding point, and is a key discipline in Inner Mongolia Autonomous Region. In the process of continuous construction, mechanical engineering has gradually refined four disciplines with regional characteristics: equipment condition monitoring and fault diagnosis, electromechanical system integration method and theory, nanostructured product design and manufacturing technology, and new energy technology and equipment. The college has four undergraduate majors: Mechanical design and manufacturing and automation, process equipment and control engineering, vehicle engineering, and mechanical and electronic engineering. Among them, mechanical design and manufacturing and automation is the national 'first-class professional' construction major, the Ministry of Education 'Outstanding engineer' training program major, the Inner Mongolia Autonomous Region's 'first-class professional' and 'brand major', and the national engineering education certification acceptance major. The process equipment and control engineering major are the brand major of the autonomous region, and it is the certification and cultivation major of the engineering education major of the university. Vehicle engineering is a pilot program of applied specialty transformation in the Inner Mongolia Autonomous Region.

The School of Information Engineering (SIE: https://sit.imust.edu.cn), formerly known as the Department of Automation and Computer Engineering, was founded in 2002. After years of development, it has become a multi-disciplinary and multi-level training base for teaching and research talents. SIE offers 10 Bachelor's Degree Programs including Automation, Computer Science

and Technology, Measurement and Control Technology and Instrument, Electronic Information Engineering, Communication Engineering, Electrical Engineering and Automation, Building Electricity and Intelligentization, Software Engineering, Cyberspace Security, and Data Science and Big Data Technology. Among these majors, Automation was approved as the national first-class undergraduate major, included in the third batch of national characteristic specialities, and selected into the second batch of undergraduate majors under the plan for educating and training outstanding engineers by the Ministry of Education. Meanwhile, Communication Engineering has been listed as one of the first-class undergraduate majors at the provincial level; Automation, Computer Science and Technology, Measurement and Control Technology and Instrument, and Electronic Information Engineering have been recognized as Inner Mongolia Autonomous Region Branded Majors. In SIE, three first-level disciplines are authorized to confer academic master's degrees (Control Science and Engineering, Computer Science and Technology, and Information and Communication Engineering). SIE also offers professional master's degree programs in disciplines including Electronic Information and Energy and Power. Meanwhile, Control Theory, Control Engineering, and Computer Application Technology are the key disciplines of the Inner Mongolia Autonomous Region.
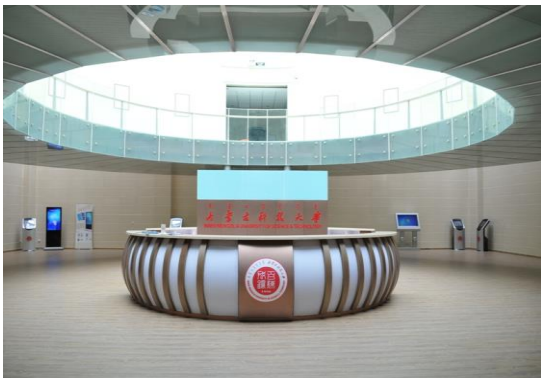
Beijing Information Science & Technology University

Beijing Information Science and Technology University (BISTU) is an institution with a relatively complete system of academic disciplines in information science and technology and is principally supported and supervised by Beijing Municipality. With a history of 85 years to date, BISTU was established in 1937.

BISTU has a student body of 10,743 full-time undergraduates, 1,963 postgraduates and 144 international students. BISTU offers 43 undergraduate programs which find the way to distinction amongst peer institutions. BISTU programs currently cover 13 first-tier disciplines of master's degrees and 6 professional master's degrees. Substantial support for teaching and research is given by 26 provincial-level research institutes. BISTU was officially approved for qualification to award doctoral degrees in 2021. BISTU has made outstanding achievements in new-generation information technology and smart manufacturing. From 2007 to 2009, BISTU won the National Science and Technology Award four times as the first author and won another one in 2017. Between BISTU and about 100 institutions around the world, Inter-school cooperative relationship has been established which covers joint educational models from the undergraduate level to master's and doctoral level. Various governmental scholarships are available for outstanding international students studying with BISTU. With the growing size of international students and constantly improving the quality of international education, international alumni of BISTU now are making contributions to every corner of the world. Following the trend of the information times and upholding the guiding principle of political construction, with efforts and enthusiasm invested in the construction of a "double first-rate university", BISTU strides forward on the way to realize information-featured, high-quality, intensive, and diversified development to make itself a high-level university with distinctive features in information technology!

8   Hotel Information

The Rare Earth International Hotel (稀土国际大酒店)

地址：内蒙古自治区包头市稀土高新区阿尔丁大街 89 号
Address: 89 Adding Street, Rare Earth High-tech Zone,
Baotou, Inner Mongolia Autonomous Region, China

一、包头东河机场距离酒店 19.2 公里。

Baotou Donghe Airport is 19.2 km away from the hotel.

到店方式：

Get to the hotel:

1. 出租车：约 25 分钟到达酒店。

Taxi: It takes about 25 minutes to get to the hotel.

2. 机场巴士：每小时一班车，费用 14 元/人，时间约 40 分钟。

Airport bus: One bus per hour, the fee is 14 yuan/person, the time is about 40 minutes.

二、包头火车站距离酒店 2.8 公里。

Baotou railway station is 2.8 km away from the hotel.

1. 出租车或网约车：时间约 6 分钟到达酒店。

1. Taxi: It takes about 6 minutes to get to the hotel.

2. 公交车：1 路，22 路，60 路和 64 路在稀土国际大酒店站下车，2 路，39 路在中国二冶集团站下车，时间约 15 分钟。

Bus: No. 1, 22, 60, and 64 get off at Xi Tu Guo Ji Da Jiu Dian Station. No. 2 and No. 39 get off at Zhong Guo Er Ye Ji Tuan Station. It takes about 15 minutes.