# ICCM2021 Handbook

# The 12ᵗʰ International Conference on Computational Methods

Virtual Conference
4th-8th July 2021

Chairman: Nguyen-Xuan Hung
Honorary Chairman: Guirong Liu

# 1. WELCOME MESSAGE

**Dear Colleagues and Friends,**

We are delighted to once again welcome you to the 12th annual International Conference on Computational Methods (ICCM2021). Due to the prolonged COVID-19 pandemic, ICCM2021 will be hosted through Zoom from July 4-8, 2021 by Ho Chi Minh University of Technology (HUTECH), Vietnam. As the world is adjusting to the new normal, we, as a scientific community, will need to be at the forefront of this and make the most out of every opportunity presented. This year's conference will serve as another platform to reinforce our commitment to the continuous exchange of innovative ideas and production of high-quality research works.

Since its establishment, the ICCM has been an international forum for academic and industrial researchers in areas related to computational methods, numerical modelling & simulation, and machine learning techniques. It will offer presentations on a wide range of topics to facilitate the inter-disciplinary exchange of ideas in science, engineering and related disciplines, and foster various types of academic collaborations. Publications, which have been peer-reviewed and accepted, will be showcased in the form of oral presentations at the conference. All presentations, including abstracts and papers, will be published online at our website.

The ICCM conference series were originated in Singapore in 2004, followed by ICCM2007 in Hiroshima, Japan; ICCM2010 in Zhangjiajie, China; ICCM2012 in Gold Coast, Australia; ICCM2014 in Cambridge, England; ICCM2015 in Auckland, New Zealand; ICCM2016 in Berkeley, CA, USA; ICCM2017 in Guilin, China; ICCM2018 in Rome, Italy; ICCM2019 in Singapore, and the most recent ICCM2020 in Vietnam (online).

We would like to express our most sincere appreciation to all members of the Organizing Committee, the International Scientific Committee, and other members who have worked tirelessly to make this conference possible. To the international reviewers, we thank you for your endless support in reviewing submitted abstracts and papers.

As we come to conclude our remarks, we would like to convey our gratitude for your contributions to the ICCM2021 conference. Although it is virtually held, we are beyond ecstatic for your attendance and look forward to your continued engagement as well as support for future ICCM conferences.

**Professor Nguyen-Xuan Hung**
Conference Chairman
CIRTECH Institute, HUTECH University of Technology
President of Vietnam Association of Computational Mechanics
Vietnam

**Professor Guirong Liu**
Honorary Conference Chairman
University of Cincinnati
USA

## 2. CONFERENCE DETAILS

The time used in this handbook is based on the U.S. Eastern Time (GMT-4, New York time), which is exactly 12 hours behind the Beijing/Sigaore/Taiwan time. Please take note of the time zone differences.

|  | Country/Region | Time 1 | Time 2 |
|---|---|---|---|
| 1 | USA (ET) | 8:00 - 12:00 | 20:00 - 24:00 |
| 2 | Australia | 22:00 - 2:00 | 10:00 - 14:00 |
| 3 | Belgium | 14:00 - 18:00 | 2:00 - 6:00 |
| 4 | China | 20:00 - 24:00 | 8:00 - 12:00 |
| 5 | Germany | 14:00 - 18:00 | 2:00 - 6:00 |
| 6 | India | 17:30 - 21:30 | 5:30 - 9:30 |
| 7 | Italy | 14:00 - 18:00 | 2:00 - 6:00 |
| 8 | Japan | 21:00 - 1:00 | 9:00 - 13:00 |
| 9 | Poland | 14:00 - 18:00 | 2:00 - 6:00 |
| 10 | Singapore | 20:00 - 24:00 | 8:00 - 12:00 |
| 11 | South Korea | 21:00 - 1:00 | 9:00 - 13:00 |
| 12 | Thailand | 19:00 - 23:00 | 7:00 - 11:00 |
| 13 | Vietnam | 19:00 - 23:00 | 7:00 - 11:00 |

Our conference medium is Zoom. All attendees have to download Zoom software on his/her own computer.
**Please register your name on Zoom, make sure it is the same name as on the conference website, so that your Session Chairman can easily identify you**.

Please try and test various functions on Zoom before attending the conference online:
(a) **Share Screen** for your presentation;
(b) **Mute** when you are not speaking, **Unmute** to speak;
(c) **Raise hand** at the **Participants** tab or by clicking on **Reactions**, to ask questions during presentations. You should turn on your webcam with **Start Video** when you speak;
(d) If you want, you may also send your comments or contact the Session Chair in the **Chat** during the conference;

We will email the link for ICCM2021 Zoom rooms to all registered participants and the co-authors by July 4th.

## 3. ORGANIZATION COMMITTEES

**Conference Chairman**
Nguyen-Xuan Hung, Ho Chi Minh City University of Technology (HUTECH), Vietnam

**Honorary Chairman**
Guirong Liu, University of Cincinnati, United States

**International Co-Chairs**
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Daining Fang, Beijng Institute of Technology, China
Jaehong Lee, Sejong University, South Korea
Hua Li, Nanyang Technological University, Singapore
Tuan Ngo, The University of Melbourne, Australia
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Timon Rabczuk, Bauhaus University Weimar, Germany
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**Local Organizing Committee**
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Zheng Hui (China)
Zhong Zheng (China)
Zhou Anna (Australia)
Zhou Kun (Singapore)
Zhuang Zhuo (China)

## 4. PROGRAM OVERVIEW

| Date | Time | Conference Program |
|---|---|---|
| **Day 0**<br>July 4th, 2021<br>(Sunday) | 8:00-10:00 | Presentation trials online at Zoom |
| | 20:00-21:00 | Presentation trials online at Zoom |
| **Day 1**<br>July 5th, 2021<br>(Monday) | **8:00-8:10** | **Opening Ceremony** |
| | **8:10-12:00** | **Plenary Lecture**<br>**(40 minute)**<br>**Semi Plenary Lectures**<br>**(30 minutes for each speaker)**<br>**Parallel Sessions**<br>**(20 minutes for each speaker)** |
| | **20:00-24:00** | **Plenary Lecture**<br>**(40 minute)**<br>**Semi Plenary Lectures**<br>**(30 minutes for each speaker)**<br>**Parallel Sessions**<br>**(20 minutes for each speaker)** |
| **Day 2**<br>July 6th, 2021<br>(Tuesday)<br>&<br>**Day 3**<br>July 7th, 2021<br>(Wednesday)<br>&<br>**Day 4**<br>July 8th, 2021<br>(Thursday) | **8:00-12:00** | **Parallel Sessions**<br>**(20 minutes for each speaker)** |
| | **20:00-24:00** | **Parallel Sessions**<br>**(20 minutes for each speaker)** |

**Note: The times used in this handbook are in the U.S. Eastern Time (GMT-4, New York time).**

## 5. MINI-SYMPOSIA AND ORGANIZERS

| MS | Mini Symposium Title | Organizers |
|---|---|---|
| MS-001 | Theory and Formulation for Novel Computational Methods | Guirong Liu, University of Cincinnati |
| MS-002 | Particle Based Methods | Xiong Zhang, Tsinghua University<br>Yan Liu, Tsinghua University<br>Zhen Chen, Dalian University of Technology / University of Missouri |
| MS-003 | Mechanics of surface/interface and bionics | Shaohua Chen, Beijing Institute of Technology |
| MS-004 | Boundary Element Methods and Mesh Reduction Methods | Xiaowei Gao, Dalian University of Technology |
| MS-005 | Reduced order models for structures and fluids | Jianyao Yao, Chongqing University<br>Ke Liang, Northwestern Polytechnical University |
| MS-006 | Energy Absorption and crashworthiness of Structures and Materials | Shujuan Hou, Hunan University<br>Qinghua Qin, Xi'an Jiaotong University<br>Xiong Zhang, Huazhong University of Science and Technology |
| MS-007 | Fire Simulation | Zhao-Feng Tian, University of Adelaide |
| MS-008 | Modeling and Simulation of Complex Flow and Transport Phenomena | Jingfa Li, Beijing Institute of Petrochemical Technology<br>Shuyu Sun, King Abdullah University of Science and Technology<br>Bo Yu, Beijing Institute of Petrochemical Technology |
| MS-009 | Computational Methods in Fluid Engineering | Songying Chen, Shandong University<br>Deyu Luan, Qingdao University of Science and Technology |
| MS-010 | Data-driven Surrogate Modeling Techniques for Inverse and Other Related Problems | Guangyao Li, Shenzhen Automotive Research Institute, Beijing Institute of Technology<br>Teng Long, Beijing Institute of Technology<br>Hu Wang, Hunan University<br>Jian Zhang, Jiangsu University |
| MS-011 | Damage and Failure Modelling in Composite Materials | Raj Das, RMIT University |
| MS-012 | Deformation, Fatigue and Fracture of Advanced Materials | Liguo Zhao, Loughborough University<br>Rong Jiang, Nanjing University of Aeronautics and Astronautics |
| MS-013 | Large Scale Coupled Problems and Related Topics | Masao Ogino, Daido University<br>Hiroshi Kanayama, Japan Women's University<br>Ryuji Shioya, Toyo University<br>Lijun Liu, Osaka University |
| MS-014 | Progresses of Computational Marine Hydrodynamics | Guiyong Zhang, Dalian University of Technology<br>Decheng Wan, Shanghai Jiaotong University<br>Aman Zhang, Harbin Engineering Unversity |
| MS-015 | Smoothed Finite Element Methods and Related Techniques | Yuki Onishi, Tokyo Institute of Technology |
| MS-016 | Computational Mechanics for Composite Plates and Shells | Taran Kant, Indian Institute of Technology Bombay |
| MS-017 | Computational methods in Hydraulic engineering | Nguyen The Hung, The University of Danang |
| MS-018 | Data, Uncertainty, Machine Learning and Digital Twin | Chenfeng Li, Swansea University |

| MS-019 | Methods for Multi-Phase Flows | Dia Zeidan, German Jordanian University<br>Lucy Zhang, Rensselaer Polytechnic Institute |
|---|---|---|
| MS-020 | Particle-based methods and applications to geomechanics | Giang D. Nguyen, University of Adelaide<br>Ha H. Bui, Monash University |
| MS-021 | Concurrent multiscale modeling from electrons to finite elements | Qing Peng, King Fahd University of Petroleum and Minerals<br>Qiang Cao, Wuhan University |
| MS-022 | Multiscale modelling of engineering materials | Sarah Zhang, Western Sydney University |
| MS-023 | Advances in computational methods for large deformation problems in geo-mechanic | Domenico Lombardi, The University of Manchester<br>Wei Wu, University of Natural Resources and Life Sciences |
| MS-024 | Recent Advances In Meshfree and Particle Methods | Bin Chen, Xi'an Jiaotong University |
| MS-025 | Meshfree and Other Advanced Numerical Methods for Engineering and Applied Mathematical Problems | Lihua Wang, Tongji University<br>Zheng Zhong, Harbin Institute of Technology<br>Chuanzeng Zhang, University of Siegen |
| MS-026 | Limit state analysis of structures and materials | Canh Van Le, International University - VNU |
| MS-027 | Modeling and Simulation for Additive Manufacturing | Van-Nam Hoang, Vietnam Maritime University<br>Jonathan Tran, RMIT<br>Nguyen-Xuan Hung, Ho Chi Minh City University of Technology |
| MS-028 | Computational Acoustics and Elastodynamics in Materials and Structures | Weiqiu Chen, Zhejiang University<br>Yuesheng Wang, Beijing Jiaotong University<br>Bin Wu, Politecnico di Torino<br>Chuanzeng Zhang, Universitat Siegen |
| MS-029 | Kernel and machine learning based solutions of PDEs | Zhuojia Fu, Hohai University<br>Elena Atroshchenko, The University of New South Wales<br>Timon Rabczuk, Bauhaus University Weimar |
| MS-030 | New methods of approximate static calculations | Janusz Rębielak, Cracow University of Technology |
| MS-031 | Stochastic BEM in Fracture Mechanics | Cheng Su, South China University of Technology<br>Zhongwei Guan, University of Liverpool |
| MS-032 | Acoustic metamaterials and phononic crystals:from fundamental theory to potential applications | Feng Jin, Xi'an Jiaotong University |
| MS-033 | Design optimization of structures and metamaterials | Zhan Kang, Dalian University of Technology |
| MS-034 | Local and nonlocal modeling approaches in dynamics | Ugo Galvanetto, University of Padova<br>Mirco Zaccariotto, University of Padova<br>Pawel Packo, AGH - University of Science and Technology |
| MS-035 | Computational Biomechanics | Ken-ichi Tsubota, Chiba University<br>Xiaobo Gong, Shanghai Jiao Tong University |
| MS-036 | Recent Advances and Developments for Damage and Failure of Engineering Materials and Structures | Tinh Quoc Bui, Tokyo Institute of Technology<br>Shunhua CHen, Sun Yat-sen University |
| MS-037 | Modelling Heterogeneous Media: Fracture, Localisation and Multiphase Flow | Yixiang Gan, The University of Sydney<br>Leong Hien Poh, National University of Singapore<br>Luming Shen, The University of Sydney<br>Daniel Dias-da-Costa, The University of Sydney |

| MS-038 | Mechanics of soft materials | Zishun Liu, Xian Jiaotong University |
|---|---|---|
| MS-039 | Computational Biomechanics | Xi-Qiao Feng, Tsinghua University |
| MS-040 | Computational methods for advanced soft matter and soft robotics | Hua Li, Nanyang Technological University |
| MS-041 | Computational Particle Dynamics | Moubin Liu, Peking University<br>Dianlei Feng, Leibniz University Hannover<br>Christian Weißenfels, Technische Universität Braunschweig |
| MS-042 | Computational and Machine Learning Studies of Hierarchical Cellular Structures | Pattabhi Ramaiah Budarapu, Indian Institute of Technology Bhubaneswar<br>Sundararajan Natarajan, Indian Institute of Technology Madras<br>I.V. Singh, Indian Institute of Technology Roorkee |
| MS-043 | Multiscale multiphysical damage and fracture simulation of cementitious composites | Zhenjun Yang, Wuhan University<br>Jianying Wu, South China University of Technology |
| MS-044 | Uncertainty quantification and analysis for structures | Chao Jiang, Bingyu Ni, Hunan University<br>Bingyu Ni, Hunan University<br>Zhe Zhang, Hunan University |
| MS-045 | Data-driven modeling and design approaches | Wenjing Ye, Hong Kong University of Science and Technology |
| MS-046 | Micro-/Nano-mechanics for Novel Materials | Yuantong Gu, Queensland University of Technology<br>Haifei Zhan, Zhejiang University |
| MS-047 | Computational design, optimization and manufacturing advanced materials and structures | Quan Bing Eric Li, Teesside University<br>Bing Li, Northwestern Polytechnical University |

## 6. SUMMARY OF PLENARY LECTURE, SEMI PLENARY LECTURE

**Plenary Lecture (PL)**

**PL-1**: On Higher-Order Shell Finite Elements and a Computational Approach for Fracture / *J.N. Reddy, Texas A&M University, United States*

**PL-2**: Integrated Computational Materials Engineering (ICME) for designing resilient buildings and infrastructure against extreme loads
*Tuan Ngo, The University of Melbourne, Australia*

**Semi Plenary Lecture (SPL) (ordered by last name)**

**SPL-1**: Large deformation modelling of coupled flow-deformation problems in unsaturated porous media using SPH method
*Bui Ha Hong, Monash University, Australia*

**SPL-2**: Model-constrained deep learning approaches for inference, control, and uncertainty quantification
*Tan Bui-Thanh, University of Texas at Austin, United States*

**SPL-3**: Hierarchical cellular structures for impact applications
*Ramaiah Pattabhi Budarapu, Indian Institute of Technology, Bhubaneswar, India*

**SPL-4**: Isogeometric Methods in Structural Analysis
*Josef Kiendl, Bundeswehr University Munich, Germany*

**SPL-5**: Efficient data-collection strategy and hyperparameter tuning for machine learning using Bayesian optimization
*Jaehong Lee, Sejong University, South Korea*

**SPL-6**: Some recent advances in Isogeometric Analysis with a special focus on structural and coupled simulations
*Alessandro Reali, University of Pavia, Italy*

**SPL-7**: CT image-based damage and fracture modelling and validation of Concrete and FRC
*Zhenjun Yang, Wuhan University, China*

**SPL-8**: Selective laser sintering of polymer composites: modelling, design, and applications
*Kun Zhou, Nanyang Technological University, Singapore*

## 7. DETAILED PROGRAM – CONFERENCE SESSIONS

**Please note:**
- **The times used in this handbook are in the Eastern Time (GMT-4, New York time).**
- **Keynote presentations are marked with "*".**
- **Presenters' names are in boldface.**

### July 5th, 2021, Monday
**Day 1: Room A**

| 8:00-8:10 | **Opening Ceremony   Chairman: Nguyen-Xuan Hung** |
|---|---|

**Session 1A-1 Plenary Lecture        Chair: Nguyen-Xuan Hung**

| Time | ID | Title / Authors |
|---|---|---|
| 8:10-8:50 | 4726 | PL: On Higher-Order Shell Finite Elements and a Computational Approach for Fracture / **J.N. Reddy** |

**Day 1: Room A**
**Session 1A-1 Semi Plenary Lectures        Chair: Guirong Liu**

| Time | ID | Title / Authors |
|---|---|---|
| 8:50-9:20 | 4737 | SPL: Isogeometric Methods in Structural Analysis / **Josef Kiendl** |
| 9:20-9:50 | 4736 | SPL: Model-constrained Deep Learning Approaches for Inference, Control, and Uncertainty Quantification / **Tan Bui-Thanh** |

**Day 1: Room B**
**Session 1B-1 Semi Plenary Lectures        Chair: Nguyen-Xuan Hung**

| Time | ID | Title / Authors |
|---|---|---|
| 8:50-9:20 | 4755 | SPL: Hierarchical Cellular Structures for Impact Applications / **Pattabhi Ramaiah Budarapu** |
| 9:20-9:50 | 4738 | SPL: Some Recent Advances in Isogeometric Analysis with a Special Focus on Structural and Coupled Simulations / **Alessandro Reali** |

**Day 1: Room A**
**Session 1A-1:  Theory and Formulation for Novel Computational Methods**
**Chair: Yan Li, Pattabhi Ramaiah Budarapu**

| Time | ID | Title / Authors |
|---|---|---|
| 9:50-10:10 | *4695 | Extremely Accurate Solutions to the Hilbert Equation Systems / **Edward John Kansa** |
| 10:10-10:30 | 4631 | Numerical Simulation of Continuous Extraction of Li+ from High Mg2+/Li+ Ratio Brines Based on Free Flow Ion Concentration Polarization / **Dongxiang Zhang** |
| 10:30-10:50 | 4590 | A Stable Node-based Smoothed Finite Element Method with Transparent Boundary Conditions for the Elastic Wave Scattering by Obstacles / **Shiyao Wang** |
| 10:50-11:10 | 4603 | Bi-potential Method Applied for Multiple Collisions Problems of Discrete Element System and Multi-body System / **Ling Tao**, ZhiQiang Feng, Yan Li, Huijian Chen |

**Chair:  Yan Liu, Yu-Chen Su**

| Time | ID | Title / Authors |
|---|---|---|
| 9:50-10:10 | *4650 | An Efficient Parallel Framework for Smoothed Molecular Dynamics Method / **Yan Liu**, LeiYang Zhao, Shuai Wang |
| 10:10-10:30 | 4594 | An Adaptive Smoothed Particle Hydrodynamics for Metal Cutting Simulation / **Yijin Cheng**, Yan Li, Zhiqiang Feng |
| 10:30-10:50 | 4619 | Concurrent Simulation of Shear-Band Evolution Based on the Material Point Method and Coarse-grained Molecular Dynamics / **Yu-Chen Su**, Zhen Chen |
| 10:50-11:10 | 4703 | Atom-based Molecular Mechanics Method for Predicting the Mechanical Property of Molybdenum Disulfide (MoS2) / **Hongfei Ye**, Dong Li, |

**Day 1: Room A**
**Session 1A-2  Plenary Lectures      Chair: Nguyen-Xuan Hung**

| Time | ID | Title / Author |
|------|-----|----------------|
| 20:00-20:40 | 4735 | PL: Integrated Computational Materials Engineering (ICME) for Designing Resilient Buildings and Infrastructure Against Extreme Loads / **Tuan Ngo** |

**Day 1: Room A**
S**ession 1A-2 Semi  Plenary Lectures      Chair: Nguyen-Xuan Hung**

| Time | ID | Title / Author |
|------|-----|----------------|
| 20:40-21:10 | 4730 | SPL: Large Deformation Modelling of Coupled Flow-deformation Problems in Unsaturated Porous Media using SPH Method / **Ha Bui** |
| 21:10-21:40 | 4725 | SPL: Efficient Data-collection Strategy and Hyperparameter Tuning for Machine Learning using Bayesian Optimization / **Jaehong Lee** |

**Day 1: Room B**
**Session 1B-2 Semi Plenary Lectures   Chair: Guirong Liu**

| Time | ID | Title / Author |
|------|-----|----------------|
| 20:40-21:10 | 4747 | SPL: CT Image-based Damage and Fracture Modelling and Validation of Concrete and FRC / **Zhenjun Yang** |
| 21:10-21:40 | 4739 | SPL: Selective Laser Sintering of Polymer Composites: Modelling, Design, and Applications / **Kun Zhou** |

**Day 1: Room A**
**Session 1A-2:   Computational Methods for Challenging Problems**

**Chair: Zhaocheng Xuan, Joe Petrolito**

| Time | ID | Title / Authors |
|------|-----|-----------------|
| 21:40-22:00 | *4585 | The Competition Between Entropy and Potential Energy in Contact Mechanics / **Zhaocheng Xuan** |
| 22:00-22:20 | 4669 | Transformed Newtons Method with a Fixed-point Iteration for Highly Nonlinear Problems in Structural Mechanics / Ngoc M. La, **Cuong Tan Nguyen**, Minh N. Dinh |
| 22:20-22:40 | 4560 | Mixed-mode Delamination Analysis of Interface Cracks in Peridynamics / **Heng Zhang** |
| 22:40-23:00 | 4555 | Nonlinear Analysis of Steel Frames Under Thermal Loading / **Joe Petrolito**, Daniela Ionescu, Ashley Sim, Timothy Lougoon |
| 23:00-23:20 | 4688 | On the Spatial Symmetry of High-resolution Simulation for Compressible Flow / **Hiro Wakimura** |

**Day 1: Room B**
**Session 1B-2: Novel Grid-based Methods for Structures and Fluids**

**Chair: Zhenquan Li, Xiao-Wei Gao**

| Time | ID | Title / Authors |
|------|-----|-----------------|
| 21:40-22:00 | *4591 | Zonal Free Element Method in Structure-Fluid Coupling Analysis Based on Interface Nodes Topology Sequence Interpolation Technique / **Xiao-Wei Gao** |
| 22:00-22:20 | *4566 | Application of a 2D Adaptive Mesh Refinement Method to the Flow Over Wall-mounted Plate / **Zhenquan Li** |
| 22:20-22:40 | 4653 | Electromagnetic Scattering Simulation Based on Element Differential Method / **Gao Lanfang** |
| 22:40-23:00 | 4552 | Structured Grids Based Method with Reformed Boundary Basis Functions for Solid and Structure / **Yanan Liu**, Fangxiong Tang, Guansi Liu |
| 23:00-23:20 | 4581 | Entropy Production Analysis of Energy Loss of a Francis Turbine Under Overall Operating Conditions: Hybrid RANS/LES Simulations / **Zhi-Feng Yu** |

**Day 2: Room A**
**Session 2A-1: Novel numerical techniques,  Data-driven Approaches, and Surrogate Models**
**Chair:  Yan Li, Zheng Hongjie**

| Time | ID | Title / Authors |
|------|-----|-----------------|
| 8:00-8:20 | *4641 | Phase Transition in Polymer Derived Ceramics (PDCs) and Its Effect on Mechanical Response / **Yan Li**, Chi Ma |
| 8:20-8:40 | 4719 | Timber Traceability with CNN Based Image Recognition Technology / **Zheng Hongjie**, Asano Miyoko, Asano Yoshiharu |
| 8:40-9:00 | 4605 | Numerical Study of Flapping Foil Energy Harvester Based on an Adaptive Immersed Boundary-lattice Boltzmann Flux Solver / **Li Weizhong** |
| 9:00-9:20 | 4673 | A Novel Surrogate Model Based Multi-objective Optimization Method Towards High IGD Quality / Yingchun Bai, **Puyi Wang**, Chengxiang Huang |
| 9:20-9:40 | 4599 | DADOS: A Cloud-based Data-driven Design Optimization System / Xueguan Song, **Shuo Wang**, Yonggang Zhao |
| 9:40-10:00 | 4578 | Effects of Impactor Mass and Dimension on CFRP Laminates Under Impact Loading / **Yuan Ke** |
| 10:00-10:20 | 4624 | Analysis of Failure Process of Bonded Pipe Joints Under Tension Loads / Hong Yuan, Jun Han, **Lan Zeng**, Ziyong Mo |
| 10:20-10:40 | 4639 | An Experimental and Numerical Study of Additively Manufactured Alsi10Mg Shell Structures with Lattice Infill / Yingchun Bai, **Chengxiang Huang**, Puyi Wang |
| 10:40-11:00 | *4687 | Bregman-iterative greedy coordinate descent for sparse polynomial chaos expansion in structural uncertainty analysis / **Jian Zhang**, Xinxin Yue, Jiajia Qiu |
| 11:00-11:20 | 4681 | Physics-Information-based Solver for Surface Partial Differential Equations / **Zhuochao Tang**, Zhuojia Fu |

**Day 2: Room B**
**Session 2B-1: Large Scale Coupled Problems and Related Topics, SFEM, SPH, and Related Techniques**
**Chair: Masao Ogino, Yuki Onishi**

| Time | ID | Title / Authors |
|------|-----|-----------------|
| 8:00-8:20 | *4638 | Performance Evaluation of Centroidal Voronoi Tessellation for Initial Particle Distribution of Particle Methods / **Masao Ogino**, Yutaka Ogisu |
| 8:20-8:40 | *4668 | Explicit Dynamic Analysis using Selective CS-FEM-T10 with Radial Element Subdivision / **Yuki Onishi** |
| 8:40-9:00 | 4699 | Improved Smoothed Particle Hydrodynamics (SPH) Model for Simulation of Abrasive Water-jet (AWJ) / Xiangwei Dong, **Ran Yu**, Mingchao Du, Zengliang Li, Long Feng |
| 9:00-9:20 | 4620 | Modes and Modal Analysis of Three-dimensional (3D) Structures Based on the Smoothed Finite Element Methods (S-FEMs) using Automatically Generatable Tetrahedral Meshes / **Jingui Zhao** |
| 9:20-9:40 | 4622 | A 3D Selective Smoothed Finite Element Method for Analysis of the Human Annulus Fibrosus with Fiber-matrix Interaction / **Xue Yan** |
| 9:40-10:00 | 4696 | Introduction to the Strain-smoothed Element Method / **Hoontae Jung**, Chaemin Lee, Phill-Seung Lee |
| 10:00-10:20 | 4678 | Analysis of Transcranial Stimulation Problems Based on the Smoothed Finite Element Method / Gang Wang, **Zhonghu Wang** |
| 10:20-10:40 | 4704 | A Full Smoothed High Order Cell Based Finite Element Method for Analysis of Axisymmetric Problems / **Xin Cui**, Zirui Li |
| 10:40-11:00 | 4685 | An Edge-based Smoothed Finite Element Method for 2D Frictionless Contact Problems / **Chao Sun** |

**Day 2: Room A**
**Session 2A-2: Modeling Techniques, Machine Learning for Complex Structures and Material Systems**
**Chair: Guannan Wang, Koichiro Ishikawa**

| Time | ID | Title / Authors |
|------|-----|-----------------|
| 20:00-20:20 | *4571 | A Robust and Efficient Micromechanical Tool in Studying Hygro-Thermo-Electro-Elastic Composites / **Guannan Wang** |
| 20:20-20:40 | *4658 | An Adaptive Artificial Neural Network-based Deep Generative Design Method / **Wenjing Ye**, Chao Qian, Renkai Tang |
| 20:40-21:00 | 4562 | Static Equivalent Modeling of Dynamic Seismic Forces for Realizing Earthquake Resistant Spatial Truss Structures / Koichiro Ishikawa, **Zhiyuan Gao** |
| 21:00-21:20 | 4597 | Influence of Material Properties on the Mechanical Responses of an Underwater Soil Mixing Process / **Jian Chen**, Daisuke Nishiura, Mikito Furuichi |
| 21:20-21:40 | 4647 | A Hybrid VOF and Level Set Interface Capturing Scheme with Cubic Surface Representations for Unstructured Meshes / **Yunong Xiong**, Bin Xie, Feng Xiao |
| 21:40-22:00 | 4646 | Structural Optimization of Laminate Composite Structures using Equivalent Static Loads / Donghyeon Yoo, Yijae Choi, Jinhwan Park, Kyunghun Jeon, Jaemin Moon, **Chang-Wan Kim** |
| 22:00-22:20 | 4661 | Modeling and Simulation Application of Multilayer Laminated Materials in Multi-physical Fields / **Wenxing Chen** |
| 22:20-22:40 | 4714 | Economic Parametric Optimization and Uncertainty Analysis in Ship Design using Monte Carlo Simulations / **Yuan Hang Hou**, Chong Fu, Ye Ping Xiong |
| 22:40-23:00 | 4748 | Improved Strategies for YOLOv2 + OC Object Detection System / Shuyong Duan, **Yijun Lu,** Ningning Lu, Heng Ouyang, Shuyong Duan |
| 23:00-23:20 | 4667 | Smoothed-Jump Q-Learning Algorithm for Optimal Robot Agent Path Planning / **Lin Xin Zhang**, Shu Yong Duan, Xu Han |

**Day 2: Room B**
**Session 2B-2: Meshfree and Other Advanced Numerical Methods for Engineering and Applied Mathematical Problems**
**Chair: Lihua Wang, Jianyao Yao**

| Time | ID | Title / Authors |
|------|-----|-----------------|
| 20:00-20:20 | *4672 | A Non-intrusive Parametrized Reduced Order Modeling for Unsteady Flows Based on Proper Orthogonal Decomposition / **Jianyao Yao** |
| 20:20-20:40 | *4694 | A Meshfree Stabilized Collocation Method and Its Applications in Fluid-structure Interactions / **Lihua Wang**, Zhihao Qian |
| 20:40-21:00 | 4606 | BESO Approach for the Optimal Retrofitting Design of Steel Hollow-Section Columns Supporting Industry Cranes / Sawekchai Tangaramvong, **Rut Su**, Thu Van Huynh |
| 21:00-21:20 | 4583 | Predictive Study on Mechanical Behavior of Additively Manufactured Nylon Products with Holes Considering a Probable Occurrence of Geometrical Imperfection / **Mizuki Maruno** |
| 21:20-21:40 | 4604 | Spectral Finite Element Method Combined with Bi-potential Approach for Efficient Simulation of Contact Acoustic Nonlinearity / **Huijian Chen**, Hongchen Miao, Ling Tao, Zhiqiang Feng |
| 21:40-22:00 | 4564 | Analysis of Transient Elastic Wave Scattering by Cavity in Micropolar Elastic Solids using 2-D M-EFIT / **Yusuke Suzuki**, Takahiro Saitoh, Sohichi Hirose |
| 22:00-22:20 | 4556 | Detection and Sizing of Surface Cracks on Tubular Components by Ultrasonic Phased Array with Surface Acoustic Waves / **Jing Xiao**, Yue Hu, Shuai Cao, Fangsen Cui |
| 22:20-22:40 | 4701 | Change in Mechanical Anisotropy of LCE by the Insertion of Grafted Au Nanoparticles: A Molecular Dynamics Study / **Hongdeok Kim** |
| 22:40-23:00 | 4734 | Estimation of the welding current in Gas Tungsten Arc welded (GTAW) process with a specified width penetration / **Quan Nguyen**, Son Nguyen_Hoai, Long Nguyen_Nhut_Phi, Thuan Lam_Phat |

**July 7<sup>th</sup>, 2021, Wednesday**
**Day 3: Room A**
**Session 3A-1:   Techniques for Optimization, Inverse, and Dynamic Problems**
**Chair:  Siddhesh Raorane, Shuyong Duan**

| Time | ID | Title / Authors |
|------|------|------|
| 8:00-8:20 | *4660 | Numerical Modeling and Analysis of Acoustic Emission Crack Sources / Pawel Packo, **Siddhesh Raorane**, Tadeusz Uhl |
| 8:20-8:40 | 4601 | Phasor Particle Swarm Optimization of Dome Structures Under Limited Natural Frequency Conditions / **Ei Cho Pyone** |
| 8:40-9:00 | 4655 | A Chaos Game Optimization Method for Weight Minimization of Steel Truss Structures / **Eain Kyi Thar**, Sawekchai Tangaramvong |
| 9:00-9:20 | 4644 | Simultaneous Size and Shape Steel Structural Optimization using Enhanced Comprehensive Learning Particle Swarm Optimization / **Soviphou Muong** |
| 9:20-9:40 | 4630 | A Turbulent Flow of Water-Based Optimization for the Optimal Sizing Design of Steel Trusses / **Saw Thiri Khaing** |
| 9:40-10:00 | 4609 | A Material Parameter Estimation Method Based on Ultrasonic Echo Measurement and Neural Network / **Jialin Zhang**, Heng Ouyang, Shuyong Duan |
| 10:00-10:20 | 4649 | Dynamic Fracture Modelling of Impact Test Specimens by the Polygon Scaled Boundary Finite Element Method / **Jiang Xinxin**, Zhong Hong, Deyu Li |
| 10:20-10:40 | 4677 | Comparative Study to Analyze Deformation/fracture Behavior Under High-velocity Impact using Different Dynamic Transient Operators / **Ravindra Kumar Saxena**, Yogeshwar Jasra, Pardeep Kumar, Nikesh Ojha |
| 10:40-11:00 | | |

**Day 3: Room B**
**Session 3B-1:  Particle and Collocation Methods, and Dynamics of Complex Structural Systems**
**Chair: Cosmin Anitescu, Dianlei Feng**

| Time | ID | Title / Authors |
|------|------|------|
| 8:00-8:20 | *4634 | An Isogeometric Collocation Method for Modeling the Mechanical Properties of Honeycomb Structures / **Cosmin Anitescu**, Yue Jia, Timon Rabczuk |
| 8:20-8:40 | *4602 | Numerical Methods for Biofilm Life Cycle Modeling at Different Time Scales: from Space-time Finite Element to SPH / **Dianlei Feng**, Insa Neuweiler, Moubin Liu |
| 8:40-9:00 | 4579 | Modelling of Two-layer Sloshing Based on Consistent Particle Method / **Xiujia Su**, Xizeng Zhao, Min Luo |
| 9:00-9:20 | 4680 | Box test and numerical simulation on settlement and energy dissipation characteristics of ballast under cyclic load / **Tianqi Zhang**, Yanyun Luo |
| 9:20-9:40 | 4592 | A New Lagrangian Discontinuous Galerkin Scheme on Moving Unstructured Triangular Mesh / Moubin Liu, **Wenbin Wu**, Na Liu, Chao Huang |
| 9:40-10:00 | 4640 | Modeling and Simulation of Gas and Solid Particle Two-phase Flow in the Abrasive Air-jet Machining / **Guangpei Zhu**, Moubin Liu |
| 10:00-10:20 | 4572 | Application of Riemann Solver on FPM for Solving Weakly Incompressible Flows / Moubin Liu, **Fan Zhang** |
| 10:20-10:40 | 4586 | Numerical Investigations on Penetration of Target Plates by Shaped Charge Jet using the Smoothed Particle Hydrodynamics (SPH) Method / **Jiahao Liu** |
| 10:40-11:00 | 4569 | Impact Analysis of Sandwiched Thin-walled Tubes with Face Plate / Pattabhi Ramaiah Budarapu, **Venkata Ravi Vusa** |
| 11:00-11:20 | 4568 | Performance Analysis of Hierarchical Sandwiched Honeycomb Core Cellular Structures / Pattabhi Ramaiah Budarapu, **Dileep Kumar Korupolu**, Venkata Ravi Vusa |
| 11:20-11:40 | 4724 | Numerical modelling investigation of wave overtopping on stepped-type seawall structures / **Bao-Loi Dang**, Viet Quoc Dang , Magd Abdel Wahab, H. Nguyen-Xuan |

**July 7th, 2021, Wednesday**
**Day 3: Room A**
**Session 3A-2: Modeling Techniques for Biological Systems, Metamaterials, and Complex Processes**
**Chair: Bing Li, Fei Jiang**

| Time | ID | Title / Authors |
|------|-----|----------------|
| 20:00-20:20 | *4723 | Compact Elastic Metamaterial Structures for Vibration and Elastic-wave Control / **Bing Li**, Eric Li, Yongquan Liu |
| 20:20-20:40 | *4563 | Multiscale Modeling for Pulmonary Airflow Simulation / Xian Chen, **Fei Jiang**, Tsunahiko Hirano, Junji Ohgi, Kazuto Matsunaga |
| 20:40-21:00 | *4550 | Blood Flow in Right Coronary Arteries with Multiple Stenoses / **Biyue Liu** |
| 21:00-21:20 | *4654 | Twinning Prediction of Annealed Pure Ti Printed by Selective Laser Melting Based on Machine Learning / **Kewei Chen, Hua Li** |
| 21:20-21:40 | 4570 | Second Harmonic Generation Image-based Strain Analysis of an Osteon in Peri-Implant Jaw Bone / **Noemie Jeannin**, Naoki Takano, Kento Odaka, Satoru Matsunaga |
| 21:40-22:00 | 4617 | A Novel Parameters Identification Procedure for Aortic Walls Based on Hybrid Artificial Intelligence Approaches / Jianbing Sang, **Yang Li**, Xinyu Wei, Zhengjia Shi, Kexin Shao |
| 22:00-22:20 | 4614 | A Review of Theoretical Modeling and Numerical Simulation of Directed Energy Deposition (DED) Process / **Stanley Jian Liang Wong**, Hua Li |
| 22:20-22:40 | 4717 | Additively Manufactured Meta-lattice Sandwich Plates for Broadband Low-frequency Vibration Suppression / **Hao Li**, Jianlin Chen, Bing Li |
| 22:40-23:00 | 4718 | Broadband Elastic Metasurface for Extraordinary Wavefront Manipulations / Bing Li, **Yabin Hu** |

**Day 3: Room B**
**Session 3B-2: Techniques for Multiscale Multiphysics Systems**
**Chair: Haifei Zhan, Zhenjun Yang**

| Time | ID | Title / Authors |
|------|-----|----------------|
| 20:00-20:20 | *4613 | Thermal Transport Properties of Polymer Nanocomposites with Ultrathin Carbon Nanothreads / **Haifei Zhan** |
| 20:20-20:40 | 4574 | Micro CT Image-based Reconstruction of Random Fields and Mesoscale Fracture Modelling of Concrete / Zhen-jun Yang, **Yu-jie Huang**, Hui Zhang, Jian-ying Wu |
| 20:40-21:00 | 4582 | Two-dimensional Meso-scale Simulation of Hydraulic Fracture in Concrete / Zhenjun Yang, **Kelai Yu**, Xin Zhang, Guohua Liu |
| 21:00-21:20 | 4576 | A Hydro-damage-mechanical Coupled Numerical Method for Fracking in Poroelastic Media Based on a Phase-field Regularized Cohesive Zone Model / Zhenjun Yang, **Hui Li** |
| 21:20-21:40 | 4623 | Mesoscale Modelling of Interfacial Failure Between FRP Sheet and Concrete / **Zihua Zhang**, Jialong Guo, Xuan Wang |
| 21:40-22:00 | 4728 | Meso-scale Modelling of Ceramic Ball Aggregated Ultra-high Performance Geopolymer Concrete Under Projectile Impact / **Kefo Qu**, Jian Liu, Chengqing Wu |
| 22:00-22:20 | 4593 | Dynamic Analysis of Non-contact Atomic Force Microscope by Vibration Characterization / **Tang LianChen**, Xiao WenLei |
| 22:20-22:40 | 4702 | Molecular Dynamics Study of Oxygen Adsorption and Oxidation on Aluminum Surface / **Youngoh Kim** |
| 22:40-23:00 | 4700 | Molecular Dynamics Analysis of Interstitial Sites Change of MWCNT Bundle According to In-plane Compression Deformation / **Byeonghwa Goh** |
| 23:00-23:20 | 4612 | Effective Enhancement of Carbon Nanothread on the Mechanical Properties of Polyethylene Nanocomposite / **Chengkai Li** |

**July 8th, 2021, Thursday**
**Day 4: Room A**
**Session 4A-1: Uncertainty Quantification and Analysis**
**Chair: Zhe Zhang, Sawekchai Tangaramvong**

| Time | ID | Title / Authors |
|------|-----|-----------------|
| 8:00-8:20 | *4565 | An Efficient Reliability-based Design Optimization Approach using PDF-based Performance Shift Strategy / **Zhe Zhang**, Chao Jiang |
| 8:20-8:40 | 4610 | A Reliability Analysis Method for Bearing Elastohydrodynamic Lubrication Under Stochastic Load / **Miaojie Wu** |
| 8:40-9:00 | 4600 | Combined Gaussian Process Regression Model and Comprehensive Learning Particle Swarm Optimization for Reliability-based Structural Design / **Thu Van Huynh** |
| 9:00-9:20 | 4657 | Sensitivity Analysis of Artillery External Ballistic Based on the Approximate High Dimensional Model Representation / **Nichen Tong**, Qiming Liu, Xu Han |
| 9:20-9:40 | 4621 | Generalized Probability and Interval Hybrid Reliability Analysis Based on a Two-stage Active Learning Kriging Model / **Mengchen Yu**, Xiangyun Long |
| 9:40-10:00 | 4561 | Influence of Random Soil Parameters on Seismic Reliability of Underground Structure / **Yifan Fan**, Zhiyi Chen, Zhiqian Liu |
| 10:00-10:20 | | |
| 10:20-10:40 | | |
| 10:40-11:00 | | |

**Day 4: Room B**
**Session 4B-1: Inverse Problems and Optimization Techniques**
**Chair: Feng Li, Cuong Tan Nguyen**

| Time | ID | Title / Authors |
|------|-----|-----------------|
| 8:00-8:20 | 4608 | Optimal Inspection Period for Structures Subjected to Fatigue / **Feng Li** |
| 8:20-8:40 | 4663 | The Finite Element Method for Inverse Wave Scattering in Rods / Bang Xuan Trinh, **Cuong Tan Nguyen** |
| 8:40-9:00 | 4573 | The Inverse Analysis of Thermophysical Parameters of Malan Loess Based on Machine Learning and Finite Element Method / **Qingbo Chen** |
| 9:00-9:20 | 4553 | Rapid Seismic Damage Evaluation of Subway Stations using Machine Learning Techniques / **Pengfei Huang,** Zhiyi Chen |
| 9:20-9:40 | 4751 | Two-way Neural Network Computational Inverse Theory Method / **Yl Li**, SY Duan |
| 9:40-10:00 | 4664 | A Novel Dimensionality Reduction Method for Inverse Problem / **Zhiping Hou**, Shuyong Duan, Xu Han, Guirong Liu |
| 10:00-10:20 | 4732 | Optimization analysis of stiffened composite plate using iJaya algorithm / **Lam Phat Thuan**, Nguyen Hoai Son, Nguyen Nhut Phi Long, Nguyen Quan, Doan Dinh Thien Vuong |
| 10:20-10:40 | | |
| 10:40-11:00 | | |