CMSE 2025

The 14th Global Conference on Materials Science and Engineering

October 16-19, 2025 | Xi'an, Shaanxi, China

Conference Program

Organizer

NORTHWESTERN POLYTECHNICAL UNIVERSITY

Table of Content

Part I Conference Organization

Conference General Chair

Tingkai Zhao

Professor, School of Materials Science and Engineering, Northwestern Polytechnical University, China
Director, NPU-NCP Joint International Research Center on Advanced Nanomaterials & Defects Engineering, China
Director, Shaanxi Engineering Laboratory for Graphene New Carbon Materials and Applications, China

International Scientific Committee

Prof. Ali Zaidi, Laghouat University, Algeria
Prof. Chin-hua Chia, Universiti Kebangsaan Malaysia, Malaysia
Prof. Henryk Paul, Institute of Metallurgy and Materials Science, PAS, Poland
Prof. Ignazio Blanco, University of Catania, Italy
Prof. Ioan Pepenar, Research Institute for Construction and Technology – ICECON S.A, Romania
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Prof. Osman Adiguzel, Firat University, Turkey
Prof. Paulo César DE MORAIS, Catholic University of Brasília / University of Brasília, Brazil
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Prof. Soner Cubuk, Marmara University, Turkey
Prof. Stefan Segla, Technical University of Kosice, Slovakia
Assoc. Prof. Luís F. A. Bernardo, University of Beira Interior, Portugal
Assoc. Prof. Muhammad Akram Chaudhry, Government of the Punjab, Pakistan
Dr. Alexander Khotsianovsky, Pisarenko Institute of Problems of Strength, NASU, Ukraine
Dr. Azman Ismail, Universiti Kuala Lumpur, Malaysia
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Dr. Boutheina Ben Fraj, Research and Technology Center of Energy (CRTEn), Tunisia
Dr. Enrico Zacchei, Itecons, Portugal
Dr. Erik Vargas Rojas, Metropolitan Technological University, Mexico
Dr. Eslam Syala, Alexandria University, Egypt
Dr. Laszlo Peter Kiss, University of Miskolc, Hungary
Dr. Liyuan Sheng, Peking University Shenzhen Institute, China
Dr. N. Ethiraj, Dr.M.G.R Educational and Research Institute - University, India
Dr. Nikolai Boshkov, Department "Electrochemistry and Corrosion", BAS, Bulgaria
Dr. Qiang Xu, University of Huddersfield, UK

Part II Conference Program Summary

Thursday October 16, 2025

Time	Session
14:00-19:00	Registration

Friday October 17, 2025

Time	Session
08:30-08:40	Welcome Speech
08:40-09:20	Keynote Speech 1
09:20-10:00	Keynote Speech 2
10:00-10:40	Group Photo Poster Session Coffee Break
10:40-11:20	Keynote Speech 3
11:20-12:00	Keynote Speech 4
12:00-12:40	Keynote Speech 5
12:40-14:00	Lunch Break
14:00-14:40	Keynote Speech 6
14:40-17:50	Parallel Oral Session 1
14:50-17:45	Parallel Oral Session 2
18:30-20:00	Welcome Banquet

Saturday October 18, 2025

Time	Session
08:30-12:15	Oral Session 3
12:15-14:00	Lunch Break
14:00-18:15	Oral Session 4

Sunday October 19, 2025

Time	Session
08:30-17:00	Field Visit

Part III Conference Program in Detail

DAY 1 | October 16, 2025

Location: Lobby of Xi'an Guangcheng Hotel

14:00-19:00	**Registration**

Note for on-site registration:

* Please let us know your name or abstract / paper number for registration.
* Please pick up all the conference materials at the registration desk (Name Card, Conference Program, Dining Tickets, Tour ticket etc.).

DAY 2 | October 17, 2025

Opening Speech & Morning Keynote Session

Location: Conference Room 1, 2nd floor

Host: Prof. Tingkai Zhao, Northwestern Polytechnical University, China

08:30-08:40	**Opening & Welcome Speech** **Prof. Tingkai Zhao,** Northwestern Polytechnical University, China
08:40-09:20	**Keynote Speech 1:** Microstructural evolution, phase transformations, and mechanical characterization of multilayered metallic composites for advanced applications **Prof. Henryk Paul,** Institute of Metallurgy and Materials Science, Polish Academy of Sciences, Poland
09:20-10:00	**Keynote Speech 2:** Ceramic membranes: pioneering a new era in water treatment technologies **Prof. Tahar Laoui,** University of Sharjah, The United Arab Emirates
10:00-10:40	**Group Photo** **Poster Session** **Coffee Break**
10:40-11:20	**Keynote Speech 3:** Composition design and validation of Au–Pt alloys with ultra-low magnetic susceptibility: insights from first-principles and experiments **Prof. Yanli Lu,** Northwestern Polytechnical University, China
11:20-12:00	**Keynote Speech 4:** The crystallization behavior of polypropylene films regulated by polar groups significantly improves energy storage performance **Prof. Zhicheng Zhang**, Xi'an Jiaotong University, China
12:00-12:40	**Keynote Speech 5:** Polarization regulation strategies in relaxor ferroelectric ceramics for enhanced energy storage performance **Prof. Li Jin,** Xi'an Jiaotong University, China

List of Poster Presentations

CMSE5221: Controlled surface texturing of dental implants via Q-switched Nd:YAG laser: toward enhanced osseointegration

Prof. Jin-Woo Kim, Chosun University, Republic of Korea

CMSE5238: Optimization of the cathode gas distribution for uniform PVD tool coating: a study based on flow field simulation and experimental verification

Dr. Zhao Jiang, Lanzhou Institute of Physics, China

CMSE5253: Enhancing tribomechanical properties of magnesium alloys with Yttria stabilized zirconia PEO coatings

Dr. Md Ariful Islam, Xi'an Jiaotong University, China

CMSE5275: Compressive behavior of AlSi12 aluminum foam-core sandwich panels elaborated by investment casting and 3D printing

Dr. Andres G. González-Hernández, Universidad Industrial de Santander (UIS), Colombia

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CMSE5279: Study on the cracking causes of tank container for dangerous chemicals transportation

Dr. Liuyi Huang, Zhejiang Academy of Special Equipment Science, China

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CMSE5280: Silver nano-prisms synthesis in acetate system via electrosynthesis-chemical reduction: application as colorimetric detection

PhD Chenyi Zheng, Central South University, China

CMSE5283: Effect of the plasma gas type on the surface characteristics of 3Y-TZP ceramic

Prof. Hee-Kyung Kim, Ajou University School of Medicine, Republic of Korea

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CMSE5289: Effect of short aramid fibers with resin pre-coating (RPC) technique on the strength of steel adhesive joints

PhD Chenyu Liu, Chang'an University, China

CMSE5293: Investigations on the pore structure of cement mortar with micronized natural zeolite

Prof. Ionut-Ovidiu TOMA, "Gheorghe Asachi" Technical University of Iasi, Romania

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CMSE5296: Design and analysis of an ultra-high sensitivity microwave antenna sensor for advanced liquid sensing applications

Dr. Xingyun Zhang, National Key Laboratory of Scattering and Radiation, China

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CMSE5324: Microstructural and mechanical characterization of Al–Ti composites produced by explosive welding and accumulative roll bonding with emphasis on Al_3Ti phase evolution

Dr. Sandra Puchlerska, AGH University of Science and Technology, Poland

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CMSE5329: Droplet friction on single-crystal copper

Ms. Hongmin Zhang, Karlsruhe Institute of Technology, Germany

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CMSE5334: Uncovering the microstructural and precipitates behavior of the friction stir processed AA6xxx sheet

Dr. Aman Gupta, Sunchon National University, Republic of Korea

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	CMSE5342: Spin relaxation dynamics in S = 1/2 ruthenium(III) complexes **Prof. Raúl Chiozzone**, Universidad de la República, Uruguay
	CMSE5346: Research on high-precision measurement technology for Chaff near-field outdoor based on region identification **Mr. Qunting Ren,** National Key Laboratory of Scattering and Radiation, China
	CMSE5347: Research on an AE sensor for PD measurement using lead-free piezoelectric materials **Dr. Insung Kim**, Korea Electrotechnology Research Institute (KERI), Republic of Korea
	CMSE5348: Research on the high-temperature compression mechanical properties of powder-metallurgical Ti-15Al-24Nb and Ti-22Al-14Nb alloys **Mr. Yuhao Jiang,** Ningbo Branch of China Academy of Ordnance Science, China
	CMSE5360: Biomaterial library from microalgae for resilient biophotovoltaic devices **Prof. Eun Yu Kim**, Duke Kunshan University, China
	CMSE5372: Preparation and crack damage study of modified iron-based amorphous coatings for shield machine heavy-load gears **Dr. Xinsheng Wang,** Zhengzhou University of Light Industry, China
	CMSE5373: Analysis of structural and antenna mode scattering based on active antennas **Ms. Fang Liu**, National Key Laboratory of Scattering and Radiation, China
12:40-14:00	**Lunch Break** - *Cafeteria, 1st Floor*
Location: Conference Room 1, 2nd floor **Session Chair: Prof. Marek Sikorski,** Adam Mickiewicz University, Poland	
14:00-14:40	**Keynote Speech 6:** 3D-printed multifunctional TPU/ANF/CNT composite foams with synergistic energy absorption and real-time pressure sensing for smart protective **Prof. Xuetao Shi**, Northwestern Polytechnical University, China
Parallel Oral Session 1: Functional Materials for Energy and Environmental Applications	
14:40-15:00	**Invited Speech CMSE5355:** CVD grown edge-rich graphene for EMW suppression and other applications **Prof. Qiang Song,** Northwestern Polytechnical University, China
15:00-15:20	**Invited Speech CMSE5233:** Designing next-generation flavin photocatalysts: overcoming challenges for sustainable organic transformations **Prof. Marek Sikorski,** Adam Mickiewicz University, Poland
15:20-15:40	**Invited Speech CMSE5371:** Molecular design and interface regulation of anode materials towards high-performance sodium batteries **Prof. Fei Xu,** Northwestern Polytechnical University, China
15:40-15:55	**CMSE5247:** Thermal performance enhancement of metallic foam–PCM-integrated heat sinks for electronics cooling applications: An experimental study **Mr. Wei Wang,** Kyungpook National University, Republic of Korea
15:55-16:10	**CMSE5255:** Adjustable dual temperature-sensitive hydrogel for synchronous temperature/strain perception bimodal sensors **PhD Fengjin Xie,** Shandong Institute of Petroleum and Chemical Technology, China

16:10-16:30	**Coffee Break**
16:30-16:50	**Invited Speech CMSE5369:** Controlling solid-liquid interfacial energy anisotropy through the isotropic liquid **Prof. Lei Wang,** Northwestern Polytechnical University, China
16:50-17:05	**CMSE5269:** Multiscale modeling damage study and shape recovery force analysis of GO-CF/EP composites **Mr. Yuyang Zhang,** Xi'an University of Architecture and Technology, China
17:05-17:20	**CMSE5327:** An operando insight into deactivation mechanisms of Pt/TiO_2 by VOCs in sintering flue gas during CO oxidation **Dr. Kailin He,** Zhongye Changtian International Engineering Co., Ltd., China
17:20-17:35	**CMSE5264:** O_2 nanobubbles: a new approach for arsenic (III) oxidation and removal in artificial mine wastewater **Dr. Zhenyao Han,** Shandong Institute of Petroleum and Chemical Technology, China
17:35-17:50	**CMSE5234:** Experimental study on application of polyurea coating for concrete dams in cold regions **Dr. Xiulin Li,** Xinjiang Water Resources Development Investment (Group) Co., Ltd., China

Parallel Oral Session 2: Biomaterials and Biomedical Applications

Location: Conference Room 8, 2nd floor

Session Chair: Prof. Levent Trabzon, Istanbul Technical University, Turkey

14:50-15:10	**Invited Speech CMSE5272:** Graphene based flexible sensor and applications **Prof. Levent Trabzon,** Istanbul Technical University, Turkey
15:10-15:25	**CMSE5281:** Preparation of TiNi shape memory alloys reinforced with CNTs for biomedical applications by powder technology **Assoc. Prof. Ayman Elsayed,** Central Metallurgical Research and Development Institute, Egypt
15:25-15:40	**CMSE5262:** Investigation of Al/Cu wetting system: a molecular dynamics study **Dr. Shan Lyu,** Technical University of Clausthal, Germany
15:40-15:55	**CMSE5310:** Microstructural refinement and intermetallic strengthening in Zn–Mn biodegradable alloys **Dr. Mohd Zamri Bin Mohd Yusop,** Universiti Teknologi Malaysia, Malaysia
15:55-16:10	**CMSE5328:** Parametric study on the effect of compaction time on Zn-0.8Mn/0.1CNF biodegradable composites fabricated by powder metallurgy **Dr. Muhammad Hanif Ramlee,** Universiti Teknologi Malaysia, Malaysia
16:10-16:30	**Coffee Break**
16:30-16:45	**CMSE5274:** The immobilization of enzymes on electrospun nanofibers for the fabrication of bioactive membranes as tools in microplastic sample preparation and analysis **Dr. Guoqiang Li,** Poznan University of Technology, Poland

16:45-17:00	**CMSE5314:** Nanofibers identification of co-electrospun polyurethane/chitosan and polyvinyl alcohol/elastin membranes **Assoc. Prof. Syafiqah Saidin,** Universiti Teknologi Malaysia, Malaysia
17:00-17:15	**CMSE5260:** Preparation and characterization of hydroxyapatite reinforced polymer composites for biomedical applications **Dr. Marwa Eid Abdel Aziz Mohamed,** Central Metallurgical Research and Development Institute, Egypt
17:15-17:30	**CMSE5290:** Fundamental investigations of sinterability of novel bioresorbable Mg-Sr-Ca implants **PhD Ava Azadi,** University College Dublin, Ireland
17:30-17:45	**CMSE5330:** Additive incorporation for improving the antibacterial efficacy of boron-activated mesoporous bioactive glass **Assoc. Prof. Ezza Syuhada Sazali,** Universiti Teknologi Malaysia, Malaysia
18:30-20:00	**Welcome Banquet** *- Conference Room 8, 2nd floor*

DAY 3 | October 18, 2025

Location: Conference Room 2, 3rd floor

Oral Session 3: Structural Materials and Their Mechanical Performance

Session Chairs: Prof. Nader Asnafi, Luleå University of Technology, Sweden
Dr. Xiaobin Lü, China Institute of Water Resources and Hydropower Research, China

08:30-08:50	**Invited Speech CMSE5223:** Rolling-sliding contact fatigue of carbonitrided SCM420 steel **Prof. Osamu Umezawa**, Yokohama National University, Japan
08:50-09:10	**Invited Speech CMSE5286:** Metal additive manufacturing of production tools, dies, and molds **Prof. Nader Asnafi**, Luleå University of Technology, Sweden / Zhejiang Chuangge Technology Co. Ltd., China
09:10-09:25	**CMSE5319:** Evolution of localized plastic deformation in thermally treated Zn-Mn alloys **Dr. Kar Fei Chan**, Universiti Teknologi Malaysia, Malaysia
09:25-09:40	**CMSE5345:** Influence of peening-induced roughness and residual stress on rolling contact fatigue of 18CrNiMo gear rollers **Dr. Hsin Shen Ho**, Zhengzhou University, China
09:40-09:55	**CMSE5232:** Study on the effect of heat treatment on the mechanical properties of die forged AZ61+xRE Mg alloy **Dr. Fenghong Cao**, Chengdu Technological University, China
09:55-10:10	**CMSE5259:** Environmental stress cracking in welded Polycarbonate – a predictive approach **Assoc. Prof. Leyu Lin**, Rheinland-Pfälzische Technische Universität Kaiserslautern-Landau, Germany

10:10-10:25	**CMSE5278:** Research on the impact of temperature environment on the mechanical properties of 304 stainless steel **Mr. Xiangdong Fang**, Anhui Science and Technology University, China
10:25-10:45	**Coffee Break**
10:45-11:00	**CMSE5212:** Research on sensitivity of concrete thermodynamic parameters to thermal stress in diversion tunnel lining **Dr. Shifa Xia**, China Institute of Water Resources and Hydropower Research, China
11:00-11:15	**CMSE5299:** Evaluation of mechanical properties and durability of normal weight concrete incorporating rice husk ash **Dr. Jin Chai Lee**, UCSI University KL Campus, Malaysia
11:15-11:30	**CMSE5367:** Recent development on timber beam strengthening using FRP rods **Dr. Muhammad Aslam**, Wenzhou University of Technology, China
11:30-11:45	**CMSE5301:** Evaluation of mechanical properties and durability of normal weight concrete incorporating lightweight expanded clay aggregate **Dr. Wei Chek Moon**, UCSI University KL Campus, Malaysia
11:45-12:00	**CMSE5370:** Modern applications of clay-based materials in sustainable construction: from China perspective **Dr. Yong Jin,** Wenzhou University of Technology, China
12:00-12:15	**CMSE5374:** Study of thermal-insulation material production technology **Dr. Meiirbekov Mohammed**, JSC "National Center of Space Research and Technology", Kazakhstan
12:15-14:00	**Lunch Break** *- Cafeteria, 1st Floor*

Oral Session 4: Synthesis and Characterization of Advanced Materials

Session Chairs: Prof. Aurelian Marcu, National Institute for Laser Plasma and Radiation Physics, Romania
Prof. Honglae Sohn, Chosun University, Republic of Korea

14:00-14:20	**Invited Speech CMSE5352:** Electric field - induced optical effects in AlN thin films for transparent electronic interfaces **Prof. Jangyong Kim,** Xi'an Jiaotong-Liverpool University, China
14:20-14:40	**Invited Speech CMSE5240:** Design of hierarchical metamaterials based on TPMS **Prof. Massimo Cuomo,** University of Catania, Italy
14:40-15:00	**Invited Speech CMSE5335:** Scalable synthesis of water-soluble silicon quantum dots by one-pot **Prof. Honglae Sohn,** Chosun University, Republic of Korea
15:00-15:15	**CMSE5273:** Atomistic simulations of the shock and spall behavior of the refractory high-entropy alloy HfNbTaTiZr **Dr. Daniel Thürmer,** Clausthal University of Technology, Germany
15:15-15:30	**CMSE5265:** Microwave resonant characterization of thin films deposited on a dielectric substrate **Prof. Bartlomiej Salski,** Warsaw University of Technology, Poland

15:30-15:45	**CMSE5267:** The effects of PZT polarities on the dynamics response of an electrostatically actuated curved microbeam **Assoc. Prof. Ayman Alneamy,** Jazan University, Saudi Arabia
15:45-16:00	**CMSE5282:** Q-choked split cylinder resonators for precise characterization of ultra-thin and thick dielectrics **Dr. Marzena Olszewska-Placha,** QWED So. z o.o.Warsaw, Poland
16:00-16:20	**Coffee Break**
16:20-16:40	**Invited Speech CMSE5228:** Nanostructured surfaces for laser particle acceleration **Prof. Aurelian Marcu,** National Institute for Laser Plasma and Radiation Physics, Romania
16:40-17:00	**Invited Speech CMSE5357:** From stoichiometric Mn_3Sn to hetero-kagome $Zr_3Mn_3Sn_4Ga$: emerging magnetism in kagome lattices **Prof. Keeseong Park,** Daegu Geonbuk Institute of Science and Technology, Republic of Korea
17:00-17:15	**CMSE5302:** In-situ formation of silicon carbide–alumina composites via carbothermal reduction of kaolinite **Dr. Heba. H. Ali,** Central Metallurgical Research & Development Institute (CMRDI), Egypt
17:15-17:30	**CMSE5344:** Vertically aligned carbon nanostructures: from electrode architecture to functional performance in electrochemistry and sensing **Dr. Eser Metin Akinoglu,** South China Normal University, China
17:30-17:45	**CMSE5263:** An efficient cerium dioxide incorporated nickel cobalt phosphide complex as electrocatalyst for all-pH hydrogen evolution reaction and overall water splitting **Dr. Dongxiao Li,** Shandong Institute of Petroleum and Chemical Technology, China
17:45-18:00	**CMSE5343:** Rheological and printability study of talc-MgO ceramic ink for 3D printing **Dr. Wei Hong Yeo,** Universiti Tunku Abdul Rahman, Malaysia
18:00-18:15	**CMSE5306:** Optimized parameters for the synthesis of high-quality single-walled carbon nanotubes (SWCNTs) **Ms. Atia Khalid,** Tsinghua University, China

DAY 4 | October 19, 2025

08:30-17:00	**Field Visit**

Note: Gathering at Lobby of Xi'an Guangcheng Hotel at 08:20.
Please present your Tour Ticket when boarding the tour bus & make sure to bring your passport (for international attendees) or Chinese ID card (for Chinese attendees) with you.

Part IV Featured Speakers

Keynote Speakers

KEYNOTE SPEAKER: Prof. Henryk Paul
Institute of Metallurgy and Materials Science
Polish Academy of Sciences, Poland

Keynote Speech 1

October 17, 2025
Time: 08:40-09:20
Speech Title: Microstructural evolution, phase transformations, and mechanical characterization of multilayered metallic composites for advanced applications

Abstract. New strategies in the development of metallic composites for advanced structural applications involve the synthesis of bulk materials. Multilayered systems with metallurgical bonding, consisting of two alternating layers of different metals, represent a notable example of such materials. In many cases, the high density of interfaces between layers has a beneficial impact on the overall properties of the composite materials. This effect creates both opportunities and challenges for technological applications, particularly concerning the mechanical response of the material and its ability to shield electromagnetic fields. Since interfaces govern the properties of nano-/micro- composite plates, the evolution of microstructure during the deformation of individual layers and the role of interfaces in composite strengthening remain topics of significant interest.

The aim of this research program was to develop and conduct a detailed structural analysis of multilayered composite materials based on combinations of metals that: (i) form and (ii) do not form intermetallic phases in the solid state. In both systems, local melting and rapid solidification near the interfaces resulted in regions composed of phases with highly varied chemical compositions and structures. The multilayer plates were produced via single-shot explosive welding (EXW). The evolution of the microstructure and phase transformations at all stages of deformation and heat treatment were analysed using advanced scanning (SEM) and transmission (TEM) electron microscopy techniques. These morphological analyses were correlated with phase transformation studies using synchrotron X-ray radiation and mechanical property evaluations via shear strength and micro-/nano- hardness measurements.

In the first group of metal compositions (forming intermetallic phases), this study investigates transformations occurring at the bonding zones of AZ31/AA1050 and Ti (Grade 1)/AA1050 multilayer plates. In the AZ31/AA1050 system, apart from the two equilibrium phases, γ-$Mg_{17}Al_{12}$ and β-Mg_2Al_3, a significant fraction of the solidified melt regions consisted of non-equilibrium phases exhibiting amorphous or ultrafine-grained structures. During subsequent annealing, a pronounced growth of γ-$Mg_{17}Al_{12}$ and β-Mg_2Al_3 phases was observed near all interfaces from the early stages of heat treatment, while the phases within the pre-existing reaction regions systematically transformed into the β-Mg_2Al_3 phase. For annealing durations exceeding 10^3 hours, an intermediate ε-$Mg_{23}Al_{30}$ phase layer emerged between the β and γ phase layers. These transformations ultimately converted the initial AZ31/AA1050 multilayer system into a γ-$Mg_{17}Al_{12}$/ε-$Mg_{23}Al_{30}$/β-Mg_2Al_3 structure. In the Ti (Grade 1)/AA1050 system, the solidified melt regions were dominated by non-equilibrium phases, with only a minor presence of the crystalline Al_3Ti phase. Heat treatment led to the nucleation of a continuous Al_3Ti phase layer between the Al and Ti sheets, accompanied by the transformation of non-equilibrium phases into structurally heterogeneous Al_3Ti. Conditions determining the transformation of the Ti(Gr.1)/AA1050 multilayer system into a Ti(Gr.1)/Al_3Ti multilayer system were proposed.

In the second group of metal compositions (not forming intermetallic phases), the layers adjacent to the interfaces exhibited complex and hierarchical microstructures. After EXW, the reaction zones consistently comprised a mixture of nanoparticles and fine dendrites of pure Cu and the reactive metals (Ta, Nb, or Fe).

Notably, no brittle intermetallic phases were observed near any of the interfaces in these composites. However, the microhardness of the solidified melt regions was 2–3 times higher than that of the annealed base materials, with values of 469 HV, 455 HV, and 480 HV for the Ta/Cu, Nb/Cu, and Cu/Fe-armco combinations, respectively. The large interface area per unit volume was found to enhance both the mechanical properties and electromagnetic shielding effectiveness of the material, offering unique opportunities and challenges for technological applications.

Biography: Professor Henryk Paul received his Doctor of Engineering degree from the Institute of Metallurgy and Materials Science (IMMS) at the Polish Academy of Sciences in Kraków, Poland, in 1989. After serving as an assistant professor, he was promoted to associate professor in 2003 and to full professor in 2010, all at IMMS PAS. He has completed numerous fellowships and internships at French institutions, including an extended stays at the École des Mines de Saint-Étienne and several study visits to LLB Saclay and Université Paris-Sud. He has authored over 290 original papers, 22 book chapters, and 22 review papers on various aspects of phase transformations. His research interests include explosive welding technology, the formation of plastic flow instabilities during the semi-static and high strain rate deformation of metallic materials, recovery and recrystallization phenomena associated with the phase transformations. He has been a plenary, keynote, or invited speaker at 42 international conferences. His publications have been cited over 2,400 times, and he has an h-index of 31.

KEYNOTE SPEAKER: Prof. Tahar Laoui
Department of Mechanical and Nuclear Engineering
College of Engineering, University of Sharjah, The United Arab Emirates

Keynote Speech 2

October 17, 2025
Time: 09:20-10:00
Speech Title: Ceramic membranes: pioneering a new era in water treatment technologies

Abstract. Ceramic membranes emerge as a sustainable solution for water treatment, offering significant advantages over conventional polymeric alternatives. Their exceptional durability, thermal and chemical stability, and resistance to fouling position them as valuable components in diverse applications ranging from reverse osmosis (RO) pre-treatment to advanced wastewater reuse. The presentation will examine the role of ceramic membranes in municipal, industrial, and desalination systems, highlighting their ability to remove suspended solids, microorganisms, and organics under challenging water conditions. Comparative analysis will highlight lifecycle performance, economic considerations, and operational reliability relative to polymeric membranes. Case studies from global practice, including municipal reuse projects in Europe; treatment of complex industrial effluents; and large-scale seawater desalination in the Middle East, will illustrate practical benefits and operational constraints. The session will conclude with a discussion on future opportunities for integrating ceramic membranes into sustainable water management strategies, emphasizing their potential to extend membrane lifespan, reduce chemical consumption, and enhance system resilience in an era of growing water scarcity.

Biography: Professor Tahar Laoui received his PhD from the University of Washington, Seattle (USA). Keywords describing his research interests include development of advanced and nanostructured materials, nanocomposites, membranes for water treatment/desalination, and additive manufacturing. He has participated in many research projects throughout his academic career. In the area of materials and membranes development, while Professor at King Fahd University of Petroleum and Minerals (KFUPM, Saudi Arabia) in collaboration with colleagues from Mechanical Engineering Dept. at MIT (USA), he worked on a joint research project related to the development of inorganic membranes for water treatment and desalination by exploring techniques to

investigate and understand the transport of water molecules and ions through macro- and nano-structured materials such as zeolites, alumina-based ceramics, carbon nanotubes and graphene. He was Fellow of The Institute of Materials, Minerals and Mining (IMMM, UK), member of the editorial board of several journals including Materials Letters, Membranes, npj Clean Water. He has served as a reviewer/member of the review committee for many journals and national/international conferences. He has published over 200 refereed journal/conference papers and conference abstracts and 16 issued patents.

KEYNOTE SPEAKER: Prof. Yanli Lu
State Key Laboratory of Solidification Processing
Northwestern Polytechnical University, China

Keynote Speech 3

October 17, 2025
Time: 10:40-11:20
Speech Title: Composition design and validation of Au–Pt alloys with ultra-low magnetic susceptibility: insights from first-principles and experiments

Abstract. Gold-platinum (Au-Pt) alloy has aroused considerable attention due to its ultra-low magnetic susceptibility (MS) in testing mass (TM) on spacecraft. However, the effect of Au content on the properties of the alloy has not yet been understood. In this study, the composition design of Au-Pt alloy with ultra-low MS was achieved through density functional theory (DFT) and experimental methods. The elastic, thermal properties and electronic structure were systematically investigated, the composition range was further optimized and Au75Pt25 was determined to be the most suitable alloy for TM material. The phase composition of this alloy after cold rolling and solid solution was characterized, indicating a single-phase FCC structure. In addition, there is a good validation between the experimental Vickers hardness and the DFT results. This work provides new insights into the compositional optimization of Au-Pt alloys and lays the foundation for alloy development.

Biography: Yanli Lu is a Professor and Ph.D. supervisor at the School of Materials Science and Engineering, Northwestern Polytechnical University. Her research focuses on multiscale studies of microstructure and properties of advanced fundamental, strategic, and frontier materials, integrating experiments, first-principles calculations, phase-field modeling, and machine learning. She has led four projects funded by the National Natural Science Foundation of China and has published over 110 papers in prestigious journals such as International Journal of Fatigue, Computational Materials Science, and Journal of Materials Science and Technology, with more than 100 indexed by SCI.

KEYNOTE SPEAKER: Prof. Zhicheng Zhang
School of Chemistry, Xi'an Jiaotong University, China

Keynote Speech 4

October 17, 2025
Time: 11:20-12:00
Speech Title: The crystallization behavior of polypropylene films regulated by polar groups significantly improves energy storage performance

Abstract. To address the increasing demand for high-temperature resistance and energy storage performance in modern power electronic devices, this study introduces a novel strategy: modifying polypropylene (PP) films with methyl acrylate trifluoroethyl methacrylate (TFEMA), which contains

fluorinated groups, and the polar, electron-deficient molecule 8-hydroxyquinoline (8-HQ). First, kilogram-scale polypropylene grafted with trifluoroethyl methacrylate (PP-g-TFEMA) was successfully prepared. By regulating α-phase crystallization, the films achieved a breakdown strength (Eb) of 865 MV/m and an energy storage density (Ue) of 8.2 J/cm³, with a discharge efficiency (η) exceeding 90%, while retaining excellent processability, self-healing capability, and reliability. Second, 8-HQ molecules were found to capture charges under high electric fields, suppress leakage current, and unexpectedly promote grain growth at the polypropylene interface, thereby enhancing mechanical strength and yielding an Eb of 814 MV/m. In combination with the increased dielectric constant, this enabled a remarkable Ue of 9.87 J/cm³, with η exceeding 90%, and Ue maintained at 6.96 J/cm³ even at 125°C. These findings significantly surpass previously reported results, representing a breakthrough in advancing polypropylene-based dielectric films for high-performance energy storage capacitors.

Biography: Polyvinylidene fluoride (PVDF)-based fluoropolymers are widely used in many fields due to their excellent chemical resistance, heat resistance, aging resistance, weather resistance and solvent resistance. PVDF-based fluoropolymers have high dielectric constants and have been widely used in electromagnetic railguns, electromagnetic catapults, high-resolution sonars, high-sensitivity sensors and other major national needs since their piezoelectricity and subsequent dielectric, ferroelectric, and pyroelectric properties were reported.

The research areas of this team mainly include the design of new fluoropolymers, modification methods, structure-property relationship and regulation of fluoropolymer materials, electroactive fluoropolymers and their applications in high energy storage capacitors, sensors and other fields, as well as the controllable synthesis of novel high-energy-storage polymer dielectric materials, etc.

Our research interests are as follows:
1) Organofluorine Chemistry and Chemical Modification of Fluoropolymers
2) Design and controllable synthesis of advanced energy storage polymers
3) Research on Energy Storage Polymer Composite Dielectric
4) Smart Materials Synthesis and Sensor Applications
5) Biomedical Functional Materials

KEYNOTE SPEAKER: Prof. Li Jin
Electronic Materials Research Laboratory, Key Laboratory of the Ministry of Education, School of Electronic Science and Engineering
Xi'an Jiaotong University, China

Keynote Speech 5

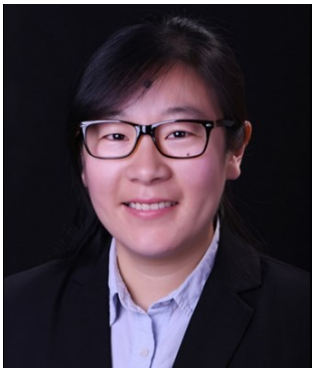
October 17, 2025
Time: 12:00-12:40
Speech Title: Polarization regulation strategies in relaxor ferroelectric ceramics for enhanced energy storage performance

Abstract. Relaxor ferroelectric ceramics have garnered significant attention for their potential in energy storage applications due to their unique polarization characteristics. However, achieving high energy-storage density (W_{rec}) and energy-storage efficiency (η) while maintaining material reliability remains a key challenge. This study consolidates two innovative approaches to design and optimize relaxor ferroelectricity and polarization regulation in $(Bi_{0.5}Na_{0.5})TiO_3$ (BNT)-based ceramics, leading to exceptional energy storage performance. The first approach employs entropy engineering, leveraging local polar fluctuations and high-entropy design to regulate the energy storage performance of BNT-based dielectrics. By optimizing the atomic configurational entropy in $0.85(Bi_{0.375}Na_{0.3}Sr_{0.25}K_{0.075})TiO_3$-0.15 $Bi(Mg_{0.5}Sn_{0.5})O_3$ ceramics, the study achieves an outstanding W_{rec} of 11.24 J/cm³ and η of 88.3% under 610 kV/cm. The high-entropy ceramics exhibit remarkable discharge

characteristics and temperature stability, demonstrating the efficacy of entropy manipulation in enhancing dielectric performance. The second strategy focuses on mitigating polarization-strain coupling in multilayer ceramic capacitors (MLCCs) to address fatigue and ultrasonic damage in pulse power systems. By designing a composition with ultra-low electrostrictive coefficient (Q_{33}) of 0.012 m^4/C^2 in $0.55(Bi_{0.5}Na_{0.5})TiO_3$-$0.45Pb(Mg_{1/3}Nb_{2/3})O_3$, the study achieves a minimal strain of 0.118% at 330 kV/cm. This approach enables a significant ESP of 7.6 J/cm³ and an ultrahigh η of 93% under 720 kV/cm, ensuring excellent fatigue resistance and temperature stability. Collectively, these advanced design strategies underscore the potential of tailored relaxor ferroelectric ceramics in next-generation energy storage applications, offering a path forward for achieving high-performance, reliable, and efficient dielectric materials.

Biography: Li Jin holds the esteemed position of professor at Xi'an Jiaotong University (XJTU) in China. He received his B.S. and M.S. degrees in Electronics Science and Technology from the XJTU in 2003 and 2006, respectively. He obtained his Ph.D. from the Swiss Federal Institute of Technology-EPFL in Lausanne, Switzerland, in 2011. Subsequently, from 2011 to 2012, he undertook a postdoctoral research fellowship at the Ceramics Laboratory of EPFL. His research encompasses the fields of ferroelectric, electrostrictive, and dielectric materials, with a particular focus on their integration into passive systems and electronic devices. He has published more than 180 articles in academic publications, which have been cited over 15,000 times.

KEYNOTE SPEAKER: Prof. Xuetao Shi
School of Chemistry and Chemical Engineering
Northwestern Polytechnical University, China



Keynote Speech 6

October 17, 2025
Time: 14:00-14:40
Speech Title: 3D-printed multifunctional TPU/ANF/CNT composite foams with synergistic energy absorption and real-time pressure sensing for smart protective

Abstract. The development of lightweight, customizable materials with high energy absorption capacity has become critically important across engineering disciplines, driven by escalating demands for impact protection in dynamic environments. Herein, a lightweight interpenetrating-network composites with aramid nanofibers (ANF)/carbon nanotubes (CNT) aerogel-filled thermoplastic polyurethane (TPU) gyroid-structured foam was developed through 3D printing and infiltration processes. The 3D-printed customizable TPU foam with both the macro-scale porous structure and micro-scale cellular structure provides superior wearer comfort, elasticity and energy absorption, while the ANF/CNT aerogel further enhances energy absorption and enables real-time pressure sensing. Furthermore, the tunable mechanical strength TPU foam allows the composite structure to sense pressures up to 0.9 MPa (at 50% strain). Prototype validation in protective equipment applications—including impact-adaptive sports pads and smart helmets—demonstrates real-time pressure mapping capabilities. This multifunctional composite system, combining mass-customizable fabrication, exceptional energy dissipation, and embedded sensing intelligence, establishes a new paradigm for next-generation smart protective materials.

Biography: Dr. Xuetao Shi received her Ph.D (2011) from Pisa university. She is currently a professor in School of chemistry and chemical engineering, Northwestern Polytechnical University. Her research interests include the design and synthesis of biodegradable polyesters, multifunctional polymer composites and polymer processing technologies including 3D printing and microcellular foaming. She is the principal investigator of some projects granted by National Natural Science Foundation of China and the Natural Science Foundation of Shaanxi Province.

Invited Speakers

Prof. Osamu Umezawa
Yokohama National University, Japan

Prof. Marek Sikorski
Adam Mickiewicz University, Poland

Prof. Nader Asnafi
Luleå University of Technology, Sweden

Prof. Massimo Cuomo
University of Catania
Italy

Prof. Jangyong Kim
Xi'an Jiaotong-Liverpool University
China

Prof. Qiang Song
Northwestern Polytechnical University
China

Prof. Aurelian Marcu
National Institute for Laser Plasma and Radiation Physics, Romania

Prof. Keeseong Park
Daegu Geonbuk Institute of Science and Technology, Republic of Korea

Prof. Honglae Sohn
Chosun University
Republic of Korea

Prof. Lei Wang
Northwestern Polytechnical University
China

Prof. Fei Xu
Northwestern Polytechnical University
China

Prof. Levent Trabzon
Istanbul Technical University
Turkey

Part V Presentations Guideline

Oral Presentation Instructions

Time Allotted for Each Presentation

Keynote Speech: 40 min
Invited Speech: 20 min
Oral Presentation: 15 min

Note: The allotted time includes 3-5 minutes of Q&A.

Devices Provided by the Conference Organizer

- Laptops (with MS-Office & Adobe Reader)
- Projectors & Screen: Ratio 4:3
- Laser Sticks
- Microphones

Materials Provided by the Oral Presenters

- Microsoft PowerPoint or PDF Presentation file (Please show your paper ID as CMSE**** on the last page.)

For presenters who do not send the presentation file to the Conference Secretary before the conference, please have your presentation ready on a memory stick, and save it on the laptop of your corresponding session about **15 minutes** before session starts.

Best Oral Presentation Award

Selection Criteria

ONE best presentation will be selected from EACH Oral Session based on the following criteria:

- Research Quality
- Presentation Performance
- Presentation Language
- Interaction with Listeners
- PowerPoint Design

Selection Procedure

- An assessment sheet will be delivered to listeners before the session.
- Write the numbers of two best presentations and submit the filled assessment sheet (with the listener's name and signature) to the Session Chair before the session termination.
- The Session Chair will count the votes for each presentation and name the winner based on the maximal number of votes. The Session Chair has three votes but can use only one in favor of his/her own presentation (if any). To avoid any conflict of interest, only registered listeners are entitled to vote.

Nature of the Award

- This award consists of free registration for the next conference CMSE 2026 and a certificate.
- The winners will be announced at the official website after the conference.

Assessment Sheet Sample

CMSE 2025 Oral Presentation Assessment

Dear participants,

After carefully listening to the presentations of this session, please kindly recommend two excellent Oral Presentations with reference to the following evaluation criteria.

The Session Chair will count the votes from each presentation and select ONE Best Oral Presentation in this session. If there is a tie, the Session Chair will make the final decision.

The winner will be announced at the official website after the conference.

You can refer to the following Criteria:

Items	Assessment
Content	Right, Logical, Original, Well-Structured
Language	Standard, Clear, Fluent, Natural
Performance	Spirited Appearance, Dress Appropriately, Behaves Naturally
PPT	Layout, Structure, Typeset, Animation, Multimedia
Reaction	Build a Good Atmosphere, Speech Time Control Properly

Please write down paper ID and give reasons for your recommendation:

Paper ID	Reasons

Evaluated by: _____ (Paper ID: _____)

Note: When the session finished, please fill it out and give it to the Session Chair so that the Best Oral Presentations in this session can be selected.

Poster Presentation Instructions

Materials Provided by the Conference Organizer

- Poster Softboard
- Adhesive Tapes or Clamps

Materials Provided by the Presenters

- Electronic Posters
- Posters Printed by the Conference Organizing Committee

Requirements for the Posters

- Material: not limited
- Size: 160 cm (height) ×60 cm (width)

Best Poster Presentation Award

Samples of Stickers

Selection Criteria

- Research Quality
- Presentation Skill
- Design

Selection Procedure

- 10 professors will be invited from the participants to serve as the judges to review the posters (Note: A judge would not have a poster or know the participant exhibiting a poster)
- 2 red stickers and 2 green stickers will be provided for the judges. The red sticker stands for "Research Quality" with a value of 2 points; the green sticker stands for "Presentation Skill and Design" with a value of 1 point
- Each judge will go around the poster session and give stickers to the poster which he/she thinks is of high quality or well designed and well presented. Please note that the judge cannot give 2 red or 2 green stickers to the same poster (one red and one green sticker are acceptable)
- After the poster session, the conference secretary will count the points from each poster and ONE best poster presentation with more points will be selected. If there is a tie, the one with more red (Research Quality) stickers wins.

Nature of the Award

- This award consists of free registration to the CMSE 2026 and a certificate.
- **TWO Best Poster Presenters** will be selected after session finishes with certificate issued and results announced on CMSE 2025 website.

Part VI Conference Venue

Venue: Xi'an Guangcheng Hotel (西安广成大酒店)

Address: Middle Section of South Laodong Road, Lianhu District, Xi'an 710000, Shaanxi, China
(陕西省西安市莲湖区劳动南路中段)
Website: http://www.xagchotel.com/Default.aspx

Access to Xi'an Guangcheng Hotel

1. Xi'an Xianyang International Airport — Xi'an Guangcheng Hotel (about 35 km)

(1) Taxi: about 45 mins, CNY 90
(2) Public Transportation (1.5-2h). There are 2 ways for your choice:

- From T5 or T2 or T3, take the airport shuttle bus (Zhonglou West Line 钟楼西线), get off at Xishaomen Crossroad (西稍门十字); walk for 150 m to Xi'an Guangcheng Hotel.
  Note: Shuttle bus service time: 08:50-01:00 (next day) (From the Airport to city center); 04:10-00:00 (From city center to Airport). Available every 30-40 mins.
- From T5 or T2 or T3, take subway Line 14, get off at Xi'an Bei Station (西安北站); Transfer to Line 2, get off at Zhonglou Sation (钟楼站); Tranfer to Line 6, get off at Datang Xishi Station (大唐西市站), walk out from Exit D, walk for 490m to Xi'an Guangcheng Hotel.

Airport Bus Ticket

2. Xi'an Railway Station - Xi'an Guangcheng Hotel (about 8.5 km)

(1) Taxi: about 25 mins, CNY 25
(2) Public Transportation (about 35 min):

- From Xi'an Railway station, take subway Line 4 (towards Hangtianxincheng 航天新城方向), get off at the 2nd stop at Dachaishi (大差市站); Transfer to Line 6 (towards Xi'annan Railway Station 西安南站方向) , get off at the 5th stop at Datang Xishi Station (大唐西市站), walk out from Exit D, walk for 490m to Xi'an Guangcheng Hotel.

3. Xi'an Bei Railway Station - Xi'an Guangcheng Hotel (about 17 km)

(1) Taxi: about 35-40 mins, CNY 60
(2) Public Transportation (about 1h):

- From Xi'an Bei subway station, take subway Line 2 (towards Changninggong 常宁宫方向), get off at the 10th stop at Zhonglou Station (钟楼站); Transfer to Line 6 (towards Xi'annan Railway Station 西安南站方向) , get off at the 4th stop at Datang Xishi Station (大唐西市站), walk out from Exit D, walk for 490m to Xi'an Guangcheng Hotel.

Part VII Field Visit

Time: 08:30-17:00. October 19, 2025 (Sunday)

Schedule:

Depart from Xi'an Guangcheng Hotel (西安广成大酒店) (08:30)→**Xi'an Museum** and the **Small Wild Goose Pagoda** (09:00 to 11:00) →Lunch (11:00 to 12:00) →**Terracotta Army** (14:00 to 17:00) → Back to Xi'an Guangcheng Hotel (西安广成大酒店)

Note: This itinerary is tentative and may be subject to minor adjustments based on the guide's arrangements.

Tips: (1) Please make sure to bring your passport (for international attendees) or Chinese ID card (for Chinese attendees) with you.

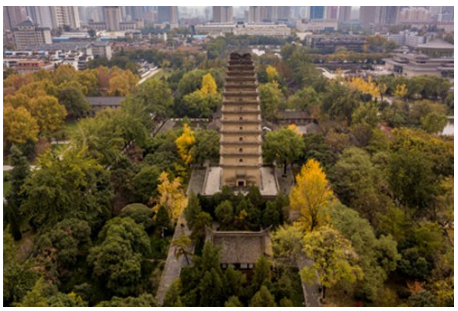
(2) Please present your tour ticket when boarding the tour bus.
(3) Please follow the guide's instructions throughout the tour. Participants must not leave the group without notifying the guide in advance.

>> Xi'an Museum

Xi'an Museum is composed of three parts including museum, site of Jianfu Temple in Tang Dynasty and Historical and Cultural Park of Small Wild Goose Pagoda, with museum, tower, temple and park enhancing each other's beauty and bringing out the best in each other, being distinctive among museums in China and the rare national grade I museum integrating world cultural heritage, historical and cultural relics under state protection, ancient architectural complex and modern exhibition hall.

Xi'an Museum contains more than 110,000 pieces of cultural relics, including bronze wares, jade wares, gold and silver wares, porcelains, stone sculptures, inscription on tablet, seals, earthenwares, three-color glazed wares, painting and calligraphy, sutra, rubbings, ancient and rare books, miscellaneous wares, including 10441 pieces of valuable cultural relics at no lower than grade III. The museum has collected more than 100,000 volumes of ancient books, with 37 volumes of books having been selected into Catalogue of National Rare Books in China and the collections complete in sequence and category to create a system of their own.

The exhibition hall of Xi'an Museum designed under the direction of Master Zhang Jinqiu as an academician of Chinese Academy of Engineering has a built-up area of more than 16000sqm and a show area of more than 5500sqm, having more than 2000 pieces of cultural relics on display, the exhibition hall has had a display pattern with focus on fundamental display of Xi'an as an ancient capital, together with special display of compassion and fascination—Chang'an Buddhist Statues Art and spirit of the universe—Selected Ancient Jade wares and various temporary exhibitions as expansion and extension thereof having shown historical features of Xi'an as a capital and cradle of Chinese civilization in various fields, including politics, economy and culture etc. since Zhou Dynasty, Qin Dynasty, Han Dynasty and Tang Dynasty.



Exhibition of Small Wild Goose Pagoda-Jianfu Temple History on central axis of Small Wild Goose Pagoda Scenery Spot shows value of Small Wild Goose Pagoda in heritage as well as historical fact and experience in exchange and innovation between orient and west in terms of culture along Silk Road in those days.

Small Wild Goose Pagoda in scenic spot is cloud kissing, with ancient trees reaching to the sky, green grass and zigzag lake therein, time-honored ancient music in Chang'an to underline the excellent location with lingering melodious rhythm, folk cultural relics that could be found everywhere in those days such as hitching posts and various folklore art exhibition open a window for tourists to understand Chinese traditional culture. Well-arranged and delightful park and garden around water enable tourists to enjoy cultivation of temperament in tranquil and relaxed environments in downtown area.

>> Terracotta Army

Terracotta Army, also namely Terracotta Warriors and Horses, is known as the Eighth Wonder of the World. It is a super large collection of life-size terra cotta sculptures in battle formations, reproducing the mega imperial guard troops of Emperor Qin Shi Huang (259 - 210BC), the first emperor of the first unified dynasty of Imperial China. The great archeological excavation of Qin (221BC-206BC) Terra Cotta Warriors and Horses unfolded a strong army of altogether 7,000 life-size pottery soldiers, horses, chariots and weapons arranged in battle formations symbolically, guarding the tomb of Emperor Qin Shi Huang. Being the most significant archeological excavations of the 20th century and a UNESCO World Heritage Site, the Terracotta Army is no doubt a must-see for every visitor to Xi'an.

Memo

Website

Contact Us

Conference Secretary: Ms. Kelly Feng

E-mail: cmse@cmseconf.org

www.cmseconf.org