

The 32<sup>nd</sup> International Congress and Exhibition on Condition  
Monitoring and Diagnostic Engineering Management

**COMDEM 2019**

Tuesday 3<sup>rd</sup> to Thursday 5<sup>th</sup> September 2019  
University of Huddersfield, Queensgate, Huddersfield,  
West Yorkshire, HD1 3DH, UK

**CONGRESS PROGRAMME**



## Programme at a Glance: the Main Schedule

**Venues:** Oastler (OA) and Richard Steinitz Buildings

**Address:** Queensgate, Huddersfield, UK, HD1 3DH

Date	Time	Agenda items	Chairs	Congress Room
Monday 2 <sup>nd</sup> Sept.	17:00-19:30	Welcome Drinks Reception and Delegate Registration	Prof. A. Ball, Prof L. Gelman and Prof. R. Rao	Atrium; Richard Steinitz Building
Tuesday 3 <sup>rd</sup> Sept	8:00-09:00	Delegate Registration		OA4/02
	8:30-8:45	Congress Opening Ceremony	Prof. A. Ball, Prof. L. Gelman and Prof. R. Rao	OA4/01
	8:45-9:45	Keynote Speech	Prof. L. Gelman	OA4/01
		Keynote Speech	Prof. L. Gelman	
	9:45-10:05	Tea, Coffee and Exhibition		OA4/02
	10:05-11:40	Session 1-A	Prof. S. Heyns	OA7/27
		Session 2-A	Dr. W. Wang	OA7/28
		Session 3-A	Dr. L. Alboul and Prof. R. Saatchi	OA7/29
		Session 4-A	Prof. D. Stegelmeyer	OA7/30
		Session 5-A	Dr. A. Bevan	OA7/31
		Session 6-A	Prof. A. Bayoumi	OA4/01
	11:40-12:30	Masterclass: Prof. Robert Randall, Australia	Prof. L. Gelman	OA4/01
	12:30-13:30	Lunch and Exhibition		OA4/02
	13:30-14:00	Keynote speech	Prof. L. Gelman	OA4/01
	14:00-15:35	Session 1-B	Prof. F. Chu	OA7/27
		Session 2-B	Prof. C. Zhang	OA7/28
		Session 3-B	Dr. L. Alboul and Prof. R. Saatchi	OA7/29
Session 4-B		Dr. Z. Li	OA7/30	
Session 5-B		Prof. Y. Xiang	OA7/31	
Session 6-B		Dr. A. Onsy	OA4/01	
17:00-23:00	Tours at the National Railway Museum in York (Coaches leave Huddersfield at 17:00 and arrive back 23:00)			
Wednesday 4 <sup>th</sup> Sept	8:30-9:00	Keynote Speech	Prof. L. Gelman	OA4/01
	9:00-9:30	Tea, Coffee and Exhibition		OA4/02
	9:30-10:40	Session 1-C	Dr. F. Balouchi	OA7/27
		Session 2-C	Dr. X. Li	OA7/28
		Session 3-C	Dr. C. Fu	OA7/29
		Session 4-C	Dr. H. Zhang	OA7/30
		Session 5-C	Prof. F. Li	OA7/31
		Session 6-C via Skype	Prof. H. Wang	OA4/01
	10:40-11:10	Tea, Coffee and Exhibition		OA4/02
	11:10-12:20	Session 1-D	Prof. F. Gu	OA7/27
		Session 2-D	Prof. P. Lane	OA7/28
		Session 3-D	Mr. K. Solinski	OA7/29
		Session 4-D	Prof. L. McCluskey	OA7/30
		Session 5-D	Prof. J. Allport	OA7/31
	12:20-13:30	Lunch and Exhibition		OA4/02
	13:30-15:00	Keynote Speech	Prof. F. Gu	OA4/01
		Keynote Speech	Prof. R. Rao	
Masterclass: Prof. John Mottershead, UK		Prof. A. Ball		
15:00-15:20	Tea, Coffee and Exhibition		OA4/02	
15:20-17:20	Session 1-E	Prof. Y. Cao	OA7/27	
	Session 2-E	Prof. Y. Shao	OA7/28	
	Session 3-E	Dr. G. Feng	OA7/29	
	Session 4-E	Prof. N. Hu	OA7/30	
	Session 5-E	Prof. D. Baglee	OA7/31	
19:00-23:00	Congress Gala Dinner, Cedar Court Hotel			
Thursday 5 <sup>th</sup> Sept	8:30-9:30	Keynote Speech	Prof. L. Gelman	OA4/01
		Keynote Speech	Prof. L. Gelman	

	9:30- 9.50	Tea, Coffee and Exhibition		OA4/02
	9:50-11:00	Session 1-F	Prof. Q. He	OA7/27
		Session 2-F	Prof. Z. Shi	OA7/28
		Session 3-F	Dr. A. Chasalevris	OA7/29
		Session 4-F	Dr. K. Lu	OA7/30
		Session 5-F	TBC	OA7/31
	11:00-11:20	Tea, Coffee and Exhibition		OA4/02
	11:20-11:50	Keynote speech	Prof. L. Gelman	OA4/01
	11:50-12:50	Poster session	TBC	OA4/02
	12:50-14:00	Session 1-G	Dr. D. Zhen	OA7/27
		Session 2-G	Dr. J. Jiang	OA7/28
		Session 3-G	Dr. H. Zhang	OA7/29
		Session 4-G	Prof. T. Lin	OA7/30
		Session 5-G	Prof. S. Yang	OA7/31
	14:00-15:00	Lunch and Exhibition		OA4/02
	15:00-15:20	Masterclass: Ms. Swati Meherishi, Springer, India	Prof. L. Gelman	OA4/01
	15:20-15:40	Congress Closing Ceremony	Prof. A. Ball, Prof. L. Gelman and Prof. R. Rao	OA4/01
	15:40-17:30	Lab Tours	Prof. A. Ball, Prof. F. Gu and Prof. L Gelman	Centre for Efficiency and Performance Engineering, the University of Huddersfield

## Plenary Keynote Speeches

### Day 1 – 3<sup>rd</sup> September

Venue: OA4/01

Time	Keynote Speech Title	Plenary Keynote Speakers	Chair
8:45-09:15	From Barely-Tolerated Evil to the Driving Force of Future Manufacturing	Prof. A. Ball, UK	Prof. L Gelman
09:15-9:45	Condition Monitoring for High Value Manufacturing	OBE, DL M. Ridgway, UK	Prof. L Gelman
13:30-14:00	Condition-Based Maintenance to Predictive Maintenance: A Use Case on Military Aircraft	Prof. A. Bayomi, USA	Prof. L. Gelman

### Day 2 – 4<sup>th</sup> September

Venue: OA4/01

Time	Keynote Speech Title	Plenary Keynote Speakers	Chair
8:30-9:00	Pervasive Robotic Sensing for Buried Pipes	Prof. K. Horoshenkov, UK	Prof. L Gelman
13:30-14:00	Incipient Fault Detection, Diagnosis and Prognosis,	Prof. Y. Cao, China	Prof. F. Gu
14:00-14:30	Bearing Faults Condition Monitoring with Compressive Sampling and Learning Algorithms	Prof. A. Nandi, UK	Prof. R. Rao

### Day 3 – 5<sup>th</sup> September

Venue: OA4/01

Time	Keynote Speech Title	Plenary Keynote Speakers	Chair
8:30-9:00	Challenges and Strategies for Condition Monitoring of Axial Piston Pumps in Open Loop Applications	Dr. G. Enevoldsen and Dr. C. Svendsen, Denmark	Prof. L Gelman
9:00-9:30	Bearing Fault Diagnosis in a Helicopter Planetary Gear Box	Prof. D. Mba, UK	Prof. L. Gelman
11:20-11:50	Parameterized Time-Frequency Analysis	Prof. Q. He, China	Prof. L. Gelman

### Scientific-Technical Sessions

Tuesday Morning, 3<sup>rd</sup> September

Time	<p><b>Session 1-A: Condition Monitoring Technologies</b>  <b>Location: OA7/27</b>  <b>Chair: Prof. S. Heyns</b></p>	<p><b>Session 2-A: Deep Learning and Condition Monitoring</b>  <b>Location: OA7/28</b>  <b>Chair: Dr. W. Wang</b></p>	<p><b>Session 3-A: Non-Invasive Methods in Monitoring for Healthcare</b>  <b>Location: OA7/29</b>  <b>Chairs: Dr. L. Alboul and Prof. R. Saatchi</b></p>	<p><b>Session 4-A: Maintenance, Digital Transformation in Manufacturing, Anomaly Detection and Forecasting for CM</b>  <b>Location: OA7/30</b>  <b>Chair: Prof. D. Stegelmeyer</b></p>	<p><b>Session 5-A: Maintenance of Railway Assets and Deep Learning</b>  <b>Location: OA7/31</b>  <b>Chair: Dr. A. Bevan</b></p>	<p><b>Session 6-A: Condition Monitoring, Digital Transformation and Industry 4.0</b>  <b>Location: OA4/01</b>  <b>Chair: Prof. A. Bayoumi,</b></p>
10:05-10:25	<p><b>Invited overview presentation</b> A Review of Blade Tip Timing Methods for Turbomachine Blade Condition Monitoring  <i>Prof. S. Heyns, South Africa</i></p>	<p><b>Invited overview presentation</b>                      Title to be confirmed  <i>Dr. W. Wang, Australia</i></p>	<p>Non-Invasive Methods of Monitoring Health: Fracture Screening in Children  <i>Offiah Amaka</i></p>	<p><b>Invited overview presentation</b>                      Introducing a Field Service Platform  <i>Prof. D. Stegelmeyer, Germany</i></p>	<p><b>Invited overview presentation:</b>                      Condition Monitoring for Railway  <i>Dr. Adam Bevan, UK</i></p>	<p><b>Invited overview presentation</b>                      Digital Transformation and Industry 4.0 Applied to Product Design, Manufacturing and Operation  <i>Prof. A. Bayoumi, USA</i></p>
10:30-10:50	<p>Piezoelectric Energy Harvesting System to Detect Winding Deformation in Power Transformers  <i>Guillermo Robles, Mariano Febbo, Sebastí'an P. Machado, and Bel'en Garc'ia</i></p>	<p>LSTM Residual Signal for Gear Tooth Crack Diagnosis  <i>Wenyi Wang, F. Antonio Galati and Dyana Szibbo</i></p>	<p>Development of a Non-invasive Screening Technique for Detection of Wrist Fractures in Children  <i>Ridita Ali, Dr. Lyuba Alboul and Dr. Amaka C. Offiah</i></p>	<p>Anomaly Detection and Forecasting Methods Applied to Point Machine Monitoring Data for Prevention of Switch Failures  <i>Daniela Narezo Guzman, Edin Hadzic, Benjamin Baasch, Judith Heusel, Thorsten Neumann, Gerrit Schrijver, Douwe Buursma and Jörn C. Groos</i></p>	<p>Planning Maintenance Actions in Train Operating Companies – A Portuguese Case Study  <i>Marie Méchain, António R. Andrade and Marta Castilho Gomes</i></p>	<p>Detection and Classification of Helicopter Drive Shaft Faults using Neuro-Fuzzy based on Wavelet Power Spectrum Algorithm  <i>Mohamed A. Hassan, Michael R. Habib and Abdel M. Bayoumi</i></p>
10:55-11:15	<p>Prediction of Remaining Useful Life Using Deep Learning Models  <i>Stephan Heyns</i></p>	<p>A New Approach to Automated Bearing Fault Severity Assessment using Deep-Learning  <i>Lucas Mailey, Pietro Borgheani, Wade A. Smith, Wenyi Wang and Zhongxiao Peng</i></p>	<p>Development and Evaluation of an Accelerometry System based on Inverted Pendulum to Measure and Analyze Human Balance  <i>Oseikhuemen Davis Ojie, Reza Saatchi</i></p>	<p>Service Engineering: Faster Spare Parts Procurement Supported by Digital Technologies  <i>Theresa Breckle, Sebastian Allegretti, Sven Seidenstricker and Bastian Joos</i></p>	<p>Deep Learning Decision Support for Sustainable Asset Management  <i>Marianne Cherrington, Zhongyu (Joan) Lu, Qiang Xu, David Airehrour, Samaneh Madanian</i></p>	<p>The Application of Statistical Quality Control Methods in Predictive Maintenance 4.0: An Unconventional Use of Statistical Process Control Charts in Health Monitoring and Predictive Analytics  <i>Clint Saily, Kaishu Xia, Anil Kircaliali, Ramy Harik and Abdel Bayoumi</i></p>
11:20-11:40	<p>Modulation Effect of Planetary Gearbox Faults on Stator Current of Induction Machine  <i>Xiaowang Chen and Zhipeng Feng</i></p>	<p>Fault Detection and Classification of Rolling Bearings Using Extreme Function Theory  <i>Xiwen Gu, Shixi Yang, Evangelos Papatheou</i></p>	<p>A Finite Element Study to Assess Fracture Risk in Humans with Low Bone Density  <i>Connor Recknell and Reza Saatchi</i></p>	<p>Exploring the Impacts of Using Mobile Collaborative Augmented Reality on the Field Service Business Model of Capital Goods Manufacturing Companies</p>	<p>The Role of In-Service Vehicles in the Measurement and Monitoring of the Railway System  <i>Kevin Hope and Russel Licence</i></p>	<p>Development of A Predictive Maintenance 4.0 Platform: Enhancing Product Design and Manufacturing</p>

				<i>Stefan Ohlig, Dirk Stegelmeyer, Rakesh Mishra and Maike Müller</i>		<i>Clint Saidy, Sruthi Puthan Valappil, Rhea McCaslin Matthews and Abdel Bayoumi</i>
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Tuesday Afternoon, 3<sup>rd</sup> September

Time	Session 1-B: Condition Monitoring Technologies Location: OA7/27 Chair: Prof. F. Chu	Session 2-B: Condition Monitoring, Machine Learning and Pattern Recognition Location: OA7/28 Chair: Prof. C. Zhang	Session 3-B: Non-Invasive Methods in Monitoring for Healthcare Location: OA7/29 Chairs: Dr. L Alboul and Prof R. Saatchi	Session 4-B: Maintenance and Asset Management Location: OA7/30 Chair: Dr. Z. Li	Session 5-B: Signal Processing and Condition Monitoring Location: OA7/31 Chair: Prof. Y. Xiang	Session 6-B: Condition Monitoring and Structural Health Monitoring Location: OA4/01 Chair Dr. A. Onsy
14:00-14:20	A Meshing Resonance based Demodulation Algorithm and Its Application for Planet Gear Tooth Root Crack Detection <i>Tianyang Wang and Fulei Chu</i>	A Kind of Faults Knowledge Discovery Pattern by means of Rough Set Theory <i>Rongzhen Zhao, Yaochun Wu and Tianjing He</i>	Non-invasive Respiration Monitoring by Thermal Imaging to Detect Sleep Apnoea <i>Muhammad Usman, Ruth Evans, Reza Saatchi, Ruth Kingshott and Heather Elphick</i>	Characteristics of Maintenance 4.0 and Their Reflection in Aircraft Engine MRO <i>Lasse Metso and Nils Elias Thenent</i>	A Remote Atrial Fibrillation Monitoring Service Based on Heart Rate Signals <i>Murtadha Kareem and Oliver Faust</i>	An Impact Event Detection System for Composite Box Structures <i>Vafa Soltangharaei, Rafal Anay, Deepak Begrajka, Matthijs Bijman, Mohamed Khaled ElBatanouny, Paul Ziehl and Michel J.L. van Tooren</i>
14:25-14:45	Realization of Condition Monitoring of Gear Box of Wind Turbine based on Cointegration Analysis <i>Zhang Biao, Zhang Chao, Duan Haoran, Ma Yunting, Li Jianjun and Cui Lingli</i>	A Structured Approach to Risk Assessment of Machine Learning Applications <i>Justin Fackrell, Jon Arne Glomsrud and Siegfried Eisinger</i>	Optimizing the Maintenance Strategy through Predicting Remaining Useful Life (RUL) for Critical Medical Equipment Based on Degradation Analysis <i>Ali Salih</i>	A Project Management Methodology for the Digitalisation of the Industrial Maintenance Domain <i>Jaime Campos, Mirka Kans and Antti Salonen</i>	Fault Diagnosis of Motor Broken Bar Using Current and Vibration Fusion Signal <i>Xiaoyun Gong, Yongjie Jing, Wenliao Du, Hongchao Wang and Baowei Zhao</i>	A Hybrid Prognostics Approach for Motorized Spindle-Tool Holder Remaining Useful Life <i>Fengxia Han, Hongjun Wang, Cheng Qiu and Yuandong Xu</i>
14:50-15:10	Repetitive Transient Extraction Algorithm for the Fault Diagnosis of Planetary Gearbox via Encoder Signal <i>Chuancang Ding, Ming Zhao, Jing Lin, Kaixuan Liang and Jinyang Jiao</i>	Automatic Diagnosis Method of Rolling Bearing Based on LSTM-SAE Network <i>Zhinong Jiang and Ning Cao</i>	Neural Network Analysis of Bone Vibration Signals to Assess Bone Density <i>Hajar Razaghi, Reza Saatchi and Amaka C Offiah</i>	A Non-linear Tent Map-Based ADC Design for Sensitive Condition Monitoring Measurement Systems <i>Philippa Hazell, Peter Mather, Andrew Longstaff and Simon Fletcher</i>	Mixed Kernel Functions for Multivariate Statistical Monitoring of Nonlinear Processes <i>Karl Ezra S. Pilario and Mahmood Shafiee</i>	Torsional Vibration Analysis Applied for Centrifugal Pump Condition Monitoring <i>Marticorena Matías, Mayer Rodrigo, Vignolo Juan and García Peyrano Oscar</i>
15:15-15:35	Respiratory Sound Analysis as a Diagnosis Tool for Breathing Disorders <i>Matthew Amper-West, Reza Saatchi, Nicola Barker and Heather Elphick</i>	Research on Surge Control of Centrifugal Compressor based on Reinforcement Learning <i>Kun Jiang, Yang Xiang, Tianyou Chen and Chaojun Jiang</i>	Quality of Service in IEEE 802.11ac and 802.11n Wireless Protocols with Applications in Medical Environments <i>Abdussalam Salama and Reza Saatchi</i>	Digital Asset Management: New Opportunities from High Dimensional Data - A New Zealand Perspective <i>Marianne Cherrington, Zhongyu (Joan) Lu, Qiang Xu, Fadi Thabtah, David Airehrour and Samaneh Madanian</i>	Compound Fault Diagnosis of Rolling Bearing based on Transformation Scale Improved BPD and MCKD <i>Jing Meng, Liye Zhao and Ruqiang Yan</i>	Condition Monitoring Techniques for Control Valves <i>Thomas Newstead</i>

Wednesday Morning, 4<sup>th</sup> September

Time	Session 1-C: Condition Monitoring and Structural Health Monitoring Location: OA7/27 Chairs: Dr. F. Balouchi	Session 2-C: Artificial Intelligence, Prognostics, IRT and Asset Management Location: OA7/28 Chairs: Dr. X. Li	Session 3-C: Condition Monitoring and NDT Location: OA7/29 Chair: Dr. C. Fu	Session 4-C: Maintenance, Risk Assessment and Condition Monitoring Location: OA7/30 Chair: Dr. H. Zhang	Session 5-C: Condition Monitoring Technologies Location: OA7/31 Chair: Prof. F. Li	Session 6-C via Skype: Condition Monitoring and NDT Location: OA4/01 Chair: Prof. H. Wang
9:30-9:50	Asset Management Simulation and Optimisation of Railway Bridges <i>Dr. Dwayne Nielsen</i>	Machine Health Monitoring using Artificial Intelligence (AI) <i>Khalique Umair, Xu Guanghua, Fei Liu, longtian chen, Renghao Liang, Niu Ben and Ahmed Waqas</i>	A New Approach of Manufacturing Tolerance Allocation based on NSGA-III Algorithm for the in-process Monitoring of Sheet Metal Parts <i>Yanfeng Xing, Zhenhai Ma, Chengyu Jiang and Min Hu</i>	Mimosa Strong Medicine for Maintenance <i>Riku Salokangas, Erkki Jantunen, Martin Larrañaga and Petri Kaarmila</i>	Detection and Diagnosis of Mechanical Seal Faults in Centrifugal Pumps based on Acoustic Measurement <i>Alsadak Daraz, Samir Alabied, Dong Zhen, Fengshou Gu and Andrew D.Ball</i>	Spectral Element Methods for Damage Detection and Condition Monitoring <i>Magdalena Palacz, Marek Krawczuk and Arkadiusz Zak</i>
9:55-10:15	Delivering Early Warning for Heavy Vehicle Anti-rollover Based on Connected Vehicles V2I Messages <i>Lin Yin</i>	Model Based Monitoring of Dynamic Loads and Remaining Useful Life Prediction in Rolling Mills and Heavy Machinery <i>Pavlo Krot, Ihor Prykhodko, Valentin Raznosilin and Radoslaw Zimroz</i>	Study of Latent Self-Healing Ability of Sodium Hydroxide Activated Blast Furnace Slag Systems via Non-Destructive Measurement <i>Richard Dvorak, Libor Topolar, Vlastimil Bilek and Petr Hruby</i>	Risk Assessment on Information Security of Ship Networks in Yangtze River Delta <i>Lin Yin, Liqun Peng and Zhixiong Li</i>	Vibration Characteristics of Self-Excited Vibration about Sliding Bearings <i>Ryosuke Fukui, Hiromitsu Ohta, Yuta Yamada, Naoya Nagahashi, Tomoo Shigi and Satoshi Tamura</i>	A New Methodology to Deal with the Multi-Phase Degradation in Rolling Element Bearing Prognostics <i>Amirhossein Mollaali, Mehdi Behzad and Motahareh Mirfarah</i>
10:20-10:40	Condition Monitoring Systems in the Railway Industry: A Review <i>Jordan Brant and Bo Liang</i>	<b>Invited overview presentation</b> Optimised Infrared Thermography and Innovative Asset Management Dr. R. Thomas, UK	Stator Resistance Imbalance Diagnosis Using Teager-Kaiser Energy Operator Based on Motor Current Signature Analysis <i>Haiyang Li, Huaqing Wang, Zuolu Wang, Funso Otuyemi, Dong Zhen, Fengshou Gu and Andrew D. Ball</i>	Chatter Characteristics Analysis of a Compliant Workpiece in Straight Turning Operations <i>Kaibo Lu, Yuhao Wang, Peisheng Lou, Fengshou Gu and Xinyu Pang</i>	A Recognition Method via Improved CEEMDAN and Multiscale Entropy for Enhancing the Diagnostic Accuracy <i>Feng Ding, Xuejiao Chen and Wenjuan Wang</i>	The Detection of Defects on Metallic Subsurface based on Pulsed Eddy Current Thermography <i>Fan Jiang, Xiaoyu Xu, Dong Zhen, Hao Zhang, Shijie Dai and Zhanqun Shi</i>



<b>Time</b>	<b>Session 1-D: Modelling, Vibration Analysis and Condition Monitoring</b> <b>Location: OA7/27</b> <b>Chair: Prof. F. Gu</b>	<b>Session 2-D: Digital Technologies for Manufacturing and Condition Monitoring</b> <b>Location: OA7/28</b> <b>Chairs: Prof. P. Lane</b>	<b>Session 3-D: Signal Processing and Condition Monitoring</b> <b>Location: OA7/29</b> <b>Chair: Mr. K. Solinski</b>	<b>Session 4-D: Autonomous Intelligent Systems, Diagnostics and Prognostics</b> <b>Location: OA7/30</b> <b>Chair: Prof. L. McCluskey</b>	<b>Session 5-D: Signal Processing for Condition Monitoring</b> <b>Location: OA7/31</b> <b>Chairs: Prof. J. Allport</b>
11:10-11:30	<b>Invited overview presentation</b> Radiometric Partial Discharge Condition Monitoring for High-voltage Electricity Substations <i>Prof. P. Lazaridis, UK</i>	<b>Invited overview presentation</b> Bringing Industrial Digital Technologies to Manufacturing SMEs: Challenges and Potential Solutions <i>Prof. P. Lane, UK</i>	Novel Higher Order Spectral Cross-Covariance Technology for Gearbox Condition Monitoring, <i>Len Gelman, Krzysztof Solinski, Andrew Ball, Brian Shaw and Moorthy Vaidhianathasamy</i>	<b>Invited overview presentation</b> Autonomous Intelligent Systems: From Data Interpretation to Deliberative Planning <i>Prof. L. McCluskey, UK</i>	A Multi-Component Bearing Fault Diagnosis using Fast Iterative Filtering Technique <i>J. P. Xing, T. R. Lin, and David Mba</i>
11:35-11:55	Coupled Vibration Analysis of a Bevel Geared Rotor-Bearing System <i>Zhen Liu, Fucui Li and Bo Jing</i>	An Investigation of Weighted Neural Networks for Rolling Bearing Fault Classification under Uncertain Speed Condition <i>Lun Lin, Yimin Shao, Xiaoxi Ding and Liming Wang</i>	Compound Faults Separation based on Intrinsic Characteristic-Scale Decomposition and Sparse Component Analysis <i>Yansong Hao, Huaqing Wang, Liuyang Song, Lingli Cui, Ke Li and Fengshou Gu</i>	Rolling Bearing Degradation State Prediction with Deep Fusion Feature <i>Hao Chen, Niaoqing Hu and Lun Zhang</i>	Application of Wavelet Packet Transform and Envelope Analysis on Pressure Pulsations from a Reciprocating Compressor <i>Ugonnaya Enyinnaya Muo, Andrew Ball and Fengshou Gu</i>
12:00-12:20	Comprehensive Frequency Domain Modelling of a Two-body Converter for Wave Energy Harvesting and a Corresponding Design Optimization Case Study <i>Yimin Tan, Na Liu, Zuguang Zhang and Kejian Lin</i>	An Improved VMD Approach for Sensitive Feature Extraction in the Application of Gears Fault Classification <i>Mingkai Zhang, Yimin Shao, Xiaoxi Ding and Liming Wang</i>	Vibration-based Detection of Wheel Flat on a High-Speed Train <i>Ruichen Wang, David Crosbee, Adam Bevan, Zhiwei Wang and Dong Zhen</i>	Fault Diagnosis of Sun Gear in Planetary Gearbox: A Comparative Study <i>Lun Zhang and Niaoqing Hu</i>	Application of Haar Wavelet Denoising with Cross Correlation and Neighboring Coefficients to the Bearing Faults Prognosis <i>Wei Cao, Zhenyuan Gou, Dong Wang, Han Zhang and Jianying Yan</i>

Wednesday Afternoon, 4<sup>th</sup> September

Time	Session 1-E: Machine Learning, Condition Monitoring and NDT Location: OA7/27 Chair: Prof. Y. Cao	Session 2-E: Gear Vibrations and Gearbox Condition Monitoring Location: OA7/28 Chair: Prof. Y. Shao	Session 3-E: Condition Monitoring Technologies Location: OA7/29 Chair: Dr. G. Feng	Session 4-E: Diagnostic and Prognostic Technologies Location: OA7/30 Chair: Prof. N. Hu	Session 5-E: Industry 4.0, Maintenance and Condition Monitoring Location: OA7/31 Chair: Prof. D. Baglee
15:20-15:40	<b>Invited overview presentation</b> Electric Vehicles and Power Grids: the Condition Monitoring Challenges and Opportunities <i>Prof N. Schofield, UK</i>	A Tooth-Wise Dimensionality Reduction Approach based on Encoder Signal for the Diagnosis of Gearbox <i>Kaixuan Liang, Ming Zhao, Chuancang Ding, Jinyang Jiao and Jing Lin</i>	An Evaluating Study of Using Thermal Imaging and Convolutional Neural Network for Fault Diagnosis of Reciprocating Compressors <i>Rongfeng Deng, Xiaoli Tang, Lin Song, Abdullahi Abdulmumeen, Fengshou Gu and Andrew D. Ball</i>	Envelope Ensemble Average of Largest Amplitude Impact Transients for Diagnosing Rolling Element Defects in Bearings <i>Lei Hu, Fengshou Gu, Jing He, Niaoqing Hu and Andrew Ball</i>	<b>Invited overview presentation</b> Are We Ready for Industry 4.0? <i>Abdu Shaalan, David Baglee and Michael Knowles</i>
15:45-16:05	Generative Adversarial Networks Enhanced Extreme Learning Machine to Classify Faults in Rolling Bearings <i>Yun Gao and Jiawei Xiang</i>	Condition Monitoring of Lubricant Shortage for Gearboxes based on Compressed Thermal Images <i>Xiaoli Tang, Ke Li, Pieter A. van Vuuren, Junfeng Guo, Funso Otuyemi, Fengshou Gu and Andrew D. Ball</i>	Multiple-Model Fault Diagnosis Method for Gas Turbine Based on Soft Switch <i>Yunpeng Cao, Kehui Zeng, Shuying Li, Fengshou Gu, Yuandong Xu and Bo He</i>	Applying Contamination Control for Improved Prognostics and Health Management of Hydraulic Systems <i>Orošnjak Marko, Jocanović Mitar and Karanović Veli-bor</i>	The Development of a Maintenance Gap Analysis Tool for Use within the Automotive Supply Chain: A Case Study Perspective <i>Derek Dixon, Kenneth Robson and David Baglee</i>
16:10-16:30	Personalized Fault Diagnosis Method based on FEM Simulation Driving Machine Learning <i>Xiaoyang Liu and Jiawei Xiang</i>	Gear Vibration Signal Extraction based on Meshing Impact under Heavy Load Condition <i>Shuiguang Tong, Yuanyuan Huang, Zheming Tong, Ning Tang, Yue Yu, Yi Zhou and Feiyun Cong</i>	A Novel Residual Domain Adaptation Network for Intelligent Transfer Diagnosis <i>Jinyang Jiao, Ming Zhao, Jing Lin, Kaixuan Liang and Chuancang Ding</i>	Remaining Useful Life Prediction of a Centrifugal Pump based on Canonical Variate Analysis, Grey Model and Particle Filter <i>Xiaochuan Li, David Mba, Tianran Lin and Edmund Okoroigwe</i>	Information System Requirements Elicitation for Gravel Road Maintenance – a Stakeholder Mapping Approach <i>Jaime Campos, Mirka Kans and Lars Håkansson</i>
16:35-16:55	A Baseline-Free Damage Detection Method for Operation Structure based on Nonlinear Ultrasonic Guided Waves <i>Yanping Zhu and Fucai Li</i>	Planetary Bearing Fault Diagnosis for a CH-46E Helicopter Main Gearbox <i>L Zhou, F Duan, S Ojolo, A Ogundare, X Li and David Mba</i>	Fault Diagnosis of Reciprocating Compressor Using Empirical Mode Decomposition-Based Teager Energy Spectrum of Airborne Acoustic Signal <i>Debanjan Mondal, Dong Zhen, Fengshou Gu and Andrew D. Ball</i>	Bond Graph Modelling for Condition Monitoring of Induction Motors <i>Aisha Alashter, Yunpeng Cao, Khalid Rabeyee, Samir Alabied, Fengshou Gu and Andrew D. Ball</i>	Condition Monitoring of Gravel Roads – Current Methods and Future Directions <i>Mirka Kans, Jaime Campos and Lars Håkansson</i>
17:00-17:20	Real-Time Motion Control of a Spark Robot using the Robot Operating System and MATLAB <i>Weijie Tang, Fengshou Gu, Rongfeng Deng, Zhetao Liu, Shaoyong Cao and Guiping Lu</i>	Novel Comparison of the Higher Order Spectral Cross Covariance and the Higher Order Spectra for Damage Diagnostics	Comparison of amplitude to real and imaginary features of the poly-coherent composite bispectrum (pCCB) components in machine diagnosis	Measurement and Signal Processing of Incipient Cavitation in Vortex Zone of Francis Turbine <i>Ning Tang, Shuiguang Tong, Zheming Tong, Hao Zhang, Yinhua</i>	Using Energy Consumption Profiles as an Indicator of Equipment Condition <i>Adrian Morris, David Baglee and Michael Knowles</i>

		<i>Len Gelman, Dezun Zhao, Biebele Jamabo and Andrew Ball</i>	<i>Kenisuomo Luwei, Jyoti Sinha and Akilu Yunusa-Kaltungo</i>	<i>Wang, Dongping Shen and Feiyun Cong</i>	
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Thursday Morning, 5<sup>th</sup> September

Time	Session 1-F: NDT Location: OA7/27 Chair: Prof. Q. He	Session 2-F: Vibration Analysis and Diagnostics Location: OA7/28 Chair: Prof. Z. Shi	Session 3-F: Rotor Dynamics and Condition Monitoring Location: OA7/29 Chair: Dr. A. Chasalevris	Session 4-F: Diagnostics, Prognostics and NDT Location: OA7/30 Chair: Dr. K. Lu	Session 5-F: Maintenance for Electrical Cars and Power Systems and Energy Harvesting Location: OA7/31 Chair: TBC
9:50-10:10	Guided Wave based Debonding Detection in CFRP-Reinforced Steel Structures <i>Jingrong Li and Ye Lu</i>	A Novel Method for Periodical Impulses Detection and Its Applications in Rubbing Fault Diagnosis <i>Peng Zhou, Zhike Peng, Shiqian Chen and Qingbo He</i>	<b>Invited overview presentation</b> Challenges in Rotor Dynamic Design of Turbo Systems <i>Dr. A. Chasalevris, Greece</i>	Feature Subset Selection using Sparse Principal Component Analysis and Multiclass Fault Classification using Selected Features <i>Biswajit Sahoo and A. R. Mohanty</i>	Parameters Analysis and Optimization Design of A Slotless Halbach Linear Generator for Wave Energy Harvesting <i>Na Liu, Yimin Tan, Weiqiang Mo and Zuguang Zhang</i>
10:15-10:35	Detection Method of Contact-Type Failure Based on Nonlinear Wave Modulation Utilizing Ultrasonic Vibration Driven by Self-Excitation <i>Takashi Tanaka, Yasunori Oura and Syuya Maeda</i>	The Separation of Vibration Components Based on Sparse Nonnegative Tensor Factorization <i>Haobin Wen, Lin Liang, Ben Niu, Lei Shan, Maolin Li and Guang Li</i>	Field Identification of Dynamic Coefficients of Journal Bearings on Flexible Rotor-Bearing System <i>Yang Kang, Jiaojiao Ma, Hao Zhang, Zhanqun Shi, Fengshou Gu and Andrew Ball</i>	Fatigue Damage Identification and Remaining Useful Life Estimation of Composite Structures using Piezo Wafer Active Transducers <i>Richard Loendersloot, Mohammad Ehsani and Mahnaz Shamsirsaz</i>	Data Openness Based Data Sharing Concept for Future Electric Car Maintenance Services <i>Lasse Metso, Ari Happonen, Matti Rissanen, Kalle Efvengren, Ville Ojanen and Timo Kärri</i>
10:40-11:00		Torsional Vibration Characteristics of Planetary Gears with Multi-Clearance Coupling <i>Chaoqun Qi, Yinghui Liu, Huibo Zhang Dong Zhen, Shijie Dai and Fengshou Gu</i>	Vibration Monitoring of the Gradual Worn in Journal Bearings <i>Osama Hassin, Jiaojiao Ma, Hao Zhang, Fengshou Gu and Andrew D. Ball</i>	Using Feonic Smart-Materials to generate power for autonomous Remote Conditional Monitoring <i>Brian Smith</i>	Technical and Operational Barriers that Affect the Successful Total Productive Maintenance (TPM) Implementation: Case Studies of Abu Dhabi Power Industry <i>Abdulla Y. Alseiri, Peter Farrell and Yassin Osman</i>

Thursday Afternoon, 5<sup>th</sup> September

<b>Time</b>	<b>Session 1-G: Condition Monitoring, Energy Harvesting and Computer Vision</b> <b>Location: OA7/27</b> <b>Chair: Dr. D. Zhen</b>	<b>Session 2-G: Modelling, Diagnostics and Prognostics</b> <b>Location: OA7/28</b> <b>Chair: Dr. J. Jiang</b>	<b>Session 3-G: Vibration Analysis, Vibration Monitoring and Acoustic Emission Monitoring</b> <b>Location: OA7/29</b> <b>Chair: Dr. H. Zhang</b>	<b>Session 4-G: Modelling and Condition Monitoring</b> <b>Location: OA7/30</b> <b>Chair: Prof. T. Lin</b>	<b>Session 5-G: Modelling, Diagnostics and System Design</b> <b>Location: OA7/31</b> <b>Chair: Prof. S. Yang</b>
12:50-13:10	Recognizing Life Cycle Benefits of Real Time Fatigue Monitoring for Ecosystems <i>Matti Rissanen, Lasse Metso, Tiina Sinkkonen and Timo Kärri</i>	<b>Invited overview presentation</b> The Higher Order Spectral Analysis for Condition Monitoring <i>Prof. L. Gelman and Prof. A. Ball, UK</i>	Vibrations based Lubricity Condition Monitoring of Journal Bearings <i>JiaoJiao Ma, Yuandong Xu, Fulong Liu, Zhanqun Shi, Hao zhang, Fengshou Gu and Andrew D. Ball</i>	A Componential Coding Neural Network based Signal Modelling for Machinery Condition Monitoring <i>Khalid Rabeyee, Yuandong Xu, Aisha Alashter, Fengshou Gu, Andrew D. Ball</i>	Operational Modal Analysis in the Presence of Pulse Train and Harmonics based on SSI <i>Fulong Liu, Jiongqi Wang, Miaoshuo Li, Fengshou Gu and Andrew D. Ball</i>
13:15-13:35	Energy Harvesting from Knee Motion using Dielectric Elastomer Generator <i>Sujit Kumar Sahu, Anup Sankar Sadangi and Karali Patra</i>	Modelling of Spur Gear Dynamic Behaviours with Tooth Surface Wear <i>Xiuquan Sun, Tie Wang<sup>2</sup>, Ruiliang Zhang<sup>2</sup>, Fengshou Gu<sup>1</sup>, Andrew D. Ball<sup>1</sup></i>	The Uncertain Vibrations of a Rotor Operating with Angular Acceleration based on Taylor Expansion <i>Chao Fu, Yuandong Xu, Yongfeng Yang, Fengshou Gu and Andrew Ball</i>	An Investigation into the Sensor Placement of A Marine Engine Lubrication System for Condition Monitoring <i>Jinxin Wang, Zhongwei Wang, Fengshou Gu, Xiuzhen Ma, Jingzhou Fei and Yunpeng Cao</i>	Rolling Element Bearing Fault Diagnosis based on the Wavelet Packet Transform and Time-Delay Correlation Demodulation Analysis <i>Chen Zhang, Junchao Guo, Dong Zhen, Hao Zhang, Zhanqun Shi, Fengshou Gu and Andrew Ball</i>
13:40-14:00	A Fast 3D Reconstruction Method based on Curve Segment of Binocular Vision <i>Junyi Lin, Kaiyong Jiang, Yi Guo, Lei Wu, Miaoshuo Li, Fengshou Gu and Andrew D. Ball</i>	Remaining Useful Life Prediction for Bearings of Shearer Rocker Transmission Parts based on Internet of Things <i>Hua Ding, Liangliang Yang, Kaibo Lu, Zhaojian Yang and Zeyin Cheng</i>		Condition Monitoring of Reciprocating Compressor based on Acoustic Imaging <i>Miaoshuo Li, Robin Appadoo, Fengshou Gu and Andrew Ball</i>	Assembly Optimization of Sugarcane Harvester Cutter Frame System under Complex Excitations <i>Chen Qiu, Hanning Mo, Shangping Li, Daiyun Yang, Xiao Lai</i>

## Poster Session, 5 Sept, 11.50-12.50

Title & Authors
Determination Method and Application of Instantaneous Rotation Center of CNC Machine Tool XY Worktable <i>Li Li, Yang Hongtao</i>
Study on the Ultrasonic Attenuation Characteristic due to Crack in a Two-Dimensional Isotropic Plate <i>Xiaojun Zhou, Huifang Xiao</i>
Reliability of Vibratory Indications during the Follow-up of Bearing Spalling <i>Omar Djebili and Oussama Berbri</i>
Modelling and Analysis of Slewing Bearings with Quenched Soft Zone <i>Jianxin Gui, Guangbin Wang, Xiaoli Tang, Zhou Zhou and Yongzheng Jiang</i>
Effect of Surface Wear on Friction of Spur Gears <i>Yatian Zhou, Xiuquan Sun, Fengshou Gu, Tie Wang, Kaida Wang, Guangbin Wang, Ruiliang Zhang</i>
Fault Diagnosis of Spiral Bevel Gear based on CEEMDAN Permutation Entropy and SVM <i>Lingli Jiang, Liman Chen, Hongchuang Tan and Xuejun Li</i>
Modulation Signal Bispectrum based Monitoring of Tooth Surface Wear for Modification Spiral Bevel Gear <i>Zhifei Wu*, Fengshou Gu, Tie Wang, Ruiliang Zhang and Andrew D. Ball</i>
Monitoring Strain Concentration at Fixtures of Wind Turbine Blades Using Fibre Bragg Grating Sensors <i>Pingyu Zhu*, Zheng Liu, Xuebin Feng, Jiang Wu, Hongjie Xie, Mengjiao Huang and Marcelo A. Soto</i>
Composite Multiscale Symbolic Dynamic Entropy: a New Entropy Method for the Feature Extraction of Rolling Bearing Faults <i>Yongbo Li*, Xianzhi Wang and Xiaoqiang Du</i>
Fault Detection for Planetary Gearbox of Rotorcraft based on DCNN <i>Cheng Zhe, Zhang Lun*, Hu Niaoqing and Chen Hao</i>
Research and Implementation of Real-Time Motion Control of Robot based on Kinect <i>Guiping Lu*, Weijie Tang, Jianwei Zheng, Ting Chen and Xinfeng Zou</i>
Design and Research of New-type Clamping Fixture Based on Tensile Test of Wire and Cable Materials <i>Zhiyong Xiao, Guiping Lu and Zhensheng Zhong</i>
The Application of a New Technique to Determine the Beginning of the Setting Time for Cement-based Materials <i>Michaela Hoduláková, and Libor Topolář</i>
Large Data and AI Analysis based Online Diagnosis System Application of Steel Ladle Slewing Bearing <i>Wei Hu and Shiqi Chen</i>
Fault Diagnosis of Planetary Gearbox Based on Random Forest and Singular Value Difference Spectrum <i>Mingxin Chen*, Xinyu Pang and Kaibo Lu</i>
Fault Diagnosis of Motor Broken Bar Using Current and Vibration Fusion Signal <i>Xiaoyun Gong, Yongjie Jing, Wenliao Du, Hongchao Wang and Baowei Zhao</i>
Acoustic Emission Fault Signal Feature Extraction of Inter-Shaft Bearing based on Multiscale Quantum Entropy <i>Yanting Ai, Bowen Tian, Jing Tian, Fengling Zhang, Zhi Wang</i>
Temperature Monitoring Data Transmission through Metallic Barrier based on Ultrasonic Technology <i>Dingxin Yang, Dong Tian and Haifeng Hu</i>
Analysis of the Combined Looseness Fault Characteristics of Bearing Pedestal of the Rotating Machinery <i>Yuegang Luo, Lin Zheng, Hao Xu, Pengfei Wang and Chenyong Wang</i>
Nonconvex Weighted Regularization Based Sparse Model for Bearing Fault Diagnosis <i>Zhibin Zhao, Ming Li, Shibin Wang and Xuefeng Chen</i>
A New Method for the Damage Detection of the Wind Turbine Blade <i>Shaohua Tian, Zhi Zhai, Yanjie Guo, Zhibo Yang and Xuefeng Chen</i>
Multi-Objective Prediction of Multistage Centrifugal Pump based on Neural Network <i>Hang Zhao and Shuiguang Tong</i>
Towards the Development of a Tribotronic Gearbox <i>Omoseye Adeyemi, A.Onsy, I.Sherrington</i>

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on Condition Monitoring and Diagnostic  
Engineering Management

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