VEH 2022+1

第四届振动与能量俘获及其应用国际会议

The 4th International Conference on Vibration and Energy Harvesting Applications

The 4th International Confereence on Vibration and Energy Harvesting Applications

(VEH 2022+1)

Program Book

Xiangtan, Hunan, China

April 14-16, 2023

Welcome to the 4th International Conference on Vibration and Energy Harvesting Applications (VEH 2022+1), the home of Mao Zedong, Xiangtan. To serve you better, the Organizing Committee of the Conference reminds you warmly:

1. **To attend this meeting with ease and pleasure, please read the conference schedule carefully.**
2. **To successfully complete the agenda of the conference, you need to observe the working hours of the conference consciously and attend activities on time.**
3. **To ensure a successful meeting, please turn your cell-phones to mute or vibrate, do not walk around the meeting area or make excessive noise. Thank you for your co-operation!**
4. **To ensure the environment of the conference room and the health of others, please do not smoke indoors during the conference.**
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7. **Hotel accommodation: Delegates who wish to reserve hotel accommodation may enjoy preferential meeting prices after consulting the reception desk.**
8. **If you experience symptoms such as fever, fatigue, or dry cough during the conference, please contact the meeting staff immediately for coordinate the treatment.**

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Thank you for your cooperation and wish you a pleasant experience!

The 4th International Conference on Vibration and Energy Harvesting Applications (VEH 2022+1)

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- Hunan Institute of Engineering
- Shanghai Jiao Tong University
- Changsha University of Science & Technology

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- Xiangtan University
- Hunan University of Science and Technology
- Journal of Dynamics and Control
- Hunan Juncheng Technology Co., Ltd
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- Hunan Provincial Key Laboratory of Vehicle Power and Transmission System
- Hunan Provincial Key Laboratory of Multi robot Cooperative Control Based on Multi Agent Theory

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About HIE

Hunan Institute of Engineering, built by the Hunan Government, is located in Xiangtan, Hunan Province, the hometown of the great man Mao Zedong. It is the first batch of the "Excellent Engineers Education and Training Program" implemented by the Ministry of Education. It is selected into the "2011 Plan" universities. HIE follows the "Double First-Class" initiative and becomes the model to build the high-level application-oriented university with comprehensive characteristics. It is among the first-batch universities for undergraduate admission in Hunan Province.

HIE meets the development needs of the regional economy and the electronics, machinery and textile industries. With the goal of cultivating high-quality application-oriented talents, HIE offers professional undergraduate programs in electronics, machinery, textile, chemistry and management, covering engineering, management, arts, science, economics and other disciplines. It now has 20 schools (departments, centers), 53 undergraduate programs, and 2 engineering master's degree authorization programs. HIE has 8 application-oriented discipline construction programs following the "Double First-Class" initiative at the provincial level, 25 provincial key laboratories and other provincial-level scientific research platforms. In the past five years, HIE has undertaken 38 national level scientific research projects, and have received 36 scientific research achievement awards. HIE has vigorously strengthened cooperation between industry, academia, and research, and has successively cooperated with 653 enterprises, generating economic benefits of over 22 billion yuan. In 2021, HIE was listed as one of the top 100 universities in China for the transformation of scientific and technological achievements.

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Conference Topics

1. Nonlinear Vibration Theory, Dynamic Modeling, and Analysis Methods
2. Electromechanical Conversion Mechanisms and Functional Materials
3. Mechanical Energy Harvesting and Applications (Vibration, Rotational Motion, etc.)
4. Mechanical Energy Harvesting and Applications (Fluids, Waves, etc.)
5. Mechanical Energy Harvesting and Applications (Human Motion, Vehicles, etc.)
6. Self–Powered Sensors and Systems; Self–Powered Actuators and Micro–Nano Robots
7. Nano Energy Applications in MEMS, E–skin, and AI
8. Energy Storage and Self–Charging Power Systems
9. Acoustic/Mechanical Metamaterials for Energy Utilization and Harvesting
10. Vibration Control and Utilization and Other Related Topics

Keynote Talks

Keynote talk I (8:30–9:10, Apr.15, The 1st conference hall)

Lei Zuo

Professor

University of Michigan, Ann Arbor

Title: Biomechanical energy harvesting for wearables and portables

Abstract: Wearable and mobile devices, such as smartphones, smartwatches, wearable medical devices, navigations and radios, etc., have become an important part of our daily life and special missions. Most of these devices are powered by electrochemical batteries, which have limited energy capacity, need periodic replacement or recharging, and lead to environmental concerns. On the one hand, there is a huge amount of energy stored in the human body and the energy dissipation rate is more than 100 Watts, while on the other hand, the power requirement of typical wearable and mobile devices is less than 1 Watt. Extracting a small amount of energy from the human body can provide enough power for many wearable/mobile devices, and enable a convenient, sustainable, eco–friendly, and self–powered alternative to batteries. In this talk, we will first review the mechanism and performance of the state–of–the–art biomechanical energy harvesting devices in three categories in terms of excitation mechanisms, specifically, relative–motion–excited, inertia–excited, and force–excited. Then we will present our research in these three categories: including electromagnetic negative–muscle–work energy harvesters from the human ankle, backpack energy harvesting while enhancing the human comfortable, and piezoelectric footwear energy harvesters. The future research challenges and directions are also outlined.

Biography: Lei Zuo joined in the University of Michigan – Ann Arbor as an endowed professor in August 2022. He was previously the Robert E. Hord Jr. Professor of Mechanical Engineering and the director of NSF Industry–University Cooperative Research Center for Energy Harvesting Materials and Systems at Virginia Tech. His research interest includes marine renewable energy (ocean waves, tidal currents, offshore wind, etc), energy harvesting, vibration and control, mechatronics design, vehicles and transportation, and advanced manufacturing. His research has been funded with over 90 projects of USD $25M by various funding agencies and industries. He has authored about 360 papers including over 15 with the best paper awards. He has graduated about 70 Ph.D. and master students, mentored 16 postdocs, and advised about 200 undergraduates in senior designs or research.

Lei Zuo was the sole recipient of the 2017 ASME Leonardo da Vinci Award and the 2015 ASME Thar Energy Design Award. He also received R&D 100 Awards twice (2015 and 2011) and received 2014 SAE Ralph R.Teetor Educational Award. Lei Zuo completed his BS in Automotive Engineering (07/1997) from Tsinghua University and his MS (02/2002) and Ph.D. (02/2005) in Mechanical Engineering from MIT. He also held a MS (02/2002) in Electrical Engineering from MIT.

Keynote talk II (9:10–9:50, Apr.15, The 1st conference hall)

Jinyue Yan

Professor

The Hong Kong Polytechnic University

Title: Trends and Needs of Future Energy R&D

Abstract: The world is facing a pressing need for a transition to sustainable, clean, and affordable energy sources. To meet this challenge, future energy research and development (R&D) needs to focus on several key areas including renewable, energy, storage, smart grids, energy efficiencies, CCUS etc. To effectively address the challenging issues, future energy transition on location, time, and human factors, future energy research and development (R&D) needs to leverage digitalization as an important tool. Digitalization of the energy system can help to optimize energy supply and demand, reduce costs, improve grid reliability and resilience, and provide safe and reliable energy to meet growing global energy demands. By leveraging data, researchers can make more informed decisions and develop more effective strategies for transitioning to sustainable, clean, and affordable energy sources.

Biography: Professor Yan obtained his PhD from Royal Institute of Technology (KTH), Sweden in 1991. He was Chair Professor and Head of Energy Department at Lule University of Technology and Chair Professor at the M lardalen University and KTH and Director of the Future Energy Profile. He is now Chair Professor of Hong Kong Polytechnic University. He is Editor in Chief of Advances in Applied Energy. He is an active member of the European Academy of Sciences and Arts.

Keynote talk III (10:00–10:40, Apr.15, The 1st conference hall)

Daniil Yurchenko

Associate Professor

University of Southampton

Title: Future of high–performance energy harvesters through global devices optimization

Abstract: In this talk a novel optimization–based strategy applied at a device level will be presented for improving performance of energy harvesters. The main question addressed by the optimization algorithm is how much energy can be extracted from a given device volume with a selected device' s topology? A global multidimensional constrained optimization algorithm is used to accounts for the physical size of the device, its physical, geometrical and electrical properties, as well as the power management circuit peculiarities, to increase the device's efficiency. Two new devices with certain topologies will be introduced and considered based on piezoelectric and triboelectric transduction for the purpose of illustrating the methodology. In the case of piezoelectric transduction, the device will utilize plucking mechanism, advantages and disadvantages of which will be analyzed from both mechanical and electrical viewpoints. Several features specific for these transduction mechanisms will be profoundly discussed for the first time. The devices' performance under deterministic and stochastic loads will be presented and different applications, including gravity–based and vibration–based, will be demonstrated. It will be shown that such devices after the optimization can deliver 0.5–5W.

Biography: Dr. Yurchenko is interested in Nonlinear and Stochastic Dynamics, Control Theory, Vibration, Stability and Bifurcation Analysis of complex dynamic systems with application to energy harvesting. In 2001 he obtained a PhD degree in Mechanical Engineering from Worcester Polytechnic Institute, USA on the development of stochastic optimal control theory and analysis of non–smooth systems and accepted position of an Assistant Professor at University of Miami. In 2005 he was offered a post of an Associate Professor at the Department of Mathematical Sciences of Saint–Petersburgh State Polytechnic University, Russia. He received Doctor of Science degree (habilitation) in 2007 and in 2008 he received a Young Scientists Award from the Russian President Science Council. In 2008 he was promoted to a full Professor and became a deputy head of MS program in Mechanics. In 2010 Dr. Yurchenko joined Mechanical Engineering Department of Heriot–Watt University.

Dr. Yurchenko has published over 150 scientific publications including peer–reviewed journals and conference proceedings, delivered multiple invited talks and keynote lectures, led a number of industrial project and received grants from EPSRC and the Royal Society. He is an Associate Editor of Journal of Vibration Testing and System Dynamics, Editorial board member of Mechanical Systems and Signal Processing, Int. J. of Dynamics and Control, Vibrations and Energies.

Keynote talk IV (10:40–11:20, Apr.15, The 1st conference hall)

Shengxi Zhou

Professor

Northwestern Polytechnical University

Title: Nonlinear vibration energy harvesters subjected to various excitations

Abstract: There are a lot of complex environmental vibrations induced by mechanical equipment, vehicles, wind, ocean waves, etc. Meanwhile, these environmental vibrations usually own broadband and time–varying characteristics, which bring difficulty to efficiently harvest energy from such vibrations. The nonlinear vibration energy harvester is one of most effective energy harvesters to convert vibration energy into usable electric energy. Based on recent research progress of his group, this presentation will discuss the design, nonlinear dynamic analysis and experimental tests of nonlinear vibration energy harvesters subjected to various excitations, such as broadband base excitations, wide ranges of rotational speeds and wind speeds.

Biography: Shengxi Zhou is a Professor in School of Aeronautics, Northwestern Polytechnical University, Xi'an, China. He has published more than 100 research papers on piezoelectric/electromagnetic vibration energy harvesters, nonlinear dynamics, vibration control, etc, and his publications have received more than 5,000 citations in Google Scholar (H–index: 37). He has given more than 20 Keynote/Invited Talks in conferences. His current research interests include vibration and energy harvesting applications, piezoelectric robots, signal processing, etc.

Prof. Zhou was A General Chair of VEH 2021, and served as a guest editor of Mechanical System and Signal Processing, Chinese Journal of Theoretical and Applied Mechanics, Chinese Journal of Solid Mechanics. He is currently a member of ASME Energy Harvesting Technical Committee, editorial board member of Journal of Propulsion Technology (Chinese Journal), and a guest editor of Journal of Dynamics and Control (Chinese Journal).

Keynote talk V (11:20–12:00, Apr.15, The 1st conference hall)

Liqun Chen

Professor

Harbin Institute of Technology (Shenzhen)

Title: Integration of vibration reduction and energy harvesting for a satellite with an adapter

Abstract: A nonlinear energy sink is a promising passive vibration reduction device. Giant magnetostrictive material can be used to harvest vibratory energy with high energy density. The present talk devotes to integrating a nonlinear energy sink and a giant magnetostrictive material energy harvester for a satellite with an adapter. A conceptual prototype of a NES–GMM device is proposed to reduce vibration via a nonlinear energy sink and to harvest energy via the Villari effect of giant magnetostrictive material. Its mathematical model is a set of differential/algebraic equations. A complexification–averaging approach is developed to analyze the differential/algebraic equations. The NES–GMM device is experimentally embedded in a scaled model of a satellite with an adapter. The scaled model consists of a mass and a conical frustum shell. Its equivalent simplified model is worked out based on finite element simulations. The complexification–averaging analysis is performed on the scaled model embedded by the NES–GMM device, and the analytical outcomes are numerically validated. The changing trend predicted by the analysis is consistent with the experimental results. The investigation demonstrates that the proposed NES–GMM device can significantly reduce the resonant peak and produce maximum 4V electricity, while the deivce hardly change the resonant frequencies of the satellite with an adapter.

Biography: Prof. Liqun Chen received his Ph. D. (Mechanics) from Shanghai Jiao Tong University in 1997. After 2 year postdoc research, he worked as a professor in Shanghai University since 1999 and has been a professor in Harbin Institute of Technology (Shenzhen) since 2017. His research interests include nonlinear reduction of vibrations, vibratory energy harvesting, and vibrations of gyroscopic continua.

His honors and awards include National Outstanding Young Scientist Fund of China (2007), Changjiang Distinguished Professor (2008), National Award of Natural Science (2017), and Most Cited Chinese Researchers (since 2014). Currently. He serves as Associate–Editor–in–Chief of Applied Mathematics and Mechanics (English Edition) and Associate Editors of Nonlinear Dynamics and Journal of Vibration Engineering & Technologies.

Keynote talk VI (13:30–14:10, Apr.15, The 1st conference hall)

Mickaël LALLART

Professor

Universit é de Lyon, Institut National des Sciences Appliqu é es de Lyon (INSA–Lyon), France

Title: Nonlinear conditioning circuits for piezoelectric energy harvesters: from principles to applications

Abstract: In the energy harvesting process, electrical conditioning circuits are nearly the last stage, before the actual load. Nonetheless, such circuits are as critical as the other stages (material, structure and so on), especially when considering the typical bidirectional coupling which yields a modification of the previous blocks (structural behavior, entering energy…) when varying the electrical parameters. Hence, optimization of electrical energy extraction and storage stage remains crucial.

In particular, in the case of vibrational energy harvesters based on active elements such as piezoelectric transducers, nonlinear processes induced by electrical circuits have been shown to be particularly attractive in order to artificially increase the converted energy of the microgenerator, yielding a significant harvested power gain up to a decade especially in the case of low–coupled, highly damped structures.

This talk will expose the progresses made since the first contemporary proposal of nonlinear circuits 20 years ago. In particular, issues such as the control of the trade–off between entering energy and converted one will be emphasized for the choice and design of proper interfaces according to the microgenerator characteristics and operating conditions. Recent trends in terms of bandwidth enhancement as well as multi–effect hybrid devices will be exposed as well.

Finally, microgenerators and associated wireless autonomous systems being above all intended to be applied in real environments and conditions, discussions regarding the realistic implementation (i.e., self–powering) of such interface will be discussed. Associated with this challenge, examples of truly self–powered sensors using such nonlinear circuits will be devised.

Biography: Micka l Lallart was born in 1983. He received the Graduate degree in electrical engineering and the Ph.D. degree in electronics, electrotechnics, and automatics from the Institut National des Sciences Appliqu é es de Lyon (INSA–Lyon), Lyon, France, in 2006 and 2008, respectively. After completing a postdoctoral fellowship with the Center for Intelligent Material Systems and Structures (CIMSS) in Virginia Tech, Blacksburg, VA, USA, in 2009, he has been hired as an Associate Professor with the Laboratoire de G é nie Electrique et Ferro é lectricit é (INSA Lyon, France), and has been appointed as a Full–Time Professor in 2019. Since 2021, he is

the head of the Department of Doctoral Studies and Education through Research in INSA Lyon, France.

Dr. Lallart authored or coauthored since 2006 more than 100 papers in international peer–reviewed journals and more than 100 conference papers including 11 personally invited talks and 3 plenary talks. He edited 6 books and participated to 9 book chapters and reviewed more than 250 manuscripts for various journals.

Dr. Lallart was the recipient of an invited JSPS research fellowship in Tohoku University, Sendai, Japan, in 2019 2020, and held an invited Adjunct Researcher position in Northwestern Polytechnical University (NPU), Xi'an, China, in 2018 2020. He was a PI or key partner of National and International Academic Projects funded by French National Research Agency or European Union for instance, and participated to several industrial collaborations as well.

Keynote talk VII (14:10–14:50, Apr.15, The 1st conference hall)

Li Cheng

Professor

The Hong Kong Polytechnic University

Title: Vibration energy manipulation through nonlinear electromechanical coupling–enhanced acoustic black hole effects

Abstract: Effective energy manipulation inside vibrating structures is essential for numerous engineering application such as vibration mitigation and energy harvesting. In this regard, wave retarding structures, exemplified by acoustic black hole (ABH) structures, offer a promising solution. ABH features remarkable slow wave effects inside a structure whose thickness is tailored to a reducing power–law profile. As such, flexural vibration energy can be trapped, before further dissipated or harvested. This property has been well demonstrated in linear systems through either stand–alone or periodic ABH designs. ABH effects, however, are limited to high frequency regime, typically above the so–called cut–on frequency. Therefore, for low frequency applications, exorbitantly large structural size is needed. To tackle this problem, this talk discusses the option of introducing intentional electromechanical coupling into an ABH beam through surface–coated PZT patches with nonlinear electrical shunts. The targeted outcome is to create effective electro–mechanical coupling and the cross–frequency energy transfer, to boost up the low frequency ABH benefits. Numerical modelling, salient nonlinear phenomena, and the potential of the technique for both vibration mitigation and energy harvesting is discussed using a beam example.

Biography: Dr. Li Cheng is Chair Professor and Associate Dean (Research) of Faculty of Engineering at the Hong Kong Polytechnic University. He was a Full Professor at Laval University, Canada before joining Hong Kong PolyU in 2000. He was the Head of Department of Mechanical Engineering from 2011 to 2014. Dr. Cheng published extensively in the field of sound and vibration, structural health monitoring, smart structures and fluid–structure interaction.

Dr. Cheng currently serves as Deputy Editor–in–Chief of Journal of Sound and Vibration, Associate Editor of the Journal of the Acoustical Society of America, Associate Editor of Structural Health Monitoring: An International Journal and an editorial board member of a few other journals. Dr. Cheng is an elected Fellow of Canadian Academy of Engineering, a Distinguished Fellow of the International Institute of Acoustics and Vibration (IIAV), a Fellow of the Acoustical Society of America and a Fellow of Acoustical Society of China etc. He was the President of the Hong Kong Society of Theoretical and Applied Mechanics. He is the President–elect of the I–INCE (International Institutes of Noise Control Engineering).

Keynote talk VIII (14:50–15:30, Apr.15, The 1st conference hall)

Kimihiko Nakano

Professor

The University of Tokyo

Title: Self–powered Active Suspension and Energy Harvesting in Vehicles

Abstract: The self–powered active suspension, where the actuator produces force using energy generated in the suspension to achieve zero power consumption, is introduced. The method to design the active controller based on the energy balance analysis is presented. The system has been applied to the suspension systems of the truck and the rubber tired vehicle for the automated guideway transit. The feasibility of the system is examined through the laboratory tests and the numerical simulations. The energy harvesting in the rotating tire using the stochastic resonance occurred in the multiple stable system is introduced. To monitor the condition between the tire and road surface, installing sensors in the tire is demanded. As supplying energy is not easy, energy harvesting in the rotating tire is useful. The phenomenon of the stochastic resonance is presented in the basic model and the method to apply it to the energy harvesting in the rotating body is explained. The power to be generated is examined through the running test of the vehicle.

Biography: Kimihiko Nakano received Ph.D. degrees in mechanical engineering from University of Tokyo, Japan, in 2000. The topic of the Ph.D thesis is “Self–powered active vibration control using regenerated energy”. After working for Yamaguchi University for six and a half years, he became an Associate Professor at Institute of Industrial Science, the University of Tokyo in 2006 and has been promoted to Professor in 2019. His major research interests include the dynamics and control of vehicles, energy harvesting and human factors in driving.

Keynote talk IX (15:30–16:10, Apr.15, The 1st conference hall)

Chris Bowen

Professor

University of Bath

Title: Design and manufacture of piezoelectric and pyroelectric materials and structures for energy harvesting

Abstract: The continuing need for reduced power requirements for small electronic components, such as wireless sensor networks, has prompted renewed interest in recent years for energy harvesting technologies capable of capturing energy from ambient vibrations and heat. This presentation provides an overview of piezoelectric harvesting system along with the closely related sub–classes of pyroelectrics and ferroelectrics; fundamental aspect are overviewed since they provide the routes to developing novel materials and applications. These properties are, in many cases, present in the same material, providing the intriguing prospect of a material that can harvest energy from multiple sources including vibration and thermal fluctuations. Examples of modeling and manufacture of porous materials and composites for piezo– and pyro–electric harvesting are discussed where the harvesting generates power from temperature fluctuations using piezoelectric materials such as ceramics, polymers and composites.

Biography: Christopher Rhys Bowen has a BSc degree in Materials Science from the University of Bath (1986–1990) and a DPhil in Ceramics from the University of Oxford (1990–1993). Post–doctoral work has been undertaken at Technische Universit t Harburg–Hamburg and University of Leeds (1994–1996). He was Senior Scientist at the Defence Evaluation and Research Agency from 1996–1998. He joined the University of Bath as a Lecturer in 1998 and is now Professor of Materials. He has recently completed a role as ERC Advanced Investigator (2013–2019) on ERC Grant Agreement no. 320963 on ‘Novel Energy Materials, Engineering Science and Integrated Systems (NEMESIS)’ and is now a UKRI Frontier Research Guarantee (2023–2028) on ‘Processing of Smart Porous Electro–Ceramic Transducers’ (ProSPECT). Research areas include energy harvesting, piezoelectric materials and functional ceramics.

Program

Overview						
Time: April 14-16,2023 Location: Panlong Villa Hotel, Xiangtan						
Date	Time (UTC+8)	Activities (Title)			Place	Chairs
Apr.14, 2023	09:00-23:00	Registration			Lobby	
	18:00-20:00	Dinner			Banquet Hall (1F of the Great Hall)	
	20:00-21:30	Academic Committee Meeting			Tian Tai hall (4F of the Crystal Palace)	
Apr.15, 2023	8:00-8:30	Registration			Lobby	
	8:00-8:30	Opening Remark & Group Photo			The 1st Conference Hall (2F of the Great Hall)	Kexiang Wei
	8:30-9:10	Keynote Talk Ⅰ	Lei Zuo University of Michigan, Ann Arbor	Biomechanical energy harvesting for wearables and portables		Wenming Zhang
	9:10-9:50	Keynote Talk Ⅱ	Jinyue Yan The Hong Kong Polytechnic University	Trends and needs of future energy R&D		Wenming Zhang
	9:50-10:00	Coffee Break			Corridor	
Apr.15, 2023	10:00-10:40	Keynote Talk Ⅲ	Daniil Yurchenko University of Southampton	Future of high-performance energy harvesters through global devices optimization	The 1st Conference Hall (2F of the Great Hall)	Junyi Cao
	10:40-11:20	Keynote Talk Ⅳ	Shengxi Zhou Northwestern Polytechnical University	Nonlinear vibration energy harvesters subjected to various excitations		Qinkai Han
	11:20-12:00	Keynote Talk Ⅴ	Liqun Chen Harbin Institute of Technology (Shenzhen)	Integration of vibration reduction and energy harvesting for a satellite with an adapter		Weiyang Qin
	12:00-13:30	Lunch			Banquet Hall (1F of the Great Hall)	
	13:30-14:10	Keynote Talk Ⅵ	Mickaël LALLART Université de Lyon, France	Nonlinear conditioning circuits for piezoelectric energy harvesters: from principles to applications	The 1st Conference Hall (2F of the Great Hall)	Bin Zhang
	14:10-14:50	Keynote Talk Ⅶ	Li Cheng The Hong Kong Polytechnic University	Vibration energy manipulation through nonlinear electromechanical coupling- enhanced acoustic black hole effects		Jiaxi Zhou

	14:50-15:30	Keynote Talk VIII	Kimihiko Nakano The University of Tokyo	Self-powered active suspension and energy harvesting in vehicles		Shengxi Zhou
	15:30-16:10	Keynote Talk IX	Chris Bowen University of Bath	Design and manufacture of piezoelectric and pyroelectric materials and structures for energy harvesting		Zhihui Lai
	16:10-16:30	Keynote Talk X	Hongfei Zu Zhejiang Sci-Tech University	Simulation system of vibration energy harvesting and its application		Bo Yan
	16:30-18:30	Coffee Break & Poster			Corridor	
	18:30-21:30	Conference Banquet & Award Ceremony			The 1st Conference Hall (2F of the Great Hall)	Hongxiang Zou
Apr.16, 2023	8:30-12:00	Oral Session A	Nonlinear Vibration Theory, Dynamic Modeling, and Analysis Methods		The 3rd Conference Hall (3F of the Great Hall)	
		Oral Session B	Electromechanical Conversion Mechanisms and Functional Materials		The 2nd Conference Hall (3F of the Great Hall)	
		Oral Session C	Mechanical Energy Harvesting and Applications (Vibration, Rotational Motion, etc.)		The 5th Conference Hall (3F of the Great Hall)	
		Oral Session D	Mechanical Energy Harvesting and Applications (Fluids, Waves, etc.)		7399 Room (3F of the Crystal Palace)	
		Oral Session E	Mechanical Energy Harvesting and Applications (Vibration, Rotational Motion, etc.) Mechanical Energy Harvesting and Applications (Human Motion, Vehicles, etc.)		Tian Tai hall (4F of the Crystal Palace)	
		Oral Session F	Self-Powered Sensors and Systems; Actuators and Micro-Nano Robots		Tian Zhu hall (4F of the Crystal Palace)	
		Oral Session G	Nano Energy Applications in MEMS, E-skin, and AI Vibration Control and Utilization and Other Related Topics		Yue Tang hall (International Conference Center)	
		Oral Session H	Energy Storage and Self-Charging Power Systems		Hong Qi hall (International Conference Center)	
		Oral Session I	Acoustic/Mechanical Metamaterials for Energy Utilization and Harvesting Vibration Control and Utilization and Other Related Topics		The 6th Conference Hall (3F of the Great Hall)	
Apr.16, 2023	8:30-12:00	Oral Session and Poster			Please refer to the Program	
	12:00-13:00	Lunch			Banquet Hall (1F of the Great Hall)	
	13:00-17:00	Red culture education				
	17:30-18:00	Dinner			Waiting for notification	
Apr.17, 2023	8:30-12:00	Free discussion or departure			Mechanical building 311, Hunan Institute of Engineering	

Oral Session A(I): Nonlinear Vibration Theory, Dynamic Modeling, and Analysis Methods

Sunday, April 16 | 8:30-10:10 (UTC +8)			The 3rd Conference Hall
Time	Presentations		Chairs
	Speakers	Titles	
8:30-8:45	Fan Yang Huaqiao University	Transient response solution of energy harvesting systems multi-well potential function under poisson white noise excitation	Xiuting Sun Yao Yan Xiangying Guo Bo Yan
8:45-9:00	Haowen Dong Beijing Institute of Technology	Inverse design of acoustic metasurfaces	
9:00-9:15	Xingrong Huang Beihang University	Dynamic characteristics analysis and fault diagnosis of complex systems based on nonlinear mode synthesis	
9:15-9:30	Kuan Lu Northwestern Polytechnical University	The applications of POD method in rotor-bearing system	
9:30-9:45	Xiuting Sun Tongji University	A data-driven reconstruction method for nonlinear dynamic systems	
9:45-10:00	Shenlong Wang University of Shanghai for Science and Technology	Curved surface-based vibration isolation mechanism with designable stiffness: Modeling, simulation, and applications	
9:00-10:10	Coffee Break		

Oral Session A(II): Nonlinear Vibration Theory, Dynamic Modeling, and Analysis Methods

Sunday, April 16 | 10:10-12:05(UTC +8)		The 3rd Conference Hall	
Time	Presentations		Chairs
	Speakers	Titles	
10:10-10:25	Bo Yan Zhejiang Sci-tech University	Realization of nonlinear damping with electromagnetic shunt damping	Xiuting Sun Yao Yan Xiangying Guo Bo Yan
10:25-10:40	Xiaoxu Zhang Fudan University	Developing the nonlinear system identification software: a step from obscure algorithms to easy-going applications	
10:40-10:55	Xiang Zhao Southwest Petroleum University	Study of vortex-induced vibration of a pipe-in-pipe system by using a wake oscillator model	
10:55-11:05	Ying Meng Shanghai University	Vibration analysis of a piezoelectric circular plate energy harvester considering a proof mass	
11:05-11:15	Jiawen Xu Southeast University	Improving energy harvesting by nonlinear dual-beam energy harvester with an annular potential energy function	
11:15-11:25	Liuding Yu Naval University of Engineering	Investigation on the passive adaptive transfer of bistable beam-slider energy harvester from chaos to inter-well vibration	
11:25-11:35	Yaobing Zhao Huaqiao University	Internal resonances and energy transfer mechanisms of suspended cables subjected to crossover shifting and symmetry breaking	
11:35-11:45	Hongyuan Zhao Xidian University	Modeling and experimental verification of a pendulum-based ultralow-frequency vibration energy harvester	
11:45-11:55	Yunan Zhu Beijing University of Technology	Theoretical and experimental analysis on intelligent vibration absorbers with particle damping	
11:55-12:05	Meng Li Southwest Jiaotong University	A novel nonlinear energy harvesting system with piecewise nonlinearity	

Oral Session B(I): Electromechanical Conversion Mechanisms and Functional Materials

Sunday, April 16 | 8:30-10:10 (UTC +8)			The 2nd Conference Hall
Time	Presentations		Chairs
	Speakers	Titles	
8:30-8:45	Yan Zhang Central South University	Flexible piezocomposite for piezoelectric sensing and energy harvesting	Junyi Cao Qinkai Han Linchuan Zhao
8:45-9:00	Fei Gao Shenzhen Institute of Advanced Technology	Harvesting energy from human motion	
9:00-9:15	Qinkai Han Tsinghua University	Triboelectric rolling bearings: design and condition monitoring applications	
9:15-9:30	Wenbin Huang Chongqing University	A lamb waves-based ultrasonic system for the simultaneous data communication, defect inspection, and power transmission	
9:30-9:45	Hongli Ji Nanjing University of Aeronautics and Astronautics	Technology of noise and vibration reduction using dynamic absorber based on acoustic black hole features	
9:45-10:00	Mingyi Liu Guangdong Technion – Israel Institution of Technology	Energy harvesting from the human body: harvesting the otherwise wasted energy	
10:00-10:10	Coffee Break		

Oral Session B(II): Electromechanical Conversion Mechanisms and Functional Materials

Sunday, April 16 | 10:10-12:05 (UTC +8)			The 2nd Conference Hall
Time	Presentations		Chairs
	Speakers	Titles	
10:10-10:25	Wei Wang Zhengzhou University	Nonlinear multi-stable energy harvesting from human motion	Junyi Cao Qinkai Han Linchuan Zhao
10:25-10:40	Hao Wu South China University of Technology	Boosting the power output of nanogenerators by contact switch and capacitor discharging effect	
10:40-10:55	Minyi Xu Dalian Maritime University	Marine triboelectric nanogenerator and self-powered systems	
10:55-11:10	Xueping Xu Beihang University	The energy conversion mechanism of magnetosensitive structures under hybrid excitations of mechanical vibration and magnetic field	
11:10-11:25	Linchuan Zhao Shanghai Jiao Tong University	Fusiform-inspired wave energy harvester using mechanical modulation mechanism for self-sustained marine environmental monitoring	
11:25-11:35	Dan Liu Hunan Institute of Engineering	Enhanced triboelectric output of PDMS-based composite film with rGO/FEP filler and filtration-membrane-molded microstructure	
11:35-11:45	Zhuang Ren Jilin university	Simulation study on magneto-electromechanical performance of magnetoelectric composite components under variable magnetic field	
11:45-11:55	Ying Zhang Xi'an Jiaotong University	A variable reluctance self-powered condition monitoring method for rotating components	
11:55-12:05	Baolin Li Zhengzhou University	A micro-vibrational piezoelectric energy harvesting system with stopper for performance enhancement	

Oral Session C(I): Mechanical Energy Harvesting and Applications (Vibration, Rotational Motion, etc.)

Sunday, April 16 | 8:30-10:10 (UTC +8)			The 5th Conference Hall
Time	Presentations		Chairs
	Speakers	Titles	
8:30-8:45	Tinghai Cheng Beijing Institute of Nanoenergy and Nanosystems	Environment energy harvesting of triboelectric nanogenerator enhanced by mechanical design strategy	Shengxi Zhou Zeqi Lu Kangqi Fan Shitong Fang
8:45-9:00	Shitong Fang Shenzhen University	Designs, modeling and experiments of high-performance rotational energy harvesters	
9:00-9:15	Yili Hu Zhejiang Normal University	A siphpn rain gauge designed with rainwater potential collection-based generation strategy for raindrops energy harvesting	
9:15-9:30	Dongmei Huang Xidian University	On the response regimes of multi-stable energy harvesters	
9:30-9:45	Long Liu Northwestern Polytechnical University	A facile frequency tuning strategy to realize vibration-based node for the internet of things applications	
9:45-10:00	Xutao Mei The Univeristy of Tokyo	Machine learning based arm motion model for wearable energy harvester	
10:00-10:10	Coffee Break		

Oral Session C(II): Mechanical Energy Harvesting and Applications (Vibration, Rotational Motion, etc.)

Sunday, April 16 | 10:10-11:45 (UTC +8)			The 5th Conference Hall
Time	Presentationsa		Chairs
	Speakers	Titles	
10:10-10:25	Lifeng Qin Xiamen University	Novel energy harvesters using liquid as an energy-capturing medium for application in low-frequency vibration/rotation environment	Shengxi Zhou Zeqi Lu Kangqi Fan Shitong Fang
10:25-10:40	Guangqing Wang Zhejiang Gongshang University	Towards ultrasound vibration energy harvesting and its applications	
10:40-10:55	Yipeng Wu Nanjing University of Aeronautics and Astronautics	Bidirectional piezoelectric energy conversion and the effect of structural vibration	
10:55-11:05	Kai Chai Naval University of Engineering	Design and experiment of electromagnetic vibration energy capture micro generator	
11:05-11:15	Yimin Fan Harbin Institute of Technology	Internal resonance energy harvesting via nonlinear modal interactions between internally coupled bending and torsional modes	
11:15-11:25	Jiale Han Xidian University	Stochastic analysis of a galloping energy harvester	
11:25-11:35	Zhiyuan Li Northwestern Polytechnical University	A piezoelectric-electromagnetic hybrid wind energy harvester	
11:35-11:45	Wanrong Lin Chongqing university	A nonlinear magnetic and torsional spring coupling piezoelectric energy harvester with internal resonance	

Oral Session D(I): Mechanical Energy Harvesting and Applications (Fluids, Waves, etc.)

Sunday, April 16 | 8:30-10:10 (UTC +8)			7399 Room
Time	Presentations		Chairs
	Speakers	Titles	
8:30-8:45	ChungKet Thein University of Nottingham Ningbo China	Investigation on the impact based cantilever beam electromagnetic vibration energy harvester	Junlei Wang Haitao Li Zhonghua Zhang Hongjun Zhu
8:45-9:00	Mingjie Guan Xiamen University	A study on inertial piezoelectric power harvester excited by flow induced vibration in low-velocity water	
9:00-9:15	Peng Han Tsinghua University	Modeling the maximum energy harvesting efficiency from vortex-induced vibration	
9:15-9:30	Xingbao Huang Hunan University	Hydrokinetic energy harvesting from flow-induced vibration of a hollow cylinder attached with a bi-stable energy harvester	
9:30-9:45	Haitao Li North University of China	Theoretical and experimental study of a hybrid flow induced vibration energy harvester	
9:45-10:00	Wan Sun Jiangsu University	High-efficiency galloping energy harvesting based on bluff body rotational motion suppression	
10:00-10:10	Coffee Break		

Oral Session D(II): Mechanical Energy Harvesting and Applications (Fluids, Waves, etc.)

Sunday, April 16 | 10:10-11:55 (UTC +8)			7399 Room
Time	Presentations		Chairs
	Speakers	Titles	
10:10-10:25	Zhonghua Zhang Zhejiang Normal University	Development of an indirectly excited piezoelectric wind energy harvester	Junlei Wang Haitao Li Zhonghua Zhang Hongjun Zhu
10:25-10:35	Quan Bai Hunan Institute of Engineering	Snap-through triboelectric nanogenerator for wind energy harvesting	
10:35-10:45	He Ren North University of China	The design optimization and experimental study of bluff body cross-section for harvesting energy from fluid-induced vibration	
10:45-10:55	Tian Song Chongqing University	Effect of angle of attack on performance of 2-DOF triangular cylinder wind-induced vibration energy harvester	
10:55-11:05	Haigang Tian Zhengzhou University	Enhanced performance of airfoil-based flutter piezoelectric energy harvester by coupling magnetic force	
11:05-11:15	Junlei Wang Zhengzhou University	Exploring the potential benefits of metasurface for enhancing piezoelectric energy harvesting performance	
11:15-11:25	Kun Wang Xi'an Jiaotong University	Piezoelectric wind energy harvester inspired from palm leaf flutter	
11:25-11:35	Guoqiang Xu City University of Hong Kong	A nonlinear triboelectric nanogenerator with a broadened bandwidth for effective harvesting of vibration energy	
11:35-11:45	Yuanhui Zeng Guangdong University of Technology	Discovery of hybrid energy harvesting systems with non-Gaussian process	
11:45-11:55	Liufeng Zhang Tsinghua University	Energy harvesting from gravity-induced deformation of rotating shaft for long-term monitoring of rotating machinery	

Oral Session E(I): Mechanical Energy Harvesting and Applications (Vibration, Rotational Motion, etc.)
Mechanical Energy Harvesting and Applications (Human Motion, Vehicles, etc.)

Sunday, April 16 | 8:30-10:10 (UTC +8)			Tian Tai Hall
Time	Presentations		Chairs
	Speakers	Titles	
8:30-8:45	Huliang Dai Huazhong University of Science and Technology	Triboelectric energy harvesting from flow-induced vibrations	Zhaoye Qin Wei Wang Dongxing Cao Huliang Dai Minghui Yao
8:45-9:00	Zhaoye Qin Tsinghua University	Rotational energy harvesting for condition monitoring of rotating machinery	
9:00-9:15	Nan Wu University of Manitoba	Shear-mode magnetic piezoelectric energy generator	
9:15-9:30	Xin Yu Changchun University of Technology	Research on the circuit of vibration energy harvesting with triboelectric nanogenerator on transmission lines	
9:30-9:45	Yunshun Zhang Jiangsu University	Non-linear oscillations for application to rotating-induced or spatial-directional energy harvesting	
9:45-9:55	Hengyu Li Chinese Academy of Sciences	Influence of mechanical motions on the output characteristics of triboelectric nanogenerators	
9:55-10:10	Coffee Break		

Oral Session E(II): Mechanical Energy Harvesting and Applications (Vibration, Rotational Motion, etc.)

Mechanical Energy Harvesting and Applications (Human Motion, Vehicles, etc.)

Sunday, April 16 | 10:10-12:00 (UTC +8)			Tian Tai Hall
Time	Presentations		Chairs
	Speakers	Titles	
10:10-10:20	Meng Li Shanghai University	Design and experimental study of human motion energy harvesting backpack with quasi-zero stiffness mechanism	Zhaoye Qin Wei Wang Dongxing Cao Huliang Dai Minghui Yao
10:20-10:30	Jia Lu Harbin Institute of Technology	Study of discharge voltage in gap-closing type electret energy harvesters	
10:30-10:40	Xiaoqing Ma Northwestern Polytechnical University	Characteristic analysis of a nonlinear vortex-induced vibration energy harvester	
10:40-10:50	Qinxue Tan Xidian University	Modeling and performance analysis of an eccentric mass-driven rotor-based rotational energy harvester	
10:50-11:00	Lu Wang Xi'an Jiaotong University	High power density multi frequency piezoelectric vibration energy harvesters for power grid transformer	
11:00-11:10	Yilong Wang Harbin Institute of Technology	Study on the method of reducing the volume of piezoelectric energy harvesters without trading off their high performance	
11:10-11:20	Shuxin Wu Xidian University	An innovative energy harvesting backpack strategy through a flexible mechanical motion rectifier	
11:20-11:30	Hongxin Yang Southeast University	A magnetically coupled dual-beam piezoelectric energy harvester with for human motion energy harvesting	
11:30-11:40	Zhe Zhao Northwestern Polytechnical University	Direct-current, long-lasting and highly efficient electret energy harvesting from ultra-low-frequency motions using toothed clutch mechanism	
11:40-11:50	Dongguo Tan Hunan University of Science and Technology	Wearable bistable triboelectric energy harvester for harvesting torsional vibration energy from human motion	

Oral Session F(I): Self-Powered Sensors and Systems; Actuators and Micro-Nano Robots

Sunday, April 16 | 8:30-10:10 (UTC +8)			Tian Zhu Hall
Time	Presentations		Chairs
	Speakers	Titles	
8:30-8:45	Xinjian Fan Soochow University	Research on control strategy and biomedical application of multi-scale magnetic miniature robot and its swarm	Fei Wang Junrui Liang Huicong Liu
8:45-9:00	Mengdi Han Peking University	Small-scale 3D robots with complex motion modalities	
9:00-9:15	Xin Li Xidian University	ViPSN: A reconfigurable battery-free iot platform for vibration energy harvesting	
9:15-9:30	Junrui Liang Shanghai Technology University	Quasi-static toggling mechanical energy harvester toward self-powered IoT applications	
9:30-9:45	Huicong Liu Soochow University	Energy harvesting and self-powered sensing techniques	
9:45-10:00	Qiongfeng Shi Southeast University	Smart floor monitoring-interacting system based on self-powered sensors	
10:00-10:10	Coffee Break		

Oral Session F(II): Self-Powered Sensors and Systems; Actuators and Micro-Nano Robots

Sunday, April 16 | 10:10-11:55 (UTC +8)			Tian Zhu Hall
Time	Presentations		Chairs
	Speakers	Titles	
10:10-10:25	Fei Wang Southern University of Science and Technology	Vibration energy harvester at ultra-low frequency with rotation structure	Fei Wang Junrui Liang Huicong Liu
10:25-10:40	Dibin Zhu Shanghai Jiao Tong University	Flow energy harvesting enabled self-powered systems: from theory to applications	
10:40-10:55	Minglu Zhu Soochow University	Wearable human machine interfaces with fusion of multi-modal sensing and haptic feedback techniques	
10:55-11:05	Jingjing Fu The Chinese University of Hong Kong	Optical emission from friboelectric gas discharge toward self-powered gas sensing	
11:05-11:15	Anxin Luo Southern University of Science and Technology	Electromagnetic-piezoelectric hybridized rotation energy harvester with double-frequency up-conversion mechanism for vibrations at ultra-low frequency	
11:15-11:25	Xiagui Pan Zhejiang Sci-tech University	Nonlinear dynamics characteristics of a tumbler on an arc	
11:25-11:35	Ling Peng Zhejiang Sci-tech University	Cockroach-inspired structure for low-frequency vibration isolation	
11:35-11:45	Qiang Wang Hunan University	Experimental studies on a compact device with quasi-zero-stiffness for vibration suppression and energy harvesting	
11:45-11:55	Yunfei Xu Chongqing University	A Lamb waves-based wireless power transmission system for powering IoT sensor nodes	

Oral Session G(I): Nano Energy Applications in MEMS, E-skin, and AI Vibration Control and Utilization and Other Related Topics

Sunday, April 16 | 8:30-10:10 (UTC +8)			Yue Tang Hall
Time	Presentations		Chairs
	Speakers	Titles	
8:30-8:45	Jian He（Jie Zhang） North University of China	A high-density stacked flexible MEMS coil based electromagnetic vibration energy harvester with improved output voltage	Kai Tao Yunjia Li Mengying Xie Jiaxi Zhou
8:45-9:00	Yunjia Li Xi'an Jiaotong University	Magnetic vibration energy harvester based on batch-fabricated flexible coils	
9:00-9:15	Kailiang Ren Beijing Institute of Nanoenergy and Nanosystems	Piezoelectric nanogenerators and electret-based triboelectric nanogenerators for energy harvesting and self-powered wearable device	
9:15-9:30	Kai Tao Northwestern Polytechnical University	Research on self-powered tactile sensor based on micropatterned hydrogel	
9:30-9:45	Mengying Xie Tianjin University	Self-powered sensors in soft robotics	
9:45-10:00	Xin Fang National University of Defense Technology	Synthetical vibration reduction enabled by strongly nonlinear metamaterials	
10:00-10:10	Coffee Break		

Oral Session G(II): Nano Energy Applications in MEMS, E-skin, and AI Vibration Control and Utilization and Other Related Topics

Sunday, April 16 | 10:10-12:05 (UTC +8)			Yue Tang Hall
Time	Presentations		Chairs
	Speakers	Titles	
10:10-10:25	Xiuchang Huang Shanghai Jiao Tong University	Vibration transmission control of a propulsion shafting system with piezoceramic patches and negative capacitances shunt networks: preliminary experimental analysis	Kai Tao Yunjia Li Mengying Xie Jiaxi Zhou
10:25-10:40	Fuyin Ma Xi'an Jiaotong University	Dynamic design of equipment components and devices based on mechanical metamaterials	
10:40-10:55	Kai Wang Hunan University	A semi-active quasi-zero stiffness metamaterial beam for low-frequency band gap tuning	
10:55-11:10	Sha Wei Shanghai University	Interval analysis of vibration systems under uncertainties and its applications	
11:10-11:25	Yao Yan University of Electronic Science and Technology of China	Nonlinear cutting dynamics and its safety	
11:25-11:35	Xinwang Wang Tianjin University	A flexible piezoelectric PVDF/MXene pressure sensor for roughness discrimination	
11:35-11:45	Xianjia Wang Zhejiang Sci-tech University	Enhanced lever-type vibration isolator via electromagnetic shunt damping	
11:45-11:55	Kefan Xu Harbin Institute of Technology	Integration of vibration reduction and energy harvesting for Spacecraft	
11:55-12:05	Ning Yu Zhejiang Sci-tech University	Lever-type quasi-zero stiffness vibration isolator with magnetic spring	

Oral Session H(I): Energy Storage and Self-Charging Power Systems

Sunday, April 16 | 8:30-10:10 (UTC +8)			Hong Qi Hall
Time	Presentations		Chairs
	Speakers	Titles	
8:30-8:45	Xiangyu Chen Beijing Institute of Nanoenergy and Nanosystems	Polymer based TENG materials and sensors	Zhengbao Yang Yunlong Zi Hailing Fu Zhongjie Li
8:45-9:00	Hailing Fu Beijing Institute of Technology, Beijing	Nonlinear dynamics and piezoelectric transducers for rotational energy harvesting and distributed sensing	
9:00-9:15	Hengyu Guo Chongqing University	The strategy of improving the total performance of sliding mode TENG via interface lubrication	
9:15-9:30	Zhongjie Li Shanghai University	Amplitude truncation effect in piezoelectric energy harvesters	
9:30-9:45	Xiong Pu Beijing Institute of Nanoenergy and Nanosystems	Flexible mechano-to-electrical energy conversion materials and devices	
9:45-10:00	Jie Wang Beijing Institute of Nanoenergy and Nanosystems	Direct-current triboelectric nanogenerators arising from electrostatic breakdown	
10:00-10:10	Coffee Break		

Oral Session H(II): Energy Storage and Self-Charging Power Systems

Sunday, April 16 | 10:10-12:00 (UTC +8)		Hong Qi Hall
Time	Presentations	Chairs
	Speakers / Titles	
10:10-10:25	Biao Wang Shang hai university A distributed-parameter electromechanical model for a bionic wrist-worn piezoelectric energy harvester	Zhengbao Yang Yunlong Zi Hailing Fu Zhongjie Li
10:25-10:40	Xin Xia The Hong Kong University of Science and Technology (Guangzhou) A universal method for output capability assessment of nanogenerators and related energy storage strategy	
10:40-10:55	Zhengbao Yang City University of Hong Kong Transmuscular ultrasonic wireless energy harvesting via a flexible and 3d-interconnected piezoceramic	
10:55-11:10	Yunlong Zi The Hong Kong University of Science and Technology (Guangzhou) High-performance triboelectric nanogenerator and tribophotonics	
11:10-11:20	Xinyuan Li Beijing Institute of Nanoenergy and Nanosystems A highly efficient constant-voltage triboelectric nanogenerator	
11:20-11:30	Xiaoyi Li Ocean University of China Energy conversion analysis of multilayered triboelectric nanogenerators for synergistic rain and solar energy harvesting	
11:30-11:40	Xuzhang Peng Shanghai University Experimental study of a dual-beam compressive-mode piezoelectric energy harvester	
11:40-11:50	Xingfeng Shen Shanghai University of Engineering Science The characteristics of the interface circuits under different coupling systems	
11:50-12:00	Chao Yang Shanghai University Comparison of power density of triboelectric generators via frequency-up-conversion method	

Oral Session I(I): Acoustic/Mechanical Metamaterials for Energy Utilization and Harvesting Vibration Control and Utilization and Other Related Topics

Sunday, April 16 | 8:30-10:10 (UTC +8)			The 6th Conference Hall
Time	Presentations		Chairs
	Speakers	Titles	
8:30-8:45	Zhongsheng Chen Changzhou Institute of Technology	Topology optimization of piezoelectric metamaterial plate with interface circuits using extended plane wave expansion method	Weiyang Qin Tianxi Jiang Zhongsheng Chen Ge Yan
8:45-9:00	Qiang Gao Southeast University	Auxetic mechanical metamaterials for energy harvesting	
9:00-9:15	Guobiao Hu The Hong Kong University of Science and Technology (Guangzhou)	Metamaterial-based piezoelectric system for wind energy harvesting	
9:15-9:30	Tianxi Jiang Shanghai Jiao Tong University	Computational sensing of vibration and acoustics with metamaterials	
9:30-9:45	Chunbo Lan Nanjing University of Aeronautics and Astronautics	Vibration energy harvesting from a topological metamaterial beam	
9:45-10:00	Weiyang Qin Northwestern polytechnical university	Increase energy harvesting output by a normal dynamic force on piezoelectric sheet with branch structure	
10:00-10:10	Coffee Break		

Oral Session I(II): Acoustic/Mechanical Metamaterials for Energy Utilization and Harvesting Vibration Control and Utilization and Other Related Topics

Sunday, April 16 | 10:10-11:50 (UTC +8)			The 6th Conference Hall
Time	Presentations		Chairs
	Speakers	Titles	
10:10-10:25	Yong Xiao National University of Defense Technology	Inverse bandgap design theory of metabeams	Weiyang Qin Tianxi Jiang Zhongsheng Chen Ge Yan
10:25-10:40	Xuhui Zhang Xi'an university of science and technology	Dynamic characteristics of wake galloping energy harvester in coal mine ventilation pipe	
10:40-10:55	Yifang Zhu Southeast University	Customizable acoustic metamaterial for sound insulation and vibration attenuation	
10:55-11:10	Rui Zhu Beijing Institute of Technology	Non-resonant metamaterials for broadband vibration isolation and elastic wave control	
11:10-11:25	Ge Yan Shanghai Jiao Tong University	Bio-inspired vibration isolation by exploring combined action mechanism of multi joints	
11:25-11:40	Kai Yang Huazhong University of Science and Technology	Active vibration isolation performance of the monostable nonlinear electromagnetic actuator with elastic boundary	
11:40-11:50	Guilin She Chongqing University	Nonlinear vibrations of graphene platelets reinforced thin-walled conical shells under aerodynamic loads	

Poster Session

Sunday, April 16 | 8:30–12:00 (UTC +8) | Corridor

Number	Authors	Affiliation	Titles
PNV-1	Wen-Hao Qi, Ge Yan, Jia-Jia Lu, Wen-Ming Zhang	Shanghai Jiao Tong University	Negative stiffness sliding beam vibration isolator with nonlinear magnetic modulation
PNV-2	Gui-Lin She	Chongqing University	Nonlinear vibrations of graphene platelets reinforced thin-walled conical shells under aerodynamic loads
PNV-3	Ying Wang, Xiangying Guo, Xiaodong Yang	Beijing University of Technology	Dynamic characteristics of acoustic diode with constant frequency
PNV-4	Xuhui Zhang, Hengtao Xu, Xiaoyu Chen, Fulin Zhu, Yan Guo, Hao Tian	Xi'an University of Science and Technology	Modelling and characteristic analysis of combined beam Tri-stable piezoelectric energy harvesting system considering gravity
PNV-5	Yongkang Wu, Bing Liu, Youwei Ma, Di Pan, Da Lian	Shanghai Aerospace Control Technology Research Institute	Mechanical test phenomenon analysis and installation optimization of a CCGA device
PNV-6	Zhou Zhou, Timiao Liang, Kexiang Wei	Hunan Institute of Engineering	Research on vibration reduction control on the high soft tower based on the pendulum tuned mass damper
PNV-7	Huiming Jiang, Honghai Pan, Han Yan, Jing Yuan, Qian Zhao	University of Shanghai for Science and Technology	Analysis of unsteady flow in tip region of compressor rotor based on SPOD method
PNV-8	Shaohua Wang, Guobiao Hu, Lihua Tang, Kean Aw	the university of auckland	Modal characteristics analysis of periodically supported beam
PNV-9	Bao Zhao, Henrik R. Thomsen, Bart Van Damme, Andrea Bergamini, Eleni Chatzi, Andrea Colombi	ETH Zurich	Nonlinear damping induced metamaterial: Wideband attenuation with nonlinear bandgap and energy transfer

Number	Authors	Affiliation	Titles
PME-1	Feng Sun, Runhong Dong, Ran Zhou, Fangchao Xu, Xutao Mei	Shenyang University of Technology	Theoretical and experimental investigation of a rotational magnetic couple piezoelectric energy harvester
PME-2	Guannan Hao, Shen Hui	Qingdao University	Harvesting kinetic energy from raindrops by using pvdf cantilever beam
PME-3	Han Lu, Kairui Chen, Hao Tang, Weiqun Liu	Southwest Jiaotong University	Comparison of four electrical interfacing circuits in Frequency Up-Conversion Piezoelectric Energy Harvesting
PME-4	Xiaofei Lyu	Tianjin University	Flexural wave energy harvesting by the topological interface state of a phononic crystal beam with acoustic black hole structures
PME-5	Hang Shao, Long Zhang, Haodong Pan, Jiaxiang Zhang, Yufeng Su	Zhengzhou University	Parameters selection of the floating magnet for airflow energy harvester based on diamagnetic levitation structure
PME-6	Guocheng Shen, Jijie Ma, Yili Hu, Jianping Li, Tinghai Cheng, Jianming Wen	Zhejiang Normal University	An air velocity monitor for coal mine ventilation based on vortex-induced triboelectric nanogenerator
PME-7	Xing-Feng Shen, Yuan Tian-Chen, Yang Jian	Shanghai University of Engineering Science	The piezoelectric laminated circular plate harvester for the railway vertical vibration
PME-8	Hanyi Sun, Han Peng, Hongfei xiao	Huazhong University of Science and Technology	An optimized design of electromagnetic vibration energy harvester considering engineering feasibility
PME-9	Ye Tang, Guo Wang, Tianzhi Yang, Qian Ding	Anhui Polytechnic University	Nonlinear energy harvesting and vibration suppression of three-directional functional graded pipes conveying fluid with the integration of piezoelectric attachment and nonlinear energy sink
PME-10	Suo Wang, Shengxi Zhou	Northwestern Polytechnical University	Scavenging energy from human walking based on the bending of the sole
PME-11	Wanshu Wang, Yunshun Zhang	Universuty of Tsukuba	LQR controller design for enhancing capabilities of vibration suppression and energy harvesting of vehicle suspension using an inerter

Number	Authors	Affiliation	Titles
PME-12	Nan Wei, Jianming Wen, Jianping Li, Jijie Ma, Yili Hu	Zhejiang Normal University	A broadband magnet-induced multi-beam piezoelectric energy harvester
PME-13	Xiaoyi Xiang, Hui Shen	Qingdao University	A rope-driven piezoelectric energy harvester for multidirectional vibrations
PME-14	Fangyang Dong, Taili Du, Meixian Zhu, Ziyue Xi, Minyi Xu	Dalian Maritime University	Mechanical vibration energy harvesting based on triboelectric nanogenerators
PME-15	Junchen Xu, Zhihui Lai, Shitong Fang, Shengxi Zhou	Shenzhen University	Energy harvesting from a hybrid piezo-dielectric vibration energy harvester with a self-priming circuit
PME-16	Ze-Qi Lu, Fei-Yang Zhang, Hai-Ling Fu, Hu Ding, Liqun Chen	Shanghai University	Rotational nonlinear double-beam energy harvesting
PME-17	Xiaofan Zhang, Han Yu, Xiaobiao Shan, Guangdong Sui	Harbin Institute of Technology	Application of the pyramid kirigami structure in double-ended fixed beam piezoelectric energy harvester
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Number	Authors	Affiliation	Titles
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PME-25	Yuzhen Jin	Zhejiang Sci-Tech University	Self-actuated flowmeter of Triboelectric nanogenerator based on wind-induced vibration wake effect
PME-26	Yue Zhang, Wan Sun	Jiangsu University	An enhanced galloping-based piezoelectric energy harvester configured with a non-rotating bluff body
PME-27	Quanwei Zhu, Yanchun Zhao, Lin-Chuan Zhao	Hunan Institute of Engineering	Design and experimental study of flexible driving wave energy harvester
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PME-35	Shasha Li, Dongxing Cao	Beijing University of Technology	Vibrational energy harvesting form defective mode of local resonant phononic crystals
PME-36	Kaiyuan Liu, San-Xin Gui, Hanqing Guan	Hunan Institute of Engineering	Magnetic suspension flywheel-road energy harvester and its application of self-powered body temperature monitoring
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PME-43	Yiwei Zhou, Changhai Zhan, Dongxing Cao	Beijing University of Technology	Dynamic analysis of a folded cantilever beam and application for piezoelectric vibration energy harvesting
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PME-55	Chenyu Wang, Hongyuan Zhao, Shuxin Wu, Yan Zhang, Jiyuan Guo, Rongchun Li, Kangqi Fan	Xidian University	Modeling and experimental verification of a pendulum-based ultralow-frequency vibration energy harvester
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PES-3	Yan Peng,Wanqing Xu, Zhongjie Li	Shang Hai university	Parametric study on circularly abrupt magnetic flux density change of electromagnetic energy harvesters via simulation
PES-4	Yajing Pei, Qianwang Wang, Chuanpeng Ning, Xin Yu	Changchun University of Technology	Research on impact-type triboelectric nanogenerator and power management circuit
PES-5	Songyi Zhong, Shaoxiang Zhang, Zhongjie Li, Ying Gong Yan Peng	Shanghai University	Design and simulation of ball-based triboelectric nanogenerator for harvesting energy from rolling tires
PES-6	Bowen Yang, Liangpei Huang, Kexiang Wei, Xiong Shu	Hunan University of Science and Technology	State of health estimation of lithium-ion batteries based on incremental capacity analysis

Number	Authors	Affiliation	Titles
PAM-1	Xuhui Zhang, Yan Guo, Xiaoyu Chen, Fulin Zhu, Hengtao Xu, Hao Tian	Xi'an University of Science and Technology	Research on dynamic characteristics of wake galloping energy harvester in coal mine
PAM-2	Qi Liu, Weiyang Qin	Northwestern Polytechnical University	Harvesting weak vibration energy by amplified inertial force and super-harmonic vibration
PAM-3	Jianan Pan, Weiyang Qin, Xuhui Zhang	Xi'an University of Science and Technology	A broadband vibrational hybrid energy harvester using collision impact mechanism with electret coupling
PAM-4	Han Wang, Weiyang Qin, Qi Li	Northwestern Polytechnical University	Study on energy harvesting performance of defect locally resonant metamaterial beam
PAM-5	Zhuochen Du, Lin-Chuan Zhao	Hunan Institute of Engineering	Dynamic modeling and experimental study of compliant human energy harvesting system
PAM-6	Xingchen Ma, Xiaoya Yang, Chuan Ding, Ying Dai, Pengfei He, Xiaoqing Zhang	Tongji University	Resilient electret film based vibrational energy harvesters with a v-shaped counter electrode
PAM-7	Teng Zhou, Lin-Chuan Zhao	Hunan Institute of Engineering	Design and experimental study of cone surface triboelectric nanogenerator
PAM-8	Long Zhao	Shanghai University	Ocean wave high density energy harvesting based on thecharacteristics of metamaterial defects
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PVC-2	Shengjie Wang, Xiangying Guo	Beijing University of Technology	The design and analysis of low-frequency vibration absorbers with bi-stable buckling beam

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PVC-3	Jia-Jia Lu, Ge Yan, Wen-Hao Qi, Wen-Ming Zhang	Shanghai Jiao tong University	Cantilever-supported sliding structure with nonlinear stiffness modulation for vibration isolation
PVC-4	Qiuhua Gao, Linchuan Zhao, Wenming Zhang	Shanghai Jiao tong University	Characterization of spatial density heterogeneity using nonlinear magnetic levitation
PVC-5	Kefan Xu, Muqing Niu, Yewei Zhang, Jianguo Cui, Wenju Han, Chen Liqun	Harbin Institute of Technology	Integration of vibration reduction and energy harvesting for spacecraft
PVC-6	Weihao Tong, Kai Yang	Huazhong University of Science and Technology	Active vibration isolation performance of the monostable nonlinear electromagnetic actuator with elastic boundary
PVC-7	Wenbo Li, Yuanzhen Zhang	Tongji University	Design strategy of soft electromagnetic transducers for actuation and energy harvesting

Conference Venue

Panlong villa hotel is located in Yuetang district, Xiangtan city, where highways criss-cross, high-speed rail, air transport in all directions, the hotel from Chang-Zhu-Tan three city high-speed rail station about 30-45 minutes by car, to Huanghua airport, 50 minutes can be reached.Panlong villa hotel is a five-star foreign tourism hotel invested and managed by Hunan Panlong investment group, a famous private enterprise in China. It is an important name card of Hunan tourism industry. Since May 2001, it has been open to the public. Since August 2002, it has been listed as the first five-star hotel in Xiangtan.

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Juxian Building
明苑(客房 会议)
Bright Garden
<6101-6326>
尽美楼(健身 乒乓球 台球)
Perfection Building
大会堂（宴会 会议）
Great Hall
停车场(2)
Parking Lot(2)
晶宫(客房 餐饮 会议)
Crystal Palace
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Swimming
国际会议中心(会议)
International Conference Centre
喷泉
Fountain
别墅区
Villas
抚琴台(茶艺)
Zither Player's Terrace
怡乐园(足浴 美发)
Joyful Park
梦剧院（KTV）
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Xiangtan University

Xiangtan University is a comprehensive national key university and a national "Double First–Class" construction university initiated and named by Mao Zedong. The college of mechanical engineering and mechanics has a long history. When it was founded, it opened the mechanical specialty, cultivating a large number of outstanding talents for the society.

Currently, the college has 2 doctoral degree authorization programs such as mechanics and materials science, as well as a post–doctoral research flow station, 4 master's degree authorization programs such as mechanical engineering, and 8 undergraduate majors such as mechanical design and manufacturing, automation, and intelligent manufacturing.

The college has 130 full–time teachers, including 39 professors, 45 associate professors and equivalent professional titles, and 109 teachers with doctoral degrees. Which it including 1 dual–appointed academician, 1 distinguished professor of the "Changjiang scholars" of the ministry of education, 1 winner of the national natural science foundation for distinguished young scholars, 3 experts with special allowances from the state council and so on.

The college aims at the forefront of disciplines and faces the regional economic construction of Hunan. In the past five years, it has undertaken over 300 scientific research projects with a funding of over 60 million Yuan, including 50 national level projects. The college has won 1 first prize and 2 second prizes for natural science in Hunan province, 2 second prizes for technological invention, one 3 prize for technological invention, and 6 provincial and ministerial level teaching achievement awards. The college has published more than 400 papers included in SCI and EI, published 9 books and textbooks, and authorized over 500 invention patents.

The college has built seven national, provincial, and ministerial level research platforms. The college has built 5 innovation bases for postgraduate education in Hunan province, 8 provincial innovation and entrepreneurship bases for college students, and 6 national and provincial first–class courses.

In recent years, the college has actively adapted to the needs of economic and social development, adhering to the educational philosophy of "mechanical excellence, striving to achieve long–term results", and adhering to the teaching philosophy of "thick foundation, wide caliber", and "students are the main body, and teachers are the leading role". Focusing on undergraduate education, the college has actively developed graduate education, highlighting engineering education, and cultivated a large number of outstanding talents.

HNUST– The School of Civil Engineering

Hunan University of Science & Technology (HNUST), which evolves from Northern Hunan Construction College founded in 1949, was established in 2003 by merging Xiangtan Institute of Technology and Xiangtan Normal University. HNUST is among the "'13th Five–Year Plan' National Basic Capacity Building Project of Hundred Universities in Central and Western Regions" as well as the "Domestic First–Class Universities" of Hunan Province. Made up of 20 schools, HNUST offers 94 undergraduate programs in eleven disciplines, 4 disciplines including Engineering and Chemistry ranking ESI's top 1% in the world, three post–doctoral research stations of First–Level Discipline, 8 First–Level disciplines for doctoral degrees, 30 First–Level disciplines offering master's degree, 17 professional master's degree authorization programs.

The School of Civil Engineering at Hunan University of Science and Technology was founded in 1988 as the Department of Architectural Engineering. In 1998, it merged with the Department of Resources Exploration and Urban Construction, and the Geotechnical Engineering major of the Department of Mining Engineering to form the Department of Civil Engineering. In 2003, it was renamed as the School of Civil Engineering at Hunan University of Science and Technology. The school consists of seven teaching departments: the Department of Architectural Engineering, the Department of Road and Bridge Engineering, the Department of Geotechnical and Urban Underground Engineering, the Department of Municipal Engineering, the Department of Engineering Mechanics, the Department of Engineering Management, and the Department of Building Environment and Energy Application Engineering.

The school currently has 1 specially–appointed academician and 155 full–time faculty members. Among them, there are 122 full–time teachers, 25 professors (including 5 second–level professors), 62 associate professors, and 107 teachers with doctoral degrees. The faculty includes 1 National Model Teacher, 1 Hunan Province "100 Talents Program" specially–appointed professor, 1 Hunan Province Furong Teaching Master, 1 leader of academic disciplines in Hunan Province ordinary universities, 2 candidates for the "121 Talent Project" in Hunan Province, 1 recipient of the Hunan Province Outstanding Youth Fund, 1 recipient of the Hunan Province Excellent Youth Fund, 1 Hunan Province Furong Youth Scholar.

The civil engineering discipline was rated as C+ in the fourth round of national discipline evaluation, and was selected as a "Double First–Class" construction discipline in Hunan Province in 2018, with the right to confer doctoral and master's degrees as well as professional master's degrees in civil and hydraulic engineering. From 2018 to 2022, the discipline ranked 49–43 in the ranking of subject majors by China's University and College Admission System (CUAC), steadily ranking in the top 30%. The College has an innovative experimental zone for high–quality application–oriented talent training in civil engineering at local universities, a Hunan Provincial School–Enterprise Cooperation Talent Training Base, a Hunan Provincial Science and Technology Innovation Team – Bridge and Tunnel Engineering Safety and Stability Research, a Hunan Provincial Higher Education "Civil Engineering Construction Technology Innovation" Industry–University–Research Cooperation Demonstration Base, and a Hunan Provincial Higher Education Graduate Production–Research–Education Training Base.

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