

Newsletter

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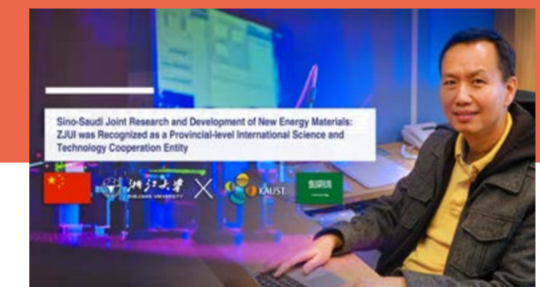


Sino-Saudi Joint Research and Development of New Energy Materials:

Our Institute was Recognized as a Provincial-level International Science and Technology Cooperation Entity

Date: 30/12/2021
Article: Stephanie Translator: JIANG, Junyue

On December 15, 2021, the Science Technology Department of Zhejiang Province announced the recognition of several International Science and Technology Cooperation Entities. The "Zhejiang-Saudi Joint Laboratory for Energy Materials" at ZJUI led by Associate Professor Ong Wee-Liat, was recognized as a Provincial-level International Joint Laboratory. This is the very first laboratory led by a mid-career faculty member at the Zhejiang University International Campus. This achievement serves as a booster for our faculty recruitment and development and heralds a new era for our young ZJUI institute, with our early and mid-career faculty members leading the way in international scientific research cooperation.



This provincial-level laboratory builds on the existing government-funded collaboration between Prof. Ong Wee Liat and Prof. Derya Baran at the King Abdullah University of Science and Technology (KAUST). It will also enhance the collaborative research strength of ZJUI and the International Research Center for Functional Polymers in energy materials research. Under the auspices of this new laboratory, the collaborating partners will deepen their cooperation in providing cutting-edge solutions for the research and development of new energy in China and Saudi Arabia. This laboratory will also assist Zhejiang Province in its innovation-driven development strategy by facilitating efficient scientific and technological exchanges between China and Saudi Arabia in the field of new energy.

Ong Wee-Liat joined ZJUI in 2018 as an Associate Professor and is currently the Acting Director for the Program in Engineering Sciences for Devices and Applied Materials. He received his B.Eng and M.Eng. degrees from the National University of Singapore and completed his Ph.D. degree from Carnegie Mellon University in 2015. Before his Ph.D., he worked at the Institute of Microelectronics (A*STAR, Singapore) in the field of bioMEMS and microfluidics. He was previously a joint post-doctoral fellow at Columbia University and Carnegie Mellon University. His current research interests include engineering thermo-physics (experimental and simulation), bioMEMS, and energy. He has published several articles in leading academic journals, including Nature Materials, Nano Letters, ACS Nano, Advanced Science, and Lab on Chip.

An International Joint Laboratory seeks to promote ground-breaking scientific research by building strong bilateral collaborations in strategic areas of common interest to China and other foreign nations.

ZJUer build a low carbon building in the Olympic Star City Zhangjiakou



universities around the world, gathered in Zhangjiakou, the Olympic Star City, to build green buildings to create a more environmentally friendly, smart, and dynamic future world, providing solutions from the energy and construction industries. The houses built by each team utilizes the new rural construction, Winter Olympic services, senior living, and rural cultural living as creative starting points, and combine technologies such as renewable energy utilization and near-zero energy consumption communities to complete localized design and construction of green buildings. These houses will also continue to be preserved as a demonstration facility in Zhangjiakou, as living labs of the National Renewable Energy Demonstrative Zone, and as models for regional sustainable development.

The Y-Team is a cross-disciplinary team composed of more than 100 members from three universities in different countries, dedicated to combining the best design and technology from China and the West, aiming to combine solar energy, energy-saving, and architectural design. They have designed and built a state-of-the-art solar house, showcasing the most advanced building technologies, control systems, and design strategies while promoting the concept of green, low-carbon and sustainable development.

The Y-team, including 10 ZJUI students, has been selected as one of the 15 finalists of Solar Decathlon China 2021. ZJUI Assistant Professor Cristoforo Demartino and Qiushi Distinguished Professor XIAO Yan are advised and in charge of the structure group of this team. The international partnership of Y-team comprises Xi'an Jiaotong-Liverpool University (Suzhou, Jiangsu, China), Thomas Jefferson University (Philadelphia, USA), and Zhejiang University-University of Illinois at Urbana Champaign Joint Institute (Haining, Zhejiang, China). As one of the 15 finalist teams, the Y-Team, together with teams from 10 countries and 29



Date: 07/02/2022 Article: YAN Xiaoyu Photo Credits: Y Project Wechat account



ZJUI Graduate LUO Chunzeng Won the Best Student Paper Award in PIERS 2021

Date: 03/12/2021 Article: JIN Yuting, LUO Chunzeng Photo Credits: JIN Yuting, LUO Chunzeng

On Nov 22, 2021, ZJUI graduate student LUO Chunzeng participated in the best student paper competition during the online 43rd international conference Progress In Electromagnetics Research Symposium in Hangzhou (PIERS 2021 Hangzhou), and won the third prize of the Best Student Paper Award for his paper "A Microwave Snow Water Equivalent Retrieval Framework Using Coupled Hydrological and Passive Microwave Radiative Transfer Models". In LUO's paper, a framework for multi-source data fusion combining theoretical modeling with physical observations is developed and characterized. The framework couples an advanced hydrological snow physical model with microwave scattering theories for snow remote sensing. The cross-disciplinary coupling is achieved through an ensemble Kalman filter approach to improve the accuracy of snow water equivalence retrieval. Its innovation and application value have been recognized by the committee.

The PIERS Symposium has held more than 40 sessions to date in Northern Ireland, Pasadena, Cambridge, Tokyo, and other locations. It is one of the most recognized academic conferences in this field. It provides an international communication platform for recent progress in electromagnetics, photonics and their applications. PIERS 2021 Hangzhou has attracted over 3,000 contributions.

LUO Chunzeng joined the Applied Electromagnetics and Information Science Lab in September 2020. Led by ZJUI Assistant Professor TAN Shurun, the lab is focused on electromagnetic wave interactions with various environments crossing multiple scales and the associated physical and informational effects. Main research areas include microwave remote sensing of the natural environment and intelligent electromagnetic ambient sensing, electromagnetic environment effects, security and reliability of critical infrastructures such as connected autonomous vehicles, scattering in wave-functional materials and devices such as metamaterials, metasurfaces and photonic crystals, electromagnetic integrity and integration of high-speed electronic systems including neuromorphic chips and in-memory computing devices, nanostructure scattering and characterization, optical random media scattering in optical sensing and photovoltaics.

The awarded paper was completed in cooperation with Dr. Do-Hyuk Kang, a snow hydrologist at NASA Goddard Space Flight Center and the University of Maryland. Besides its direct contribution to the snow remote sensing community, this work provides references to general asynchronous multi-source data fusion and coupling problems. It also promotes effective response to global challenges and issues through cross-disciplinary and international exchange and cooperation.

Professor Wee-Liat Ong's paper was recognized as "ESI Highly Cited Papers" on Web of Science

Date: 04/02/2022
Article: Prof.Ong's group

A 2020 review paper published by Associated Professor Wee-Liat Ong and his KAUST collaborators on "Halide perovskites: thermal transport and prospects for thermoelectricity" in Advanced Science was recently recognized as one of the "ESI Highly Cited Papers" on Web of Science. Highly Cited Papers are papers that gathered sufficient citations to place them in the top 1% of a particular academic field.

Advanced Science is an interdisciplinary journal covering fundamental and applied research in several areas including materials science, physics and chemistry, medical and life sciences, as well as engineering. Advanced Science has a 2020 Impact Factor of 16.806.

This paper summarizes the recent re-emergence of halide perovskites for optoelectronic applications. The multifunctional nature of halide perovskites has led to diverse applications other than photovoltaics. The ultralow thermal conductivity coupled with decent mobility and charge carrier tunability made it a contender for future thermoelectrics. This paper describes recent advances in the understanding of thermal transport in halide perovskites. The structural and compositional effects on phonon transport are analyzed. Understanding thermal transport is critical for devising effective heat dissipation schemes and determining other thermal-related properties like thermo-optic coefficients, hot-carrier cooling, and thermoelectric efficiency. Their potentials and challenges for thermoelectrics are also reviewed. Finally, strategies to overcome the limiting factors for creating good halide perovskite thermoelectrics are explored.



Date: 17/01/2022 Article: Stephanie Photo Credits: Interviewees

21' Undergraduates Published a Paper as First Authors in A Top Journal on Heat Transfer

Recently, two students (21' Electrical Engineering), LU Haofan and YU Yi, published their paper "Deep learning techniques elucidate and modify the shape factor to extend the effective medium theory beyond its original formulation" in the International Journal of Heat and Mass Transfer under the supervision of ZJUI Associate Professor Weeliat Ong. Their paper proposes a universal optimization method based on neural networks, which realizes the rapid estimation of the thermal conductivity of composite materials with new particle shapes and expands the application range of the original effective medium theories (EMTs).

There are two widely-used methods for approximating the thermal conductivity of composite materials - one is the Analytical EMT Model, the other is the Finite Element Model. They both have advantages and disadvantages- while it is faster to use the Analytical EMT Model, a re-derivation is required for a new particle shapes and the Finite Element Model requires much time and computing resources.

In this regard, the two students were inspired by the transfer learning of neural networks. They applied the known EMT

First International Competition on Modern Bamboo Structure Building Design kicked off

Date: 23/01/2022 Article: James Qi

The First International Competition on Modern Bamboo Structure Building Design closed its registration on January 15, 2022. The competition is organized by ZJUI, Zhejiang University (Ninghai) Joint Research Center for Bio-Based Materials and Carbon Neutral Development, China Wood Protection Industry Association, the American society of civil engineers ASCE Engineered Bamboo Structures task committee. More than 200 teams from 100 universities around the world, and nearly 1,000 participants successfully registered in the competition. International teams include the University of Illinois, University of British Columbia, Imperial College London, University College London, University of Auckland, Deakin University, National University of Singapore, Nanyang Technological University, and Addis Ababa University, Ethiopia. Close to 80 domestic universities are invited, including ZJU, Southeast University, Tianjin University, Tongji University, China Academy of Art, Central Academy of Fine Arts, University of Macau.



This competition is planned and organized by Prof. Y. Xiao, Qiushi distinguished professor of Zhejiang University. Three academicians of The Chinese Academy of Engineering serve as consultants and an academic committee of several internationally well-known experts in architecture, structure, environment, forestry and materials science will help to evaluate the submitted work. It is also supported by the Sustainable Development Action Plan of ZJU and the International Association of Universities (IAU).



ZJU-UIUC Forum was held successfully

Date: 10/01/2022 Article: Stephanie Translator: TANG, Feiyu Photo Credits: Gaoxingjiuhao Studio

University's Sustainability Action Plan" (Z4G). This forum invited 32 experts from academy and industry to give speeches, including Prof. Spencer from UIUC, also a Foreign Member of the Chinese Academy of Engineering, Prof. K.C. Ting, former Department Head at Department of Agricultural and Biological Engineering at UIUC, Prof. GAO Changyuo, fellow of the American Institute for Medical and Biological Engineering (AIMBE), ZINSIGHT CEO SHI Jingkui, Hang Zhou Cai Decided Technology Co., Ltd. CEO, CHEN Yusen, Flexiv Ltd. Business Partners WANG Jingfan. University scholars and industry elites from UIUC, Cambridge University, Carnegie Mellon University, Columbia University, Zhejiang University, Hunan University shared their new opinions, new technologies and new results from different angles. The atmosphere of the forum was warm and intriguing.

After the Forum, Assistant Professor WANG Gaoang who won Excellent Academic Prize in this Annual Academic Conference said "The Annual Academic Conference was a multi-disciplinary academic feast, where attendees can learn about frontier development of different disciplines. Plus, interactions among scholars from different background will spur technological innovation. Presentations in the Sub Forum came from outstanding scholars from home and abroad and provided a platform for industry-university-research interaction, which is beneficial to research transformation."



"Presentations in the Sub Forum were wonderful! In the Engineering Sciences for Devices and Applied Materials session, I learned about frontier research of Random meta materials for efficient daytime radiative cooling, and Silicon photonic devices, which are closely related to my research area. Thanks to the popularization of science in this conference, I have a deeper understanding of the development of this area as well as frontier theories and applications." WANG Can, Master student of Electronic and Information said, "The culture of the International Campus is open and tolerant, and the most attractive one is cross-disciplinary, like the integration of biology and computer, integration of material and computer, integration of transportation and computer. Since different disciplines see problems differently, the integration of different subjects will absolutely form sparks of inspiration. At ZJU, researchers can analyze problems exhaustively from different angles because of cross-disciplinary, which drives academic progress."

LI Haoyu, Master student of Mechanical Engineering shared some of the interesting opinions that he heard in the conference, "For instance, 'estimate the digitalization of modern people through the usage of cellphone battery', 'real world is like the world that uses computer rules', 'Schrodinger's cat is very similar to the virtual world since we will never know where the item will appear until we enter into a new scene.' Novel ideas from guests brought him inspiration and thoughts. And more importantly, thanks to the Annual Academic Conference, he learned many new areas that he never met before, which made him look forward to his future life in this multi-disciplinary-focus campus where he can foster new wisdom and conduct innovative multi-disciplinary research."

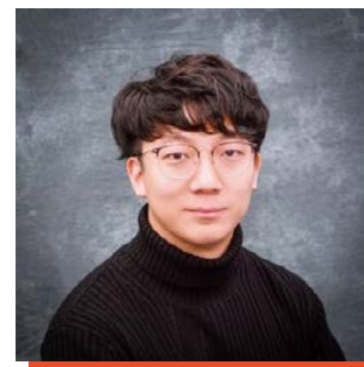


ZJU-ZINSIGHT Research & Development Center for SiC Application Technologies Unveiling Ceremony was held

ZJU-ZINSIGHT Research & Development Center for SiC Application Technologies Unveiling Ceremony was also successfully held in the main forum of the 2nd Annual Academic Conference, adding one more joint research center to ZJU. Under the background of the goal of peaking carbon emissions before 2030 and realizing carbon neutrality before 2060, the ZJU-Zinsight Research & Development Center for SiC Application Technologies facing the trend of wide bandgap based power conversion technology, aims to develop novel silicon carbide power semiconductor devices and their applications.

On January 8th, the Annual Academic Conference of the International Campus, Zhejiang University and Academic Forum of World-Class Universities was successfully held. This annual conference was organized online and offline by the International Campus, Zhejiang University, together with about 10 world-class universities and academic institutions like University of Edinburgh, University of Illinois at Urbana-Champaign, National University of Singapore, and Australian National University. The morning Main Forum and the afternoon Sub Forum were inspiring, offering a feast for audiences where they can enjoy sparks collided by different disciplines.

At the Main Forum, Prof. HE Lianzhen, Vice President of Zhejiang University, Secretary of the CPC of International Campus, ZJU(IC) delivered a welcome speech. Prof. OUYANG Hongwei, Dean of the IC, made an Annual Academic Report of the IC. Mr. CAO Guoliang, Secretary of CPC of Haining attended the Forum. Prof. TAN Weihong, Dean of Molecular Medical College, Hangzhou Institute for Advanced Study and also Fellow of Chinese Academy of Sciences, Prof. HUANG Yiping, Vice Dean of the National School of Development in Peking University, Prof. HONG Minghui, professor from the National University of Singapore and also Fellow of Academy of Engineering Singapore, delivered their own Keynote Speech during the Main Forum. The Main Forum was chaired by Prof. LI Erping, Vice Dean of International Campus. This year marked the 20th anniversary of the partnership between Zhejiang University and University of Illinois at Urbana-Champaign. On this special occasion, ZJU-UIUC Forum (Engineering+) was co-organized by Zhejiang University and University of Illinois at Urbana Champaign at Lecture Theatre West of the International Campus. Aimed at integrating multi disciplines to enhance innovative ability and to build better future, ZJU-UIUC Forum included 3 sessions, Energy, Environment, and Sustainable Systems Sciences (session 1), Engineering Sciences for Devices and Applied Materials (session 2), and Information and Data Sciences (session 3), which was a positive correspondence to the "Zhejiang



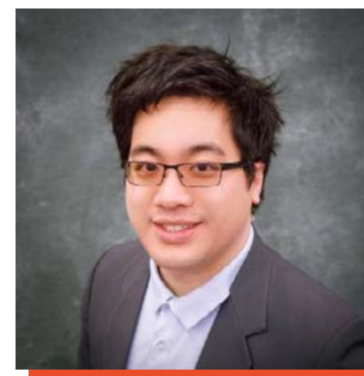
Meng ZHANG

Assistant Professor

Dr. Meng Zhang joined ZJU as a tenure-track assistant professor in January 2022. His research interests are wireless and computer networks, optimization for intelligent networks, edge intelligence, and decentralized machine learning. Specific topics include timely communications and computation, privacy protection for real-time data, network and data economics, etc. Meng Zhang received his Ph.D. degree from the Chinese University of Hong Kong in 2019, and his B. Eng. degree from South China University of Technology. He has been a Post-doctoral Fellow with Northwestern University for two years. During his doctoral study, he served as a visiting student research collaborator with Princeton University. He is a recipient of the IEEE/IFIP WiOpt Best Paper Award in 2021. He has been serving as the reviewer for top journals and conferences, including IEEE/

ACM ToN, IEEE TMC, IEEE JSAC, IEEE TWC, IEEE INFOCOM, WiOpt.

Research Interests: wireless and computer networks, optimization for intelligent networks, edge intelligence, and decentralized machine learning

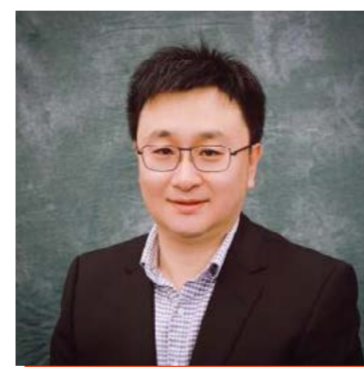


Timothy Haw-Yu LEE

Assistant Professor

Dr. Timothy Lee has been working on the development of green fuels since 2013, when he began his studies on the blending of biomass fuels with diesel to enhance combustion and reduce the need for fossil fuels. After graduating in December 2019, he began to work as a lecturer in both the Department of Agricultural and Biological Engineering and Department of Mechanical Science and Engineering at the University of Illinois at Urbana-Champaign, while continuing his research on biofuels. In 2022, Dr. Lee joined ZJU as an Assistant Professor. His research areas include the development and preparation of waste-based fuels, the life cycle analysis of biofuels, the exploration of new energy production methods, and novel manufacturing methods. His approach to research utilizes computational machine learning and experimental optical laser diagnostics in tandem to produce accurate models for the optimization of engines and combustion.

Research Interests: Combustion, Biofuels, Waste to Energy, Internal Combustion Engines, Diesel, Gasoline



Ruisheng DIAO

Associate Professor

Dr. Ruisheng Diao obtained his B.S. in Electrical Engineering from Zhejiang University in 2004, M.S. degree in Electric Power Systems & Automation from Zhejiang University in 2006 (Advisor: Prof. Zheng Xu, IEEE Fellow), and Ph.D. degree in Electrical Engineering from Arizona State University in 2009 (Advisor: Prof. Vijay Vittal, Member of the U.S. National Academy of Engineering, IEEE Fellow). His research areas include high-fidelity power system modeling, simulation and analysis, application of HPC, optimization and control and artificial intelligence in power systems. He served as a team lead, Advanced Grid Analytics, and a deputy program manager at the Pacific Northwest National Laboratory (affiliated with the U.S. Department of Energy) from July 2009 to May 2018 (funding level: \$2-3M/year). Then, he joined GEIRI North America as Deputy Department Head, AI&System Analytics, and the Principal Investigator of developing AI-related technologies for power systems. He led and participated more than 30 R&D projects funded by the U.S. Department of Energy, multiple U.S. Power Companies and the State Grid Corporation of China, with a total funding level of approximately \$30,000,000. He published around 100 SCI/EI indexed peer-reviewed articles, 1 book chapter, filed 19 patent applications (including 13 U.S. patents, 2 of which were granted by USPTO), and owned multiple software copyrights. Prof. Diao is the recipient of the 2018 R&D 100 Awards (one of the 100 most technologically significant new products of the year in software/services), 3 IEEE PES best paper awards (2017-2019, including 1 IEEE PES conference prize paper award), the MPCE Best Paper Award as well as the U.S. DOE PNNL Outstanding Performance Award (5 times). His team won the Championship of the 2019 Learn to Run Power Network (L2RPN) Global Power AI Competition. Prof. Diao is a senior member of IEEE, a registered professional engineer (PE) at Washington State, USA and serves as a R&D project reviewer for the U.S. DOE and power companies. He is on the editorial board for multiple top journals in power systems, including IEEE Transactions on Power Systems, IEEE Access, IET Generation, Transmission&Distribution, and International Journal of Numerical Modelling. Multiple research prototypes developed by Prof. Diao's team were commercialized by vendors, which are now widely used by power companies in North America and China.

Research Interests: Power system security and stability; power grid modeling, simulation and analysis; application of HPC and Artificial Intelligence; planning, operation and control of new-style power system

Paper of sophomores was accepted by the 25th IEEE CSCWD International Conference

Date:16/02/2022 Article: Group of Prof. WANG Photo Credits: Group of Prof. WANG

Recently, the paper "Representation and Extraction of Physics Knowledge Based on Knowledge Graph and Embedding-Combined Text Classification for Cooperative Learning" co-first authored by SHANG Jialin, HUANG Jingyuan and ZENG Shihua, undergraduates of class of 2024, majoring in computer engineering, were accepted by the 25th IEEE CSCWD International Conference. The conference is one of the most important international conferences in the field of collaborative computing, and it is also a key conference recommended by CCF of China computer society.

It is worth mentioning that the main work of the paper was completed by three students in their second semester of freshman year, and the following summer vacation. It is an important achievement of their freshman scientific research and training project (SRTP) "Research on Intelligent Evaluation System Of Subject Knowledge Level Based On Knowledge Graph". The project is jointly guided by ZJU Professor WANG Hongwei and Professor Wang's Research Assistant ZHANG Jian. This paper builds an embedded layer combined neural network for high school knowledge text classification, and adds the classification results to the knowledge graph for combing knowledge and visualizing the output of knowledge, which improves the efficiency of neural network for physical knowledge text classification, and realizes the data and systematic management and integration of high school physical knowledge by using neural network system and knowledge graph. It expands the application scope of knowledge atlas and neural network collaborative learning, as well as the application scope of neural network in word embedding and text classification.

The intelligent system for systematic management and integration of high school physics knowledge proposed by the project aims to solve two major problems existing in current Chinese high school education: one is the problem of online learning resources for Chinese high school students. At present, the types of online learning resources for senior high school students are complex and the quality is uneven. They are often difficult for high school students to select coursework. They may waste time and energy in screening resources, resulting in low learning efficiency; Second, the traditional teaching in senior high school is not personalized and needs to be targeted. Because there are great differences between students' knowledge level and learning progress, it is usually difficult for teachers to make an overall plan. HUANG Jingyuan, SHANG Jialin and ZENG Shihua put forward the idea of better integrating the traditional education industry with information technology, which is conducive to the systematic evaluation of students' subject knowledge and ability level, and also provides many conveniences for teachers to master and analyze students' learning more efficiently. At the same time, it enriches the ways students obtain learning resources, so that students (especially students in areas with relatively scarce educational resources) can obtain many rich learning resources online that they could not obtain before. Through this project, the three students hope to optimize high school education resources, help high school students formulate learning strategies scientifically, help middle school teachers provide more personalized guidance, use the scientific and technological dividends of the information age to reduce the burden on teachers, and use computer-based collaborative learning to serve the education industry.

