COMPSAFE 2025

1st-4th July 2025

Kobe International Conference Center,
Kobe, JAPAN

Hosting Organizations

Japan Association for Computational Mechanics

The Japan Society for Computational Engineering and Science

Supporting Organizations

Asian Pacific Association for Computational Mechanics

International Association for Computational Mechanics

Kobe University

National Research Institute for Earth Science and Disaster Resilience

RIKEN Center for Computational Science (R-CCS)

University of Hyogo

CONFERENCE CHAIRS

Makoto Tsubokura

Kobe University/ RIKEN R-CCS

Dear Colleagues and Participants,

On behalf of the Organizing Committee, it is my great pleasure and honor to welcome you to the 4th International Conference on Computational Engineering and Science for Safety and Environmental Problems (COMPSAFE2025), held from July 1st to 4th, 2025, at the Kobe International Conference Center.

COMPSAFE first began in April 2014 in Sendai, Japan, followed by the second conference in Chengdu, China, in October 2017. The third conference was originally scheduled to be held in Kobe, but due to the COVID-19 pandemic, it was conducted entirely online in December 2020. We are now delighted to finally hold this long-awaited fourth edition in person here in Kobe.

This year, COMPSAFE2025 is proudly organized as both an APACM Thematic Conference and an IACM Special Interest Conference, underscoring its important role in the international community of computational engineering and mechanics.

We are pleased to welcome over 350 registered participants from around the world. The technical program features more than 300 presentations, mainly from Asia, distributed across up to 13 parallel sessions. Furthermore, we are honored to host three Plenary Lectures and thirteen Semi-Plenary Lectures by distinguished researchers who are at the forefront of this field. These talks will offer valuable insights into cutting-edge research and future directions in computational approaches to safety and environmental challenges.

Kobe is a city closely connected to the theme of this conference. In January 1995, the city was struck by the Great Hanshin-Awaji Earthquake, which caused devastating damage. Since then, Kobe has become a symbol of recovery and resilience, with continuous efforts in disaster preparedness and safety innovation. It is, therefore, an ideal setting for a conference dedicated to advancing computational technologies for safety and environmental problem-solving.

Surrounded by both mountains and the sea, Kobe offers a beautiful natural setting and a culturally rich atmosphere. Since opening to the world as a port city in the 19th century—alongside Yokohama—Kobe has flourished as an international hub with a unique blend of tradition and modernity. The city is also known for its world-class cuisine, including the famous Kobe beef, which we hope you will enjoy during your stay.

I sincerely hope that COMPSAFE2025 will be an intellectually stimulating and rewarding experience for all of you, and that your time in Kobe will be both enjoyable and memorable.

We look forward to engaging discussions, new collaborations, and shared visions for a safer and more sustainable future.

Toshio Nagashima
The president of JSCES

Dear Participants,

We are honored to co-host COMPSAFE2025 with the Japan Association for Computational Mechanics (JACM).

We are grateful to all of you who have come from all over the world to participate in this conference, which is being held here in Kobe, Japan.

COMPSAFE is an international academic conference on using computational mechanics and engineering to contribute to realizing a safe and secure society. I feel it is significant that we have the opportunity to bring together people who are active at the forefront of various fields to share knowledge and deepen discussions on such an important theme.

The Japan Society of Computational Engineering and Science (JSCES), of which I am the president, is an academic organization in Japan where researchers in computational engineering from industry and academia are active. It will celebrate its 30th anniversary in 2025. Many members will participate in this conference, presenting their research results and/or listening to lectures.

I would like to express my deepest gratitude to the members of the international advisory committee, the local organizing committee, the local arrangements committee, the supporting organizations, and all those involved in making this conference possible, and I sincerely hope that all participants will have a fruitful experience.

Seiya Hagihara
The president of JACM

Dear Participants,

We are pleased to welcome you to the 4th International Conference on Computational Engineering and Science for Safety and Environmental Issues (COMPSAFE 2025), to be held in Kobe in Japan. We are honored to co-host COMPSAFE2025 with The Japan Society for Computational Engineering and Science (JSCES).

I am the president of the Japan Association for Computational Mechanics (JACM), an APACM member society and IACM affiliated society. On behalf of all the individual members of the JACM and 29 JACM affiliated computational mechanics societies in Japan, I would like to welcome all of you to Kobe Japan.

First, I would like to thank you all for your participations in COMPSAFE 2025. I would also like to thank Professor Makoto Tsubokura and the organizing committee members.

The JACM was established on December 17, 2002 and, as stated in the statutes, is an affiliated society of IACM (International Association for Computational Mechanics). The JACM is a kind of umbrella organizations independent of the domestic academic societies. 39 GC members were elected from 29 computational mechanics-related societies in Japan. JACM has brought the 29 societies together and has connected them with IACM and APACM activities.

It is hoped that more members of the national societies will continue to participate more actively in IACM and APACM-related international conferences such as COMPSAFE2025. I would like to hope you to obtain new discoveries and knowledges during the conference that will lead us to safety and security.

I am looking forward to seeing you at the future IACM and APACM-related international conferences.

Plenary Lectures

Prof. **YuanTong Gu** (Queensland University of Technology)

Physics-informed Machine Learning: a powerful computer modelling framework for engineering and science

In recent years, physics-informed neural networks (PINNs) have revolutionized the application of machine learning to solving partial differential equations (PDEs). By combining data-driven and physics-based models, PINNs retain the strengths of both approaches, showing exceptional potential in addressing a wide range of complex problems. As a result, they have garnered increasing attention in many applications, particularly for problems with strong nonlinearities. The PINN has been becoming a game-changer for computer modelling and simulation for engineering and science.

This talk will first review the latest advancements in the use of PINNs for mechanics, including solid mechanics, nonlinear mechanics, fracture analysis, structural optimization, fluid mechanics, and more. Next, the challenges in applying PINNs to mechanics will be discussed. Finally, recent research from the speaker's group will be presented, covering topics such as the new neural network architecture in PINN for mechanics, PINN-based structural topology optimization, food drying modelling, dynamic and nonlinear problem solving, and inverse problems. It has proven that physics-informed machine learning will be the new generation of a computer modelling framework for mechanics.

Prof. **Jung-Wuk Hong** (Korea Advanced Institute of Science and Technology)

Recent Advances in Nonlocal Methods for Computational Mechanics

This plenary talk presents recent advancements in nonlocal methods for computational mechanics, emphasizing their pivotal role in addressing challenges such as fracture, damage, and multiscale interactions in which classical continuum-based methodologies often encounter limitations. Nonlocal methods, which incorporate interactions within a specific range, provide a robust alternative by capturing complex behaviors in materials with discontinuities and intricate microstructures. The talk begins with an overview of current nonlocal approaches classified as either mesh-based or meshless nonlocal methods and then focuses on the peridynamics as one of the notable recent methodologies. Peridynamics provides an innovative framework for simulating damage and fracture mechanics without reliance on traditional differential operators, enabling more accurate modeling of damage and discontinuities. By exploring the latest developments in peridynamic theory and its applications across engineering fields, this talk aims to inspire further advances in computational mechanics, particularly in nonlocal methodologies.

Prof. **Michael Kaliske** (Technische Universität Dresden)

Theoretical-numerical Approaches to Damage and Fracture Analysis of Structures

The design of resilient structures depends on a comprehensive understanding of structural behavior through realistic models of material damage, fracture processes, and failure to evaluate complex load scenarios, optimize repair intervals, and predict remaining lifetimes. This plenary talk explores key aspects of nonlocal damage models applied to multiaxial loading scenarios, emphasizing the mechanisms of induced anisotropy, which is inherent in concrete. Applications to discretization techniques, including the Finite Element Method (FEM) and the Material Point Method (MPM), illustrate the versatility and integration of these material models across different computational frameworks.

Another focus is on recent energy-based fracture formulations, discussing their potential in addressing complex fracture processes such as crack branching, multi-physical couplings, and impact loads. Additionally, we introduce an algorithm for calculating effective limit criteria for composites and multiscale materials. Its computational efficiency enables the exploration of the structural design space and facilitates structural optimization. The presented models and frameworks are demonstrated through diverse examples, spanning concrete structures, wooden artwork, pavement systems, and glass components.

Semi-Plenary Lectures

Prof. **Leszek Demkowicz** (The University of Texas at Austin)

DPG Method on a New Road to Nonlinear Problems

2025 marks the 16th anniversary of our first foundational papers on the Discontinuous Petrov- Galerkin method with Optimal Test Functions, in short the DPG method. In the talk, I will attempt to present DPG fundamentals for linear problems illustrated with a few numerical examples, and an outlook at the generalization of the DPG methodology to nonlinear problems represented by a nonlinear elasticity problem.

Prof. **Tsuyoshi Ichimura** (The University of Tokyo)

Earthquake simulation enhanced by high-performance computational science

With the accumulation of measurement data, there is an increasing need for analysis using high fidelity models. The huge analysis cost associated with these models is a common problem in many fields. Such analysis will often not be possible simply by using conventional methods and a supercomputer, so there is a need to develop computer architecture-aware algorithms that can take advantage of massively parallel supercomputers. On the other hand, the integration with data science (e.g. neural networks) is being promoted to improve the efficiency of analysis, but accuracy assurance is often an issue. This talk will present recent computational science algorithms with high performance computing (including integrated algorithms with data science that can guarantee accuracy to further improve the efficiency of analysis) that are suitable for modern computer systems/architectures to efficiently solve large-scale nonlinear/linear, dynamic/static problems. This presentation will show implementations using the finite element method with an application example for earthquake problems, but it is expected to be applied and extended to other similar problems.

Prof. **Kiao Inthavong** (RMIT University)

Revealing respiratory physiology defence of inhaled airborne particles through multiphase flow simulations

The respiratory system is a remarkable structure with complex physiological functions that sustain life autonomously by delivering oxygen to the body and expelling carbon dioxide. On average, a person takes about 20,000 to 25,000 breaths per day, equating to approximately 10,000 to 12,500 liters of air. Hidden within this system are evolutionary anatomical features that serve as defense mechanisms, protecting us from airborne pollutants and viruses. Recent advancements in radiology have enabled multiphase flow simulations within computational fluid dynamics (CFD) for respiratory models. In this talk, I will present recent simulation outcomes that reveal the intricate and evolutionary adaptations of the airways that serve to protect us. This includes an analysis of the risks associated with exposure to airborne pollutants such as pollen, silica, asbestos, and viruses (e.g., COVID-19). Furthermore, I will explain how certain sub-anatomies serve extended, hidden functions in addition to their traditional roles–for instance, the larynx does more than just enable vocalization. The talk will also explore how the airway's shape can be leveraged to enhance drug delivery, offering new strategies to combat systemic diseases. Finally, the talk will conclude with future work that aims to enable instant diagnosis directly from a visit to the radiology center.

Prof. **Artem Korobenko** (University of Calgary)

Advances in Variational Multiscale Methods for Optimizing Wind and Marine Energy Systems

Accelerating the deployment and scientific advancement of wind and marine energy systems requires the development of predictive multi-fidelity numerical tools integrated into their design, operation, and management. In this talk, I will present recent advances in variational multiscale (VMS) methods that address various technological and scientific challenges in marine and wind energy applications. These challenges include high-Reynolds number turbulent flows in complex domains, wake-structure interactions, free-surface and cavitation effects, complex topography, stratification, and more. The numerical framework developed by the CFSMgroup at the University of Calgary (https://www.cfsmgroup.com/) utilizes the incompressible Navier-Stokes equations, along with a transport equation for vapor/volume fraction (for multiphase flows) or temperature (for stratified flows). The VMS method operates as an LES-like approach, eliminating the need for filters or artificial dissipation. The formulation supports both linear finite elements and quadratic NURBS discretization, with enhanced stability and accuracy near walls achieved through weak imposition of boundary conditions, similar to classical wall modeling approaches. The robustness and accuracy of this framework will be demonstrated through a range of challenging applications, including simulations of vertical-axis hydrokinetic turbines in turbulent flow with free surfaces, full-scale and geometrically complex cavitating flow simulations, wind farm modeling under stable atmospheric boundary layers, flow over complex terrains, and more.

Prof. **Antonia Larese** (Università degli Studi di Padova)

Integrating Multiphysics and Particle-Based Techniques: A New Frontier in Natural Hazard-Structure Interaction Modeling

Climate change has intensified the frequency and severity of natural hazards involving large mass movements such as landslides, debris flows, and mud flows. These phenomena pose significant threats to structures, landscapes, and human life, necessitating urgent scientific attention and effective mitigation strategies.

The numerical simulation of these events presents significant challenges, primarily due to the need to handle large strain regimes and their intrinsic multiphysics nature. While the Finite Element Method (FEM) is well-established in many engineering fields, it shows limitations when dealing with large deformations and complex material laws. To overcome this crucial drawback, particle-based methods have emerged as groundbreaking solutions. Among these, the Material Point Method (MPM) stands out as a hybrid technique that blends the advantages of both mesh-based and mesh-less methods.

This study presents recent advances in MPM formulations, including irreducible and mixed formulations stabilized using variational multiscale techniques, as well as partitioned strategies to couple MPM with other methods like FEM or DEM, further enhancing its versatility in multiphysics simulations. These novel numerical formulations aim to accurately simulate multiphysics phenomena involving the interaction of water, air, particles, complex boundaries, and soil in mountainous contexts.

The research focuses on high-fidelity modeling of water-related hazards and their interaction with structures or protection systems. Additionally, recent work on acoustic wave emission, potentially crucial for early warning systems, is presented. All algorithms are implemented within the open-source Kratos-Multiphysics framework.

Prof. **Xinzheng Lu** (Tsinghua University)

Generative-AI Design and Intelligent Optimization of Building Structures

Traditional building structure design methods are inefficient and heavily dependent on engineers' expertise. Emerging generative AI technologies, while promising, require enhancements in the safety and cost-effectiveness of their designs. This study introduces an integrated generative AI and intelligent optimization framework for building structure design. Leveraging generative AI, the intelligent generation algorithm generates feasible design schemes by learning from existing drawings and considering constraints of architectural layout, design conditions, mechanical principles, and empirical rules. Accelerated by data-driven and domain knowledge-enhanced computational models and evaluation functions, the intelligent optimization algorithm refines AI-generated designs swiftly. The proposed method, integrating intelligent generation and optimization, ensures design safety and cost-efficiency, and mitigates the challenges of scarce and poor-quality training data faced by AIs. Case studies demonstrate that the structural designs produced by the proposed method are on par with those of human experts, meeting design criteria and enhancing efficiency. The proposed intelligent design platform has been adopted by over a hundred design and research institutes, impacting thousands of engineering projects.

Prof. **Akiko Matsuo** (Keio University)

Combustion Simulations Beyond the Hazard of Explosion and Detonation

The words “Explosion" and “Detonation” are negative in terms of safety. They destroy our property and are so-called "physical hazards”. In particular, “detonation" is a dangerous and unpleasant event, and nobody wants to see the results. Scientifically, detonation is one of the premixed combustion phenomena that propagate at hypersonic speed such as Mach number 5. For several decade, detonation has been attractive to the space propulsion research community as a “detonation engine”. Research began with the “pulsed detonation engine (PDE)”, in which detonations occur intermittently to produce thrust for space propulsion. Following the trend for PDE, a new type of detonation engine appeared: the “rotating detonation engine”. Many research institutions succeeded in developing it, and it was eventually launched on a rocket and tested in space. While detonation engines were being developed in many places, CFD with combustion was a powerful tool for elucidating the physics of the newly developed engines. Today, detonation is also an attractive term from an industrial perspective. In the presentation, I would like to introduce the results of a series of simulations of the fundamentals and development research of detonation engines.

Prof. **Satoru Oishi** (Kobe University)

Digital Twins for Smart Disaster Prevention and Automatically Executing Disaster Simulations

To address the increasing frequency and severity of earthquakes and weather-related disasters, it is essential to rapidly and comprehensively predict the damage and impact of natural disasters, utilizing these insights to enhance response efforts. A disaster prevention digital twin provides a powerful solution by integrating cyber and physical spaces, predicting potential damage, and optimizing response strategies based on these predictions. Our team is developing a disaster prevention digital twin that combines social infrastructure data, social dynamics, and real-time sensing data within cyberspace. This digital twin aims to mitigate damage by supporting appropriate evacuation guidance and accelerating early recovery by effectively assessing repair priorities for damaged infrastructure.

Prof. **Hiroshi Okada** (Tokyo University of Science)

Redefined three-dimensional J-integral and J-integral range ΔJ for finite strain elastic-plastic fracture mechanics (considerations on energy release rate and weakly singular terms)

In this presentation, the redefined three-dimensional J-integral and J-integral range ΔJ as finite strain elastic-plastic crack parameter with considerations on energy release rate and weakly singular terms are presented. The redefined three-dimensional J-integral was proposed by the authors with rigorous considerations on the power of external force and deformation energy stored or dissipated in the solid. In the process of deriving the redefined J-integral, weakly singular terms that were related to the deformation energy dissipation in the vicinity of the crack front were found to arise. They played important roles in the characterization of elastic-plastic crack propagation phenomenon. However, the weakly singular terms have not been discussed in previous studies on the three-dimensional J-integral. Then, the redefined J-integral was extended to the J-integral range ΔJ for cyclic load problems.

Crack propagation analyses both under monotonic and cyclic loads are presented. They reveal that the present redefined J-integral and ΔJ characterize the energy release at and the deformation energy dissipation in the vicinity of the crack front.

Prof. **Shabnam J. Semnani** (University of California, San Diego)

Landslide hazard assessment under changing climate conditions

Rainfall-triggered landslides are widespread natural hazards which take a heavy toll on lives, properties, and infrastructure each year. Estimating the regional evolution of landslide hazard in a changing climate is essential for adaptation planning and risk mitigation efforts. Various data-driven and machine learning based algorithms have been applied to assess landslide susceptibility. However, data-driven methods fail to account for the physical mechanisms behind landslides and are affected by issues such as extrapolation. On the other hand, physics-based models are typically only applicable to a limited region. In this talk, we present the recent advances in data-driven and physics-informed landslide susceptibility assessment techniques as promising tools to investigate landslide susceptibility and its evolution at the regional and national scales to inform decision making and risk mitigation efforts.

Prof. **Fei Xu** (Northwestern Polytechnical University)

The improvement of SPH method and its applications in the field of civil aviation

In recent years, the Smoothed Particle Hydrodynamics (SPH) method has advanced in algorithms and applications. To improve the computational accuracy, stability and efficiency, several numerical algorithms are proposed. Based on Finite Particle Method (FPM), a specified FPM is derived by matrix decomposition, which possesses simple calculation with high efficiency. A generalized FPM algorithm is studied, which has no extra limit on the number of particles and may approach high-order accuracy. Secondly, a DSFPM algorithm is presented to obtain high accuracy at interfaces among multi-material problems. Further, the idea of SFPM is introduced into Total Lagrangian SPH to describe large deformation of solid.

The above improved algorithms with recent progress of SPH in fluid, such as δSPH, GSPH, provide opportunities to solve complex problems in civil aviation. To meet the airworthiness requirements, these improved methods can be used to evaluate crucial and safety problems, such as the water spray of airplane tires running on the contaminated runway, the airworthiness assessments of aircraft ditching, the bird strikes and discrete fragment impact, etc. Furthermore, other Fluid Solid Interaction problems related to the airplane flying, such as oil tank sloshing, oil pump operation can be simulated. As artificial intelligence and machine learning technologies develop, the SPH method will provide an insightful contribution to engineering problems.

Prof. **Jun Yan** (Dalian University of Technology)

Intelligent design of topology optimization considering physics-related information

Structural optimization design is an effective means to achieve innovative structural design configurations, widely applied in structural design fields such as aerospace, automotive, and marine engineering. However, with the increase of the problem complexity, the number of structural design variables has surged, traditional topology optimization methods face the significant computational challenges. Due to the powerful nonlinear learning and computational capabilities of deep learning algorithms, applying deep learning algorithms to topology optimization design to speed up the topology optimization process has emerged as the most promising new discipline in topology optimization. This paper significantly improves the efficiency of topology optimization by combining deep learning models with traditional topology optimization methods such as SIMP (Solid Isotropic Material Penalty) and MMC (Moving Morphable Component). By incorporating physics-related information (such as principal stress matrices and temperature gradient matrices) into model training, a neural network prediction model based on a small sample set is constructed, yielding highly accurate prediction results. A data preprocessing method and a new form of loss function PMSE (Penalty Mean Square Error) that conform to the data characteristics of the optimization algorithm are proposed to improve the model prediction accuracy for structural boundaries. At the same time, the effects of different input modes on the final prediction results are compared. The results show that the introduction of physical information related to the objective function can effectively improve the prediction accuracy of the model, which provides new ideas for topology optimization methods based on deep learning.

Prof. **Zohar Yosibash** (Tel Aviv University)

Autonomous finite element analysis of fracture prediction in human bones applied in clinical practice

The prescription of medications for individuals at risk of osteoporotic hip fractures, or the recommendation of prophylactic surgery for patients with femoral metastases, requires reliable, validated, patient-specific finite element analyses (FEAs). Traditionally, these analyses have been challenging to automate due to their complexity, including geometry generation from CT scans, the application of heterogeneous bone material properties, complex failure laws, and physiological boundary conditions.

Recent advancements such as low-dose CT scanning, machine learning, and high-order FEAs with inherent accuracy verification now enable a fully autonomous approach to evaluating bone strength and fracture risk. This new approach, termed autonomous finite element (AFE) analysis, represents a paradigm shift in FEA application.

This presentation introduces a novel patient-specific AFE process for femurs, designed for clinical practice. It encompasses automatic femur segmentation from CT scans using U-Net, automated mesh generation and boundary condition applications based on anatomical markers, high-order FE analysis with numerical error control, and an automatically generated report that clearly assesses fracture risk.

Two clinical applications of AFE will be demonstrated: (a) Quantifying fracture risk in patients with femoral tumors, along with surgical recommendations, and (b) opportunistically identifying patients at high risk for hip fractures.

COMSAFE 2025 Schedule Overview

	Room 301 (360)	Room 401 (124)	Room 402 (102)	Room 403 (104)	Room 404 (52)	Room 405 (52)	Room 406 (52)	Room 407 (34)	Room 501 (212)	Room 502 (212)	Room 503 (84)	Room 504 (84)	Room 505 (100)
7/1(Tue)													
09:00-16:00	Conference Excursion												
16:00-20:00	Registration@Kobe International Conference Center, 3F												
18:00-20:00	Welcome Reception @ Portopia Hotel, Owada(South Build. 1F)												
7/2(Wed)													
08:15-17:00	Registration@Kobe International Conference Center, 3F												
08:30-09:00	Coffee Break												
09:00-09:15	Opening Ceremony @ Room301												
09:15-10:15	Plenary Lecture-Prof. Michael Kaliske @ Room 301												
10:15-10:40	Coffee Break												
10:40-11:20	Semi-Plenary Lecture-Prof. Leszek Demkowicz @ Room 301				Semi-Plenary Lecture-Prof. Akiko Matsuo @ Room 501				Semi-Plenary Lecture-Prof. Fei Xu @ Room 502				
11:20-12:00	Semi-Plenary Lecture-Prof. Tsuyoshi Ichimura @ Room 501						Semi-Plenary Lecture-Prof. Antonia Larese @ Room 502						
12:00-13:00	Lunch Break @Ariston Hotel/Kobe Sankan												
13:00-15:00	MS16	MS08	MS22	MS06	MS10	MS09	MS11	MS24	MS05	MS07	MS17	MS20	MS01
15:00-15:30	Coffee Break												
15:30-17:30	MS16	MS08	MS22	MS06	MS10	MS09	MS11	MS24	MS05	M07	MS17	MS20	MS01
7/3(Thu)													
08:15-17:00	Registration@Kobe International Conference Center, 3F												
08:30-09:00	Coffee Break												
09:00-10:00	Plenary Lecture-Prof. Jung-Wuk Hong @ Room 301												
10:00-10:20	Coffee Break												
10:20-11:00	Semi-Plenary Lecture-Prof. Artem Korbenko @ Room 501						Semi-Plenary Lecture-Prof. Hiroshi Okada @ Room 502						
11:00-11:40	Semi-Plenary Lecture-Prof. Shabnam J. Semnani @ Room 501						Semi-Plenary Lecture-Prof. Satoru Oishi @ Room 502						
11:40-13:00	Lunch Break @Ariston Hotel/Kobe Sankan												
13:00-15:00	MS16	MS08	MS22	MS06	MS10	MS09	MS11	MS25	MS05	MS07	MS17	MS20	MS01
15:00-15:30	Coffee Break												
15:30-17:30	MS16	MS08		MS06	MS13	MS15	MS03	MS25	MS05	MS07	MS14	MS02	
18:30-21:00	Banquet@Portopia Hotel, Owada(South Build. 1F)												
7/4(Fri)													
08:15-17:00	Registration@Kobe International Conference Center, 3F												
08:30-09:00	Coffee Break												
09:00-10:00	Plenary Lecture-Prof. Yuan Tong Gu @ Room 301												
10:00-10:20	Coffee Break												
10:20-11:00	Semi-Plenary Lecture-Prof. Kiao Inthavong @ Room 501						Semi-Plenary Lecture-Prof. Xinzheng Lu @ Room 502						
11:00-11:40	Semi-Plenary Lecture-Prof. Zohar Yosibash @ Room 501						Semi-Plenary Lecture-Prof. Jun Yan @ Room 502						
11:40-13:00	Lunch Break @Ariston Hotel/Kobe Sankan												
13:00-15:00	MS16	MS08	MS04	MS12	MS13	MS15	MS03		MS05	MS07	MS14	MS02	MS23
15:00-15:30	Coffee Break												
15:30-17:30			MS04	MS12	MS18	MS21					MS14	MS02	MS23
17:40-17:45	Closing Celemony @ Room301												

MS-01: Combustion Simulations for Safety and Environmental Problems
Akiko Matsuo (Keio University), Yuji Nakamura (Toyohashi University of Technology), Ryoichi Kurose (Kyoto University), Huangwei Zhang (National University of Singapore), Xinyan Huang (Hong Kong Polytechnic University)

MS-02: Computational Methods for Water Environmental Problems and Coastal/Flood Disaster Mitigation
Kazuo Kashiyama (Chuo University), Ethan Kubatko (The Ohio State University),Clint Dowson (The University of Texas at Austin), Eirik Valseth (The University of Texas at Austin)

MS-03: Advances in Hypercomplex Disaster Simulation and Modeling
Joannes J. Westerink (University of Notre Dame), Seizo Tanaka (Hiroshima Institute of Technology), Takatoshi Kiriyama (Shimizu Corporation), Mitsuteru Asai (Kyushu University), Shinsuke Takase(Hachinohe Institute of Technology)

MS-04: Numerical Simulation in Geomechanics and Geodisasters Co-organized by TC103 of International Society for Soil Mechanics and Geotechnical Engineering
Kazunori Fujisawa (Kyoto University), Takayuki Shuku (Tokyo City University), Babloo Chaudhary (National Institute of Technology Karnataka), Vikas Sharma (Kyoto University)

MS-05: Novel Numerical Methods and Multi-Approach Strategies in Computational Mechanics
Koji Nishiguchi (Nagoya University), Naoto Mitsume (University of Tsukuba), Shunhua Chen (Sun Yat-sen University), Tetsuya Matsuda (University of Tsukuba), Toshiyuki Imamura (RIKEN), ChungGang Li (National Cheng Kung University), Wei-Hsiang Wang (National Chung Hsing University), Hiroyuki Omura (National Research Institute for Earth Science and Disaster Resilience)

MS-06: Multiscaling for Safety and Environmental Problems
Akiyuki Takahashi (Tokyo University of Science), Yuichi Tadano (Saga University), Tong-Seok Han (Yonsei University)

MS-07: Multiscale Modeling and Multiscale Analysis for Computational Materials and Engineering Applications.
Shu-Wei Chang (National Taiwan University), Seunghwa Ryu (Korea Advanced Institute of Science and Technology)

MS-08: Recent Advances in Impact and Blast Analyses
Masuhiro Beppu (National Defense Academy), Piotr Sielicki (Poznan University of Technology), Akemi Nishida (Japan Atomic Energy Agency), Masato Komuro (Muroran Institute of Technology), Wensu Chen (Curtin University), Yifei Hao (Hebei University of Technology), Xihong Zhang (Curtin University), Toshiyuki Horiguchi (National Defense Academy), Thong Pham (University of South Australia)

MS-09: Recent Advances in Computational Fracture Mechanics and Failure Analysis
Yoshitaka Wada(Kindai University),Hiroshi Okada(Tokyo University of Science),Toshio Nagashima(Sophia University),Xiaosheng Gao(Acron University),Ayhan Ince(Concordia University),Adrian Loghin(Simmetrix Inc.)

MS-10: Deep and Machine Learning Methodology in the Contexit of Application to Computational Mechanics
Yoshitaka Wada(Kindai University),Yasushi Nakabayashi(Toyo University), Masao Ogino(Daido University), Akio Miyoshi(Insight Inc.), Shinobu Yoshimura(University of Tokyo)

MS-11: Structural Optimization for Creating a Better Society
Shintaro Yamasaki (Waseda University), Junji Kato (Nagoya University), Akihiko Takezawa (Waseda University), Xiaopeng Zhang (Dalian University of Technology)

MS-12: Simulation of Earthquake Hazards and Disasters with HPC
Kohei Fujita (The University of Tokyo), Takane Hori (Japan Agency for Marine-Earth Science and Technology), Tsuyoshi Ichimura (The University of Tokyo), Kengo Nakajima (The University of Tokyo/RIKEN)

MS-13: Particle-based Numerical Methods for Simulating Solid-granular Interactions
Yupeng Jiang(Leibniz University Hannover), Clarence Choi (The University of Hong Kong), Kenjiro Terada (Tohoku University), Hashimoto Ryota (kyoto university), Bodhinanda Chandra (UC Berkeley)

MS-14: Meshless and Particle Method for Safety Problems
Mitsuteru Asai (Kyushu University), Moubin Liu(Peking University), Abbas Khayyer(Kyoto University), Min Luo(Zhejiang University), Seiya Hagihara(Saga University), Seiichi Koshizuka(University of Tokyo)

MS-15: Direct Computation of Safety Margins for Structures and Materials
Konstantinos V. Spiliopoulos (National Technical University of Athens), Geng Chen (Beijing Jiatong University)

MS-16: Advances in Numerical Methods for Enhancing Safety and Resilience of Structures in Civil and Architectural Engineering
Takuzo Yamashita (National Research Institute for Earth Science and Disaster Resilience), Poh Leong Hien(National University of Singapore),Wei-Tze Chang(National Center for Research on Earthquake Engineering)

MS-17: Stochastic Simulation, Uncertainty Quantification, Verification and Validation
Mao Kurumatani (Ibaraki University), Kazumi Matsui (Yokohama National University), Naoki Takano (Keio University)

MS-18: Damage Evaluation and Structural Application of Cementitious Materials
Rena C Yu (University of Castilla-La Mancha), Zhimin Wu & Hui Jin (Zhejiang University of Science and Technology)

MS-20: Simulation-based Disaster Prediction and Mitigation
Ha H. Bui (Monash University), J. S. Chen (University of California San Diego), Jinhyun Choo (Korea Advanced Institute of Science & Technology), Tsung-Hui "Alex" Huang (National Tsing Hua University), Antonia Larese (University of Padova), Kuan-Chung Lin (National Cheng Kung University), Kenjiro Terada (Tohoku University)

MS-21: Mathematical Modelling and Simulation for Social, Environmental, and Disaster Prevention Issues
S. Yoshimura (University of Tokyo), K. Kashiyama (Chuo University), H. Fujii (University of Tokyo), T. Ichimura (University of Tokyo), E. Kita (Nagoya University)

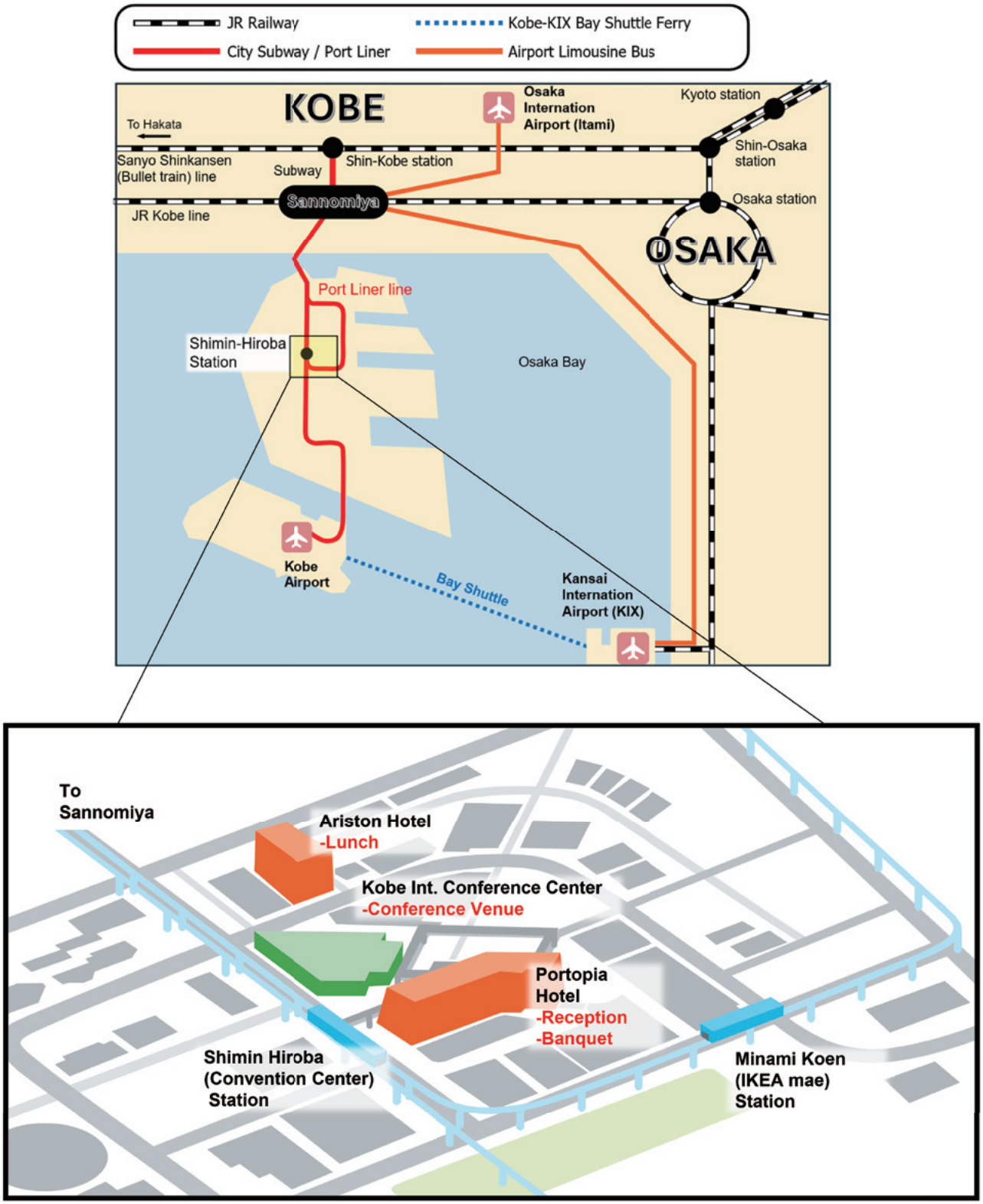
MS-22: Innovative CAE for Vehicle Development and Cross-industry Applications toward Safety and Sustainability
Makoto Tsubokura (Kobe University), Chenguang Lai (Chongqing University of Technology), Thomas Indinger (Technical University of Munich)

MS-23: Computational Fluid and Particle Dynamics of the Nose and Airway in Association with SCONA
Kiao Inthavong (RMIT University), Kazuhide Ito (Kyushu University), Narinder Singh (University of Sydney)

MS-24: High Performance Computing for Environmental Problems
Takashi Shimokawabe (University of Tokyo), Lutz Gross (The University of Queensland), Hiroshi Okuda (University of Tokyo), Gabriel Wittum (Goethe University Frankfurt), Ryuji Shioya (Toyo University)

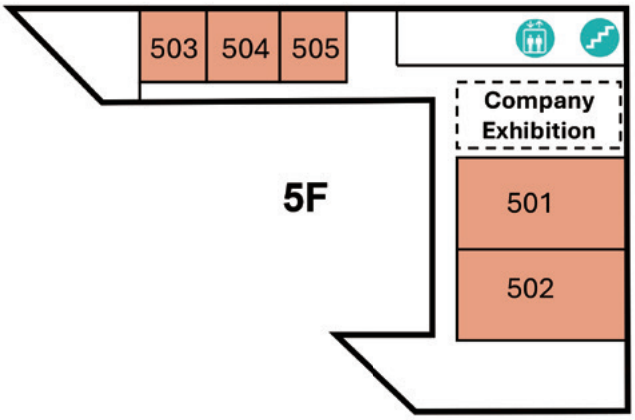
MS-25: Creating a Rational Disaster Response Society Through an Automatic System for Creating Disaster Prevention Digital Twins and Numerous Hazard Simulations.
Satoru Oishi (Kobe University), Xinzheng Lu (Tsinghua University), Tomohide Takeyama (Kobe University), Shinya Tachibana (Kobe University), Atsushi Iizuka (Chuo University), Muneo Hori (Japan Agency for Marine-Earth Science and Technology)

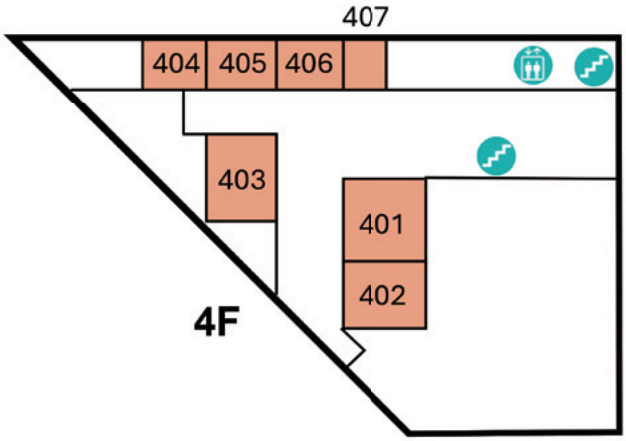
COMSAFE 2025 Conference Venue

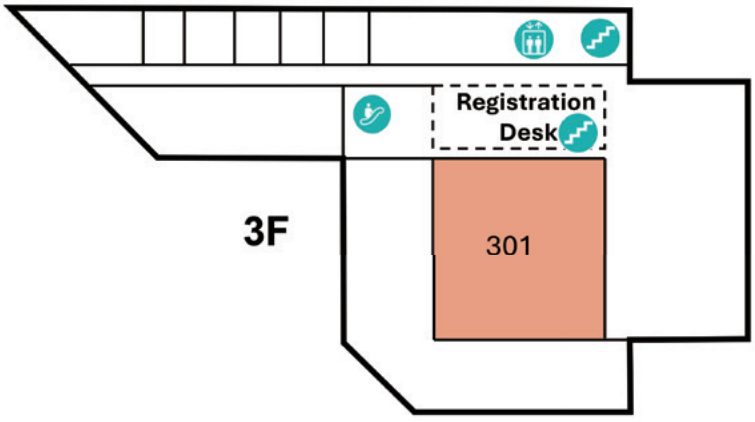


COMSAFE 2025 Conference Venue

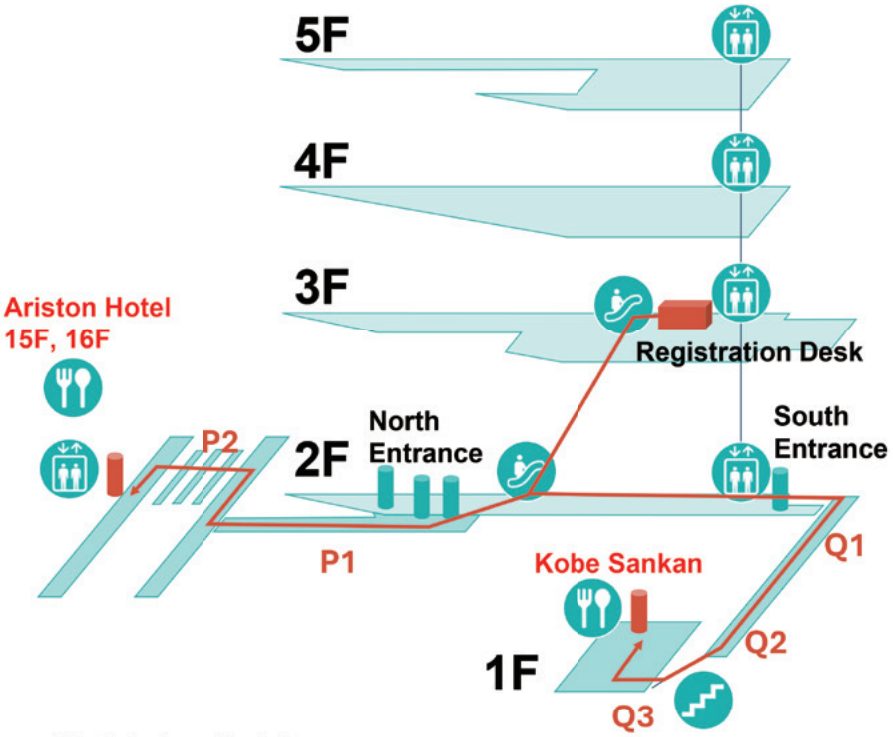
Kobe Int. Conference Center







COMSAFE 2025 Access to the Lunch Venues



To Ariston Hotel

P1

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To Kobe Sankan

Q1

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Q3

Program

Wed. Jul 2, 2025

Plenary Lecture

9:15 AM - 10:15 AM
Room 301
[230101-01]
Theoretical-numerical Approaches to Damage and Fracture Analysis of Structures
Prof. Michael Kaliske (Technische Universitat Dresden)
Chairman:
Kenjiro Terada (Tohoku University)

Semi-Plenary Lecture

10:40 AM - 11:20 AM
Room 301
[230102-02]
DPG Method on a New Road to Nonlinear Problems
Prof. Leszek Demkowicz (The University of Texas at Austin)
Chairman:
Jung-Wuk Hong (Korea Advanced Institute of Science and Technology)

10:40 AM - 11:20 AM
Room 501
[250101-01]
Combustion Simulations Beyond the Hazard of Explosion and Detonation
Prof. Akiko Matsuo (Keio University)
Chairman:
Ryoichi Kurose (Kyoto University)

10:40 AM - 11:20 AM
Room 502
[250201-01]
The improvement of SPH method and its applications in the field of civil aviation Prof. Fei Xu (Northwestern Polytechnical University)
Chairman:
Mitsuteru Asai (Kyushu University)

11:20 AM - 12:00 PM
Room 501
[250102-02]
Redefined three-dimensional J-integral and J-integral range ΔJ for finite strain elastic-plastic fracture mechanics (considerations on energy release rate and weakly singular terms)
Prof. Hiroshi Okada (Tokyo University of Science)
Chairman:
Ryoichi Kurose (Kyoto University)

11:20 AM - 12:00 PM
Room 502
[250202-02]
Integrating Multiphysics and Particle-Based Techniques: A New Frontier in Natural Hazard- Structure Interaction Modeling
Prof. Antonia Larese (Universita degli Studi di Padova)
Chairman:
Mitsuteru Asai (Kyushu University)

Oral Presentation

[250501-05] MS-01-1
Combustion Simulations for Safety and Environmental Problems
1:00 PM - 3:00 PM
Room 505
Chairman:
Ryoichi Kurose (Kyoto University)

1:00 PM - 1:40 PM
[250501-05-01]
Fighting fire with data: How can advances in modeling, machine learning, and data analytics address challenges in wildfire mitigation?
*Matthias Ihme[1] (1. Stanford University)

1:40 PM - 2:00 PM
[250501-05-02]
Study on variability in burning characters of pool fires with a controlled gasification methodology
*Daiki Matsugi[1], Yuji Nakamura[1] (1. Toyohashi University of Technology)

2:00 PM - 2:20 PM
[250501-05-03]
Large Eddy Simulation of the inclined surface fire under ambient wind
*Yanli Miao[1,2], Peng Xiao[1] (1. State Grid Jiangsu Electric Power Co., Ltd. Research Institute, 2. School of Electronic Science and Engineering, Southeast University)

2:20 PM - 2:40 PM
[250501-05-04]
Assessment of FDS applicability for Modeling Fire Suppression in Car Carrier with Carbon Dioxide Fire Extinguishing System
*Sangwon Kim[1], Ayato Takii[2], Makoto Tsubokura[2,1], Masaki Kubo[3], Shigeo Kawamura[3], Hirohumi Onishi[3], Yusaku Fujii[4], Yuki Higuchi[4], Yoichi Otani[4], Tsumuraya Koji[5], Masashi Hirano[5], Nobuyuki Musrasako[5], Yasuyoshi Tarao[6] (1. RIKEN Center for Computational Science, 2. Graduate School of System Informatics, Kobe University, 3. Air Water Safety Service Inc., 4. Shin Kurushima Dockyard Co.Ltd., 5. Kawasaki Kisen Co.Ltd., 6. Nippon Kaiji Kyokai)

2:40 PM - 3:00 PM
[250501-05-05]
Validation of diffusion flame CFD modeling for porous-bed gas burner fire applications
*Jakub Bielawski[1,2], Dia Luan[3,2], Wai Kit Cheung[2,1], Xiaoning Zhang[2], Xinyan Huang[2], Wojciech W.grzy.ski[1] (1. Building Research Institute, 2. Hong Kong Polytechnic University, 3. Central South University)

[250506-11] MS-01-2
Combustion Simulations for Safety and Environmental Problems
3:30 PM - 5:30 PM
Room 505
Chairman:
Akiko Matsuo (Keio University)

3:30 PM - 3:50 PM
[250506-11-01]
Fire Heat Release Rate Recognition Based on Multi-Scale Atrous Attention Mechanism and SAM Large Model
*Jinrong Cui[1], Rongxing Li[1], Shiqi Huang[1], Kaihua Zheng[1], Jinhui Xu[1], Yong Xu[2] (1. College of Mathematics and Informatics, South China Agricultural University, Guangzhou, China, [2]. Harbin Institute of Technology (Shenzhen), Shenzhen, China)

3:50 PM - 4:10 PM
[250506-11-02]
Statistical analysis of flashback of turbulent lean hydrogen premixed flame in turbulent channel flow
*Reo Kai[1], Kazuhiro Kinuta[2], Hiroaki Watanabe[1], Ryoichi Kurose[2] (1. Kyushu University, 2. Kyoto University)

4:10 PM - 4:30 PM
[250506-11-03]
Analysis of displacement speed during flashback of low-swirling hydrogen-air jet flames: An LES study
*Maho Kawai[1], Abhishek Lakshman Pillai[1], Ryoichi Kurose[1] (1. Kyoto University)

4:30 PM - 4:50 PM
[250506-11-04]
Numerical Simulation of Coherent Structures in Boundary Layer Flame
*Yue ZHANG[1], Yuji NAKAMURA[1] (1. Toyohashi University of Technology)

4:50 PM - 5:10 PM
[250506-11-05]
Prediction of Premixed Hydrocarbon Flames under Stretched Condition Using the LTF-S Model
*Tongtong Cui[1], Hiroshi Terashima[1], Soshi Kawai[2] (1. Division of Mechanical and Aerospace Engineering, Hokkaido University, 2. Department of Aerospace Engineering, Tohoku University)

5:10 PM - 5:30 PM
[250506-11-06]
Transient Behaviors of the Smoldering and Flaming Combustion of Charring Materials
*Pichayaporn Viriya-amornkij[1], Kazunori Kuwana[1], Yasuhisa Saito[2], Xinyan Huang[3] (1. Tokyo University of Science, 2. Shimane University, 3. The Hong Kong Polytechnic University)

[250103-07-01] MS-05-1
Novel Numerical Methods and Multi-Approach Strategies in Computational Mechanics
1:00 PM - 3:00 PM
Room 501
Chairman:
Naoto Mitsume (University of Tsukuba)

1:00 PM - 1:20 PM
[250103-07-01]
Physics-Informed Neural Networks (PINNs) for heat transfer and flow interaction
*Edward Oliver Teng[1], Chung Gang Lee[1], Heng Chuan Kan[2] (1. National Cheng Kung University Department of Mechanical Engineering, 2. National Center for High-performance Computing, National Applied Research Laboratories)

1:20 PM - 1:40 PM
[250103-07-02]
Development of a Lagrange multiplier/cohesive zone approach for dynamic internalinterfacial crack interactions
*YIFANG QIN[1] (1. Sun Yat-sen University)

1:40 PM - 2:00 PM
[250103-07-03]
Evaluation of mechanical metamaterials for high-performance shock absorption and stability in fall prevention
*Taiga Matsumoto[1], Koji Nishiguchi[1,2], Hiroshi Shimomura[3], Akihiro Ikki[3], Masato Yokoi[3], Mayumi Ito[3], Hiroya Hoshiba[1], Junji Kato[1] (1. Nagoya university, 2. RIKEN, 3. Magic Shields, Inc.)

2:00 PM - 2:20 PM
[250103-07-04]
A Novel Numerical Method with full Eulerian approach for Coupled Fluid-Structure Topology Optimization
*Ryohei Katsumata[1], Koji Nishiguchi[1,2], Hiroya Hoshiba[1], Junji Kato[1] (1. Nagoya University, 2. RIKEN)

2:20 PM - 2:40 PM
[250103-07-05]
Impact of Amplitude Variation Trends on Natural Convection over Vertical Wavy Surfaces
*Tse-Yu Chen[1], Chung-Gung Li[1], Wu-Shung Fu[2] (1. National Cheng Kung University, 2. National Yang Ming Chiao Tung University)

[250108-12] MS-05-2
Novel Numerical Methods and Multi-Approach Strategies in Computational Mechanics
3:30 PM - 5:30 PM
Room 501
Chairman:
Chung-Gung Li (National Cheng Kung University)

3:30 PM - 4:10 PM
[250108-12-01]
A multi-GPU computational framework for large-scale phase field crack simulations
Hanming Yang[1], Daniel Shigueo Morikawa[2], Yiyu Tan[3], Toshiyuki Imamura[4], *Shunhua Chen5 (1. South China University of Technology, 2. Japan Agency for Marine-Earth Science and Technology, 3. Iwate University, 4. RIKEN Center for Computational Science, 5. Sun Yat-sen University)

4:10 PM - 4:30 PM
[250108-12-02]
Eulerian Elastoplastic Simulation Considering Internal Voids in Structures
*Yuuri Ozaki[1], Koji Nishiguchi[1,2], Junji Kato[1] (1. Nagoya University, 2. RIKEN Center for Computational Science)

4:30 PM - 4:50 PM
[250108-12-03]
A 3D Generative Model Based on Time-Series Data from Eulerian Structural Analysis
*Koichiro Nakaya[1], Koji Nishiguchi[1,2], Issei Toida[1], Naoya Chiba[3], Junji Kato[1] (1. Nagoya University, 2. RIKEN Center for Computational Science, 3. D3 Center, Osaka University)

4:50 PM - 5:10 PM
[250108-12-04]
Vibration-reducing bushings design with topology optimization
*Tojo Soma[1], Hiroya Hoshiba[1], Toshitaka Sugimoto[2], Shinji Azetsu[2], Koji Nishiguchi[1], Junji Kato[1] (1. Department of Civil and Environmental Engineering, Nagoya University, 2. Honda R & D Co., Ltd.)

5:10 PM - 5:30 PM
[250108-12-05]
Hierarchical Reduced-Order Modeling with Adaptive Basis Selection and Load Balancing
*Kyohei Shintate[1], Naoki Morita[1], Shigeki Kaneko[2], Naoto Mitsume[1] (1. University of Tsukuba, 2. Nagoya Institute of Technology)

[240301-04] MS-06-1
Multiscaling for Safety and Environmental Problems
1:00 PM - 3:00 PM
Room 403
Chairman:
Yuichi Tadano (Saga University)

1:00 PM - 1:40 PM
[240301-04-01]
Analysis of gradient characteristics in cement mortar interfacial transition zones (ITZs) and their impact on mechanical behavior using micro-CT
*Sang-Yeop Chung[1], Ji-Su Kim[2] (1. Yonsei University, 2. University of Seoul)

1:40 PM - 2:00 PM
[240301-04-02]
Multiscale Modeling and Simulation for Predicting Tensile Strength of Cement Paste Incorporating Calcined Clay
*Donghwi Eum[1], Ju-Hyeon Park[1], Tong-Seok Han[1] (1. Yonsei University)

2:00 PM - 2:20 PM
[240301-04-03]
Multiscale analysis framework to identify correlation between microstructure and strength of cement paste
*Yong-Woo Kim[1], Se-Yun Kim[1], Donghwi Eum[1], Tong-Seok Han[1] (1. Yonsei University)

2:20 PM - 2:40 PM
[240301-04-04]
Influence of sand mixture ratio on cyclic deformation property for compacted bentonite
*Tomoyoshi Nishimura[1] (1. Ashikaga University)

[240305-10] MS-06-2
Multiscaling for Safety and Environmental Problems
3:30 PM - 5:30 PM
Room 403
Chairman:
Sang-Yeop Chung (Yonsei University)

3:30 PM - 3:50 PM
[240305-10-01]
Strain localization analysis using higher-order gradient crystal plasticity model
*Yuichi Tadano[1], Yuki Okawa[1] (1. Saga University)

3:50 PM - 4:10 PM
[240305-10-02]
Refinement by a negative exponent on I4 to avoid the instability of fiber-reinforced hyperelastic materials
*Hio Konishi[1], Seishiro Matsubara[1], So Nagashima[1], Dai Okumura[1] (1. Nagoya University)

4:10 PM - 4:30 PM
[240305-10-03]
Surrogate macroscopic constitutive model of a nonreciprocal gel
*Yuto Inamae[1], Seishiro Matsubara[1], So Nagashima[1], Dai Okumura[1] (1. Nagoya University)

4:30 PM - 4:50 PM
[240305-10-04]
Evaluation and modeling of effect of thermal history on the mechanical behavior of polyamides
*Makoto Uchida[1], Mei Toji[1], Keito Ohya[1], Yoshihisa Kaneko[1] (1. Osaka Metropolitan University)

4:50 PM - 5:10 PM
[240305-10-05]
Direct data-driven approach for sequential boundary value problems in two-phase materials
*Misato Suzuki[1], Erik Prume[2], Stefanie Reese[2,3], Mayu Muramatsu[1] (1. Keio University, 2. RWTH Aachen University, 3. University of Siegen)

5:10 PM - 5:30 PM
[240305-10-06]
Numerical Analysis of Respiratory Protective Gear Performance in Toxic Gas Leak Scenarios
*Feifan He[1,2], Sheng He[1,2], Jialin Wu[3], Wenguo Weng[1,2] (1. School of Safety Science, Tsinghua University, 2. Beijing Key Laboratory of City Integrated Emergency Response Science, Tsinghua University, 3. College of Safety Science and Engineering, Nanjing Tech University)

[250203-08] MS-07-1
Multiscale modeling and multiscale analysis for computational materials and engineering applications
1:00 PM - 3:00 PM
Room 502
Chairman:
Shu-Wei Chang (National Taiwan University)

1:00 PM - 1:20 PM
[250203-08-01]
Mycelium-Based Multifunctional Surface Coating for Sustainable Composites
*Zhao Qin Qin[1], Ludovica Clementini[2], Gargi De[1], Federica Buccino[2], Laura Vergani[2] (1. Syracuse University, 2. Politecnico di Milano)

1:20 PM - 1:40 PM
[250203-08-02]
Establishment of a fatigue life prediction framework for steels based on a multiscale modeling for simulating crack growth
*Kazuki Shibanuma[1] (1. The University of Tokyo)

1:40 PM - 2:00 PM
[250203-08-03]
Design of metallic glass and nanoglass composites using a mesoscale kinetic Monte Carlo model
*Chang-Wei Huang[1], Chih-Jen Yeh[2], Yu-Chieh Lo[2] (1. Department of Civil Engineering, Chung Yuan Christian University, Taiwan, 2. Department of Materials Science and Engineering, National Yang Ming Chiao Tung University, Taiwan)

2:00 PM - 2:20 PM
[250203-08-04]
Tailored-mechanical-properties structures inspired by bone microstructures using deep learning-based methods
*Zheng-Shun Su[1], Bo-Xue Chen[1], Kuan-Lun Huang[1], Shu-Wei Chang[1] (1. National Taiwan University)

2:20 PM - 2:40 PM
[250203-08-05]
Imaging and modeling analysis of mitochondrial morphology and dynamics
Jirapong Saelor[1], Tzu-Yen Liao[2], Yu-Te Lin[2], Wen-Wei Tseng[2], *An-Chi Wei[2] (1. The Chinese University of Hong Kong, 2. National Taiwan University)

2:40 PM - 3:00 PM
[250203-08-06]
Molecular Dynamics Study of the Gating Mechanism in the KtrAB Potassium Transport System
*Pei-Cheng Li[1], Wei-Han Hui[1], Shu-Wei Chang[1,2] (1. Dept. of Civil Engineering, National Taiwan University, Taipei 10663, Taiwan, R.O.C, 2. Dept. of Biomedical Engineering, National Taiwan University, Taipei 10663, Taiwan, R.O.C)

[250209-12] MS-07-2
Multiscale modeling and multiscale analysis for computational materials and engineering applications
3:30 PM - 5:30 PM
Room 502
Chairman:
Chang-Wei Huang (Chung Yuan Christian University)

3:30 PM - 3:50 PM
[250209-12-01]
Enhanced Energy Harvesting in Rotary Triboelectric Nanogenerators via Gaussian Process Regression-Based Bayesian Optimization
*Seunghwa Ryu[1] (1. KAIST)

3:50 PM - 4:10 PM
[250209-12-02]
Design of Tunable Acoustic Metasurfaces
*I-Ling Chang[1] (1. National Cheng Kung University)

4:10 PM - 4:30 PM
[250209-12-03]
Irradiation effects on ultimate pressure capacity of a steel containment vessel
*Min Jeong Park[1], Yoon-Suk Chang[1] (1. Kyung Hee University)

4:30 PM - 4:50 PM
[250209-12-04]
Multiphysics Phase Field Modeling for Accelerating Materials Design and Realization
*Yanming Wang[1] (1. Shanghai Jiao Tong University)

[240101-04] MS-08-1
Recent advances in impact and blast analyses
1:00 PM - 3:00 PM
Room 401
Chairman:
Masuhiro Beppu (National Defense Academy)
Akemi Nishida (Japan Atomic Energy Agency)

1:00 PM - 1:40 PM
[240101-04-01]
Design of protective structures: debris loading on the buried construction - numerical approach
*Piotr W. Sielicki[1] (1. Poznan University of Technology)

1:40 PM - 2:00 PM
[240101-04-02]
Annual occurrence probabilities of design blast loads acting on building structures
*Akemi Nishida[1], Toshiya Kano[2], Toshiyuki Horiguchi[3], Takuya Hamamoto[4] (1. Japan Atomic Energy Agency, 2. JSOL CORPORATION, 3. National Defense Academy, 4. Tokyo City University)

2:00 PM - 2:20 PM
[240101-04-03]
Predicting the response of reinforced concrete components subjected to low-speed planar impact due to frame collapse in fire
*Shuhei Fukumura[1], Yasunori Mizushima[1], Junichi Suzuki[2], Tomohiro Naruse[2], Michikazu Kobayashi[3], Yoko Hirano[4] (1. Kobe University, 2. Building Research Institute, 3. Takenaka Corporation, 4. Dot Corporation)

2:20 PM - 2:40 PM
[240101-04-04]
Dynamic increase factor of concrete compressive strength under uniaxial strain state
*Sangho Lee[1] (1. Korea Institute of Civil Engineering and Building Technology)

[240105-10] MS-08-2
Recent advances in impact and blast analyses
3:30 PM - 5:30 PM
Room 401
Chairman:
Xihong Zhang (Curtin University)
Hiroki Tamai (Kyushu University)

3:30 PM - 3:50 PM
[240105-10-01]
Investigations of autoclaved aerated concrete walls subjected to blast loadings
*Chunyuan Liu[1], Yifei Hao[1], Shan Liu[2] (1. Hebei University of Technology, 2. Tianjin University)

3:50 PM - 4:10 PM
[240105-10-02]
Blast resilience of RC slab using sprayed engineered geopolymer composite
Shan Liu[1,2], *Yifei Hao[3] (1. Tianjin University, 2. Nanyang Technological University, 3. Hebei University of Technology)

4:10 PM - 4:30 PM
[240105-10-03]
Impact response analysis of diamond-shaped wire mesh under drop-weight impact loading
*Masato Komuro[1], Tomoki Kawarai[1], Norimitsu Kishi[1] (1. Muroran Institute of Technology)

4:30 PM - 4:50 PM
[240105-10-04]
Study on estimation method of debris flow load using a channel flume with a movable bed and Distinct Element Method
*Kazuki Saito[1], Toshiyuki Horiguchi[2] (1. Graduate School of Science and Engineering Doctoral Course, National Defence Academy, 2. Civil Engineering, National Defence Academy)

4:50 PM - 5:10 PM
[240105-10-05]
Experimental Investigation of the Fragmentation of SON68 Glass under Normal Impact
Pascal Forquin[1], Charles Francart[1], *Joffrey Lhonneur[2], Christophe Mano[2] (1. Soils, Solids, Structures and Risks (3SR) Lab., University Grenoble Alpes, CNRS, Grenoble INP, 38000 Grenoble, FRANCE, 2. Institute for Radiation Protection and Nuclear Safety (IRSN), BP 17-31, avenue de la Division Leclerc, 92262 Fontenay-aux-Roses Cedex, FRANCE)

5:10 PM - 5:30 PM
[240105-10-06]
Numerical simulation on reinforcing and mitigating methods for scabbingof RC slabs subjected to projectile impact
*MASUHIRO BEPPU[1], Koki Mori[1], Ryo Matsuzawa[2], Hiroyoshi Ichino[1] (1. National Defense Academy, 2. ITOCHU Techno-Solutions Corporation)

[240501-05] MS-09-1
Recent Advances in Computational Fracture Mechanics and Failure Analysis
1:00 PM - 3:00 PM
Room 405
Chairman:
Masaki Shibanuma (University of Tokyo)

1:00 PM - 1:20 PM
[240501-05-01]
Damage Propagation Analyses of CFRP and CFRTP laminates by XFEM using continuumbased shell elements
*Toshio Nagashima[1] (1. Sophia University)

1:20 PM - 1:40 PM
[240501-05-02]
Failure simulation of reactor pressure vessels under In-Vessel Retention through External Reactor Vessel Cooling (IVR-ERVC) condition
*Jun-Won Park[1], Eui-Kyun Park[1], Yun-Jae Kim[1], Kukhee Lim[2], Eung-Soo Kim[3] (1. Korea University, 2. Korea Institute of Nuclear Safety, 3. Seoul National University)

1:40 PM - 2:00 PM
[240501-05-03]
Three-dimensional ductile crack growth analysis of C(T) specimen using stress triaxialitydependent cohesive zone model
*Yanlong Li[1], Toshio Nagashima[2] (1. Guaduate School of Sophia University, 2. Sophia University)

2:00 PM - 2:20 PM
[240501-05-04]
Numerical prediction of combined ductile-brittle fracture in drop weight tear test
*Seo Ki-Wan[1], Jae-Yoon Kim[1], Yun-Jae Kim[1], Ki-Seok Kim[2] (1. Korea University, 2. POSCO)

2:20 PM - 2:40 PM
[240501-05-05]
Crack propagation analysis in composite material considering adhesion region
*Hirofumi Sugiyama[1], Tomoki Nomura[1], Shigenobu Okazawa[1] (1. University of Yamanashi)

[240506-10] MS-09-2
Recent Advances in Computational Fracture Mechanics and Failure Analysis
3:30 PM - 5:30 PM
Room 405
Chairman:
Toshio Nagashima (Sophia University)

3:30 PM - 3:50 PM
[240506-10-01]
Ductile Fracture in Welded Thin Plate for Stainless Steel with Multiple Flaws
*Beom-Jin Kim[1], Chang-Young Oh[2], Jin-Ha Hwang[1] (1. Pukyong National University, 2. Korea Institute of Materials Science (KIMS))

3:50 PM - 4:10 PM
[240506-10-02]
S-version FEM-based strategy for predicting high-speed crackpropagation/arrest behaviour in 3D structures
*Tianyu He[1], Naoki Morita[2], Naoto Mitsume[2], Kazuki Shibanuma[1] (1. The University of Tokyo, 2. University of Tsukuba)

4:10 PM - 4:30 PM
[240506-10-03]
Theoretical and experimental study of crack modes of flow elastoplasticity
*Hong-Ki Hong[1] (1. Department of Civil Engineering, National Taiwan University)

4:30 PM - 4:50 PM
[240506-10-04]
S-IGA with blending functions for finite strain elastoplastic analyses
*Yuhi Tsuchiyama[1], Hiroshi Okada[1] (1. Tokyo University of Science)

4:50 PM - 5:10 PM
[240506-10-05]
Gradient-enhanced ductile fracture modeling on robust algorithm and scale transition
*TIANWEN TAN[1,2], Ikumu WATANABE[1,2] (1. Graduate School of Pure and Applied Sciences, University of TSUKUBA, 2. Center for Basic Research on Materials, National Institute for Materials Science)

[240401-05] MS-10-1
Deep and Machine Learning Methodology in the Context of Application to Computational Mechanics
1:00 PM - 3:00 PM
Room 404
Chairman:
Yasushi Nakabayashi (Toyo University)

1:00 PM - 1:20 PM
[240401-05-01]
DDM-PINN method for considering boundary conditions inside the analysis domain
*Masao Ogino[1], Shin-ichiro Sugimoto[2] (1. Daido University, 2. Hachinohe Institute of Technology)

1:20 PM - 1:40 PM
[240401-05-02]
Neural network-based eddy-viscosity prediction for wake flow field of Ahmed model
*Songyuan Hu[1], Yiping Wang[1], Shiqiang Wen[1], Jian Zhao[1] (1.

Wuhan University of Technology)

1:40 PM - 2:00 PM
[240401-05-03]
Accurate inverse analysis of incompressible fluid flow using physics-informed neural networks with implicit distance functions and an adaptive weight tuning method
*Shota Deguchi[1], Mitsuteru Asai[1] (1. Kyushu University)

2:00 PM - 2:20 PM
[240401-05-04]
Analysis of partial differential equations using novel physics-informed neural network techniques
*Der Liang Young[1] (1. National Taiwan University)

2:20 PM - 2:40 PM
[240401-05-05]
A machine learning technique for predicting fluid flow at different conditions based on physics-informed deep operator networks
*Junya Onishi[1], Harutaka Kitagawa[2], Makoto Tsubokura[1,2] (1. RIKEN Center for Computational Science, 2. Kobe University)

[240406-09] MS-10-2
Deep and Machine Learning Methodology in the Context of Application to Computational Mechanics
3:30 PM - 5:30 PM
Room 404
Chairman:
Masao Ogino (Daido University)

3:30 PM - 3:50 PM
[240406-09-01]
Deep Learning for High-Resolution Modeling of Accidental Hazardous Releases through Multisource Data Integration
*Yudie Jianyao[1,2], Yuheng Cheng[1,2], Shuai Liu[1,2], Xiaole Zhang[1,2] (1. School of Safety Science, Tsinghua University, 2. Institute of Public Safety Research, Tsinghua University)

3:50 PM - 4:10 PM
[240406-09-02]
Hybrid strategy of neural network and numerical simulation to accelerate the computation time of SPH method
*Gen Matono[1], Mayuko Nishio[1] (1. University of Tsukuba)

4:10 PM - 4:30 PM
[240406-09-03]
Multi-Scale Learning and Classification Ensemble for Vehicle Point Cloud Regression: A Study on Drag Coefficient Prediction
*Mengdi Li[1,2,3], Yiping Wang[1,2,3], Chuqi Su[1,2,3], Xiaohong Yuan[1,2,3], Xun Liu[1,2,3] (1. Hubei Key Laboratory of Advanced Technology for Automotive Components, Wuhan University of Technology, Wuhan 430070, China, 2. Hubei Collaborative Innovation Centre for Automotive Components Technology, Wuhan University of Technology, Wuhan 430070, China, 3. Hubei Research Center for New Energy and Intelligent Connected Vehicle, Wuhan University of Technology, Wuhan 430070, China)

4:30 PM - 4:50 PM
[240406-09-04]
Predicting the outcome of sports competitions using text mining
*Shuntaro Kanke[1] (1. Toyo University)

[240601-05] MS-11-1
Structural Optimization for Creating a Better Society
1:00 PM - 3:00 PM
Room 406
Chairman:
Shintaro Yamasaki (Waseda University)
Xiaopeng Zhang (Dalian University of Technology)

1:00 PM - 1:20 PM
[240601-05-01]
Data-driven topology design methodology considering additive manufacturing constraints
*Jun Yang[1], Shintaro Yamasaki[1] (1. Waseda University)

1:20 PM - 1:40 PM
[240601-05-02]
Topology optimization for a distribution of two types of miniaturized dynamic vibration absorbers for damping of two vibration modes
*Jun Iwasaki[1], Riku Yoneoka[1], Akihiro Takezawa[1], Yuya Saito[2], Takeshi Matsuoka[2], Takahiro Komamura[2], Naoyuki Uchida[2], Masanari Nakayama[2] (1. Waseda University, 2. Mitsubishi Chemical Corporation)

1:40 PM - 2:00 PM
[240601-05-03]
Improved Bi-directional Evolutionary Structural Optimization Method of Stiffness Design with Stress Constraint
*Pei Chen Ko[1,2], Liang Jenq Leu[1], Mitsuteru Asai[2] (1. National Taiwan University, 2. Kyushu University)

2:00 PM - 2:20 PM
[240601-05-04]
Computational design of periodic microstructure with misalignment for mechanical metamaterials
Jiaxin Zhou[1,2], *Ikumu Watanabe[1,2], Keita Kambayashi[3] (1. National Institute for Materials Science, 2. University of Tsukuba, 3. Nagaoka University of Technology)

2:20 PM - 2:40 PM
[240601-05-05]
Design of meta-structures with specific ultra-low bandgaps via topology optimization
*Xinlin Xu[1], Hiroya Hoshiba[1], Koji Nishiguchi[1], Junji Kato[1] (1. Nagoya University)

[240606-10] MS-11-2
Structural Optimization for Creating a Better Society
3:30 PM - 5:30 PM
Room 406
Chairman:
Akihiro Takezawa (Waseda University)
Shintaro Yamasaki (Waseda University)

3:30 PM - 3:50 PM
[240606-10-01]
Distributed-Element Filter Design Considering Manufacturing Errors Based on Data-driven Topology Design
*YUYANG CHEN[1], Shintaro Yamasaki[1] (1. Waseda University)

3:50 PM - 4:10 PM
[240606-10-02]
Design of Mechanical Metamaterials with Precise Performance Customization Using Topology Optimization Methods
*Xiaopeng Zhang[1] (1. Dalian University of Technology)

4:10 PM - 4:30 PM
[240606-10-03]
Topology optimization for maximizing ductility using RBSM
*Ryoko Ishiwata[1], Yoshihito Yamamoto[1], Junji Kato[2] (1. HOSEI University, 2. Nagoya University)

4:30 PM - 4:50 PM
[240606-10-04]
Numerical investigation of two-body contact system: two-body-based topology optimization for strain energy minimization problem
*Siyue Chang[1], Hiroya Hoshiba[1], Koji Nishiguchi[1,2], Junji Kato[1] (1. Nagoya University, 2. RIKEN)

4:50 PM - 5:10 PM
[240606-10-05]
Reconstruction of Kelvin-Voigt viscoelastic parameters using a full-waveform inversion
*Sihyeong Lee[1], Jun Won Kang[1] (1. Hongik University)

[230103-07] MS-16-1
Advances in Numerical Methods for Enhancing Safety and Resilience of Structures in Civil and Architectural Engineering
1:00 PM - 3:00 PM
Room 301
Chairman:
Hiroyuki Tagawa (Mukogawa Women's University)

1:00 PM - 1:20 PM
[230103-07-01]
Detailed FE simulation of RC structures using damage plasticity model with consideration of tensile cracking in concrete material
*Takuzo Yamashita[1], Tomoshi Miyamura[2], Jun Fujiwara[1] (1. National Research Institute for Earth Science and Disaster Resilience, 2. Nihon University)

1:20 PM - 1:40 PM
[230103-07-02]
Assessment of the Structural Performance of Bumper Walls in Mitigating Seismic Pounding Effects
*Konstantinos Vassilios Spiliopoulos[1], Vasiliki N. Tsotoulidi[1] (1. National Technical University of Athens)

1:40 PM - 2:00 PM
[230103-07-03]
Seismic Damage Evaluation of Reinforced Concrete Tall Pierswith Circular Cross Section Using 3D Lattice Model
*Elber de Araujo Silva[1], Tomohiro Miki[1] (1. Kobe University)

2:00 PM - 2:20 PM
[230103-07-04]
Development of a collapse analysis method for timber houses based on the finite element method considering the expansion of plastic regions
*Tomoaki Ohba[1], Shinya Ito[1], Hiroyuki Omura[2], Daigoro Isobe[3] (1. Graduate School of Science and Technology, University of Tsukuba, 2. National Research Institute for Earth Science and Disaster Resilience, 3. Division of Engineering Mechanics and Energy, University of Tsukuba)

2:20 PM - 2:40 PM
[230103-07-05]
Reproducibility of numerical simulations for shaking table test using full-scale specimen of traditional wooden folk house conducted at E-Defense
*Kiichi Kuboki[1], Misaki Yamashita[1], Yoichi Mukai[1], Kunihiko Nabeshima[1] (1. Kobe University)

2:40 PM - 3:00 PM
[230103-07-06]
Damage identification of braces in steel-framed school gymnasiums using echo statenetworks
*Jingyao Zhang[1], Taisei Toyama[2], Jun Fujiwara[3] (1. Kyoto University, 2. West Japan Railway Company, 3. National Research Institute for Earth Science and Disaster Resilience)

[230108-12] MS-16-2
Advances in Numerical Methods for Enhancing Safety and Resilience of Structures in Civil and Architectural Engineering
3:30 PM - 5:30 PM
Room 301
Chairman:
Takuzo Yamashita (National Research Institute for Earth Science and Disaster Resilience)

3:30 PM - 4:10 PM
[230108-12-01]
High-Performance In-house Finite Element Framework for Advanced Engineering Applications
*Jeong-Rae CHO[1] (1. Korea Institute of Civil Engineering and Building Technology)

4:10 PM - 4:30 PM
[230108-12-02]
Folding Simulation of Origami Deployable Structure with Uniaxial Rotation of Fold-lines modeled by Solid Elements
*Hiroyuki Tagawa[1], Takuzo Yamashita[2] (1. Mukogawa Women's University, 2. National Research Institute for Earth Science and Disaster Resilience)

4:30 PM - 4:50 PM
[230108-12-03]
Development of an unresolved fluid-beam coupling scheme based on Darcy-Brinkman equation
*Satoshi Ohinata[1], Hiroyuki Omura[2], Daigoro Isobe[1] (1. University of Tsukuba, 2. National Research Institute for Earth Science and Disaster Resilience)

4:50 PM - 5:10 PM
[230108-12-04]
An Automated Design System for Beams and Lateral Restraints with Three-side Protection Utilizing Non-Uniform Temperature Beam Elements
*Yang Li[1] (1. The University of Manchester)

5:10 PM - 5:30 PM
[230108-12-05]
Performance simulator based on real-time hybrid simulations of semi-active response control for seismic isolation system
*Misaki Kotani[1], Shito Kageyama[1], Hayato Naka[1], Yoichi Mukai[1], Hideo Fujitani[2] (1. Kobe University, 2. Fukuyama University)

[250301-05] MS-17-1
Stochastic simulation, uncertainty quantification, verification and validation
1:00 PM - 3:00 PM
Room 503
Chairman:
Mao Kurumatani (Ibaraki University)

1:00 PM - 1:20 PM
[250301-05-01]
Prediction of post-processing cost in additive manufacturing to recover geometrical imperfection considering its variability
*Tung Thanh Pham[1], Takumi Oshima[1], Naoki Takano[2] (1. Graduate School of Science and Technology, Keio University, 2. Department of Mechanical Engineering, Keio University)

1:20 PM - 1:40 PM
[250301-05-02]
Uncertainty modeling of contact boundary condition with gum in mechanical simulation of additively manufactured removable partial denture
*Rintaro Morita[1], Naoki Takano[2] (1. Guraduate School of Science and Technology, Keio University, 2. Department of Mechanical Engineering, Keio University)

1:40 PM - 2:00 PM
[250301-05-03]
Ai.aided geometrical defect detection for additive manufactured complex architected materials
*pin wen[1], Chenxi Lu[1], Fei Chen[1] (1. Wuhan university of technology)

2:00 PM - 2:20 PM
[250301-05-04]
Effect of Thermal Aging on the Mechanical Properties of 3D Printed Biodegradable Filaments
Md Ashequl Islam[1], *Khairul Salleh Basaruddin[1,2], Nor Amalina Muhayuddin[1,2], Tien -Dat Hoang[3] (1. Faculty of Mechanical Engineering & Technology, Universiti Malaysia Perlis, 2. Centre of Excellence Automotive & Motorsports (MoTECH), Universiti Malaysia Perlis , 3. School of Mechanical and Automotive Engineering (SMAE), Ha Noi University of Industry, VIETNAM)

2:20 PM - 2:40 PM
[250301-05-05]
Triply Periodic Minimal Surfaces in 3D-Printed Bone Scaffolds: A Path to Enhanced Stochastic Mechanical Performance
Dat Tien Hoang[1], *Thuan Ba Nguyen[2], Khairul Salleh Basaruddin[3] (1. School of Mechanical and Automotive Engineering (SMAE), Ha Noi University of Industry, Vietnam., [2]. Faculty of Mechanical Engineering, Vinh University of Technology Education, Vietnam, 3. Faculty of Mechanical Engineering and Technology, Universiti Malaysia Perlis, Arau, Malaysia)

[250306-11] MS-17-2
Stochastic simulation, uncertainty quantification, verification and validation
3:30 PM - 5:30 PM
Room 503
Chairman:
Kazumi Matsui (Yokohama National University)

3:30 PM - 3:50 PM
[250306-11-01]
Random microstructure modeling and stochastic multiscale simulation of textile and short fiber reinforced composite materials
*Naoki Takano[1] (1. Department of Mechanical Engineering, Keio University)

3:50 PM - 4:10 PM
[250306-11-02]
Uncertainty modeling of time/space dependent boundary conditions in the 3D heat equation applied to quenching process simulation
*Esteban Antier[1], Naoki Takano[2] (1. Graduate School of Science and Technology, Keio University, 2. Department of Mechanical Engineering, Keio University)

4:10 PM - 4:30 PM
[250306-11-03]
Risk analysis by analyzing tail distribution of QoI in stochastic simulation
*Rikuto Karasudani[1], Naoki Takano[2] (1. Graduate School of Science and Technology, Keio University, 2. Department of Mechanical Engineering, Keio University)

4:30 PM - 4:50 PM
[250306-11-04]
Analysis of structural fire response of metro shield tunnel considering existing damage uncertainty
*Tongsheng Yu[1], Zhiguo Yan[1] (1. Department of Geotechnical Engineering, Tongji University)

4:50 PM - 5:10 PM
[250306-11-05]
Quantification of Numerical Error with Physics Informed Neural Network
*Adhika Satyadharma[1], Heng-Chuan Kan[2], Ming-Jyh Chern[1], Chun-Ying Yu[1] (1. National Taiwan University of Science and Technology, [2]. National Center for High-performance Computing, National Applied Research Laboratories)

5:10 PM - 5:30 PM
[250306-11-06]
Multiscale damage development/strength analysis of filament winding CFRP with microscopic manufacturing defects
*Shuma Anzawa[1], Tetsuya Matsuda[1], Naoki Morita[1], Tomohiro Yokozeki[2], Ryoma Aoki[2], Masahito Ueda[3], Wataru Iwase[4] (1. University of Tsukuba, 2. The University of Tokyo, 3. Nihon University, 4. Motherson Yachiyo Automotive Systems Co., Ltd.)

[250401-05] MS-20-1
Simulation-based Disaster Prediction and Mitigation
1:00 PM - 3:00 PM
Room 504
Chairman:
TBA

1:00 PM - 1:40 PM
[250401-05-01]
Thermodynamics-based Model-free Data-driven Landslide Modeling
*Jiun-Shyan Chen[1,4], Yanran Wang[1], Xiaolong He[2], Jacob Koester[3], Kuan-Chung Lin[4] (1. University of California San Diego, 2. ANSYS Inc, 3. Aperi Computational Mechanics Consulting, LLC, 4. National Cheng Kung University)

1:40 PM - 2:00 PM
[250401-05-02]
Enhanced semi-implicit MPM for seepage slope failure analysis

*Soma Hidano[1], Reika Nomura[1], Shuji Moriguchi[1], Kenjiro Terada[1] (1. Tohoku University)

2:00 PM - 2:20 PM
[250401-05-03]
Comparison of boundary enforcement methods for seismic wave absorption in Material Point Method simulations
*Connor Geudeker[1], Bodhinanda Chandra[1], Jun Kurima[2], Kenichi Soga[1] (1. University of California, Berkeley, 2. The University of Tokyo)

2:20 PM - 2:40 PM
[250401-05-04]
Simulation of Large woody debris using a driftwood model with cylinder model in distinct element method
*Taishi Tatsukawa[1], Toshiyuki Horiguchi[1] (1. National Defence Academy)

2:40 PM - 3:00 PM
[250401-05-05]
Development and validation of an implicit material point method solver with benchmark analyses of triaxial tests
*Yudai Takegawa[1], Yuki Kurakami[1], Kohei Murotani[1], Higo Yosuke[2] (1. Railway Technical Research Institute, 2. Kyoto University)

[250406-10] MS-20-2
Simulation-based Disaster Prediction and Mitigation
3:30 PM - 5:30 PM
Room 504
Chairman:
TBA

3:30 PM - 3:50 PM
[250406-10-01]
VC-enhanced RK-MPM for Microcracks Informed Damage Modeling on Brittle Solids via a Model-Based Neural Network Approach
*Tsung-Hui Alex Huang[1], Yu-Chun Chou[1], Sung-Han Yu[1] (1. National Tsing Hua University)

3:50 PM - 4:10 PM
[250406-10-02]
Development and verification of a dynamic fracture simulation method for concrete structures using an extended RBSM considering large rotation and fragment collision
*Kanto Kimura[1], Yoshihito Yamamoto[1] (1. Hosei University)

4:10 PM - 4:30 PM
[250406-10-03]
Physics-Informed Neural Networks for Landslide Simulation and Material Modeling
*Kuan-Chung Lin[1], Chieh-Ming Hsu[1] (1. National Cheng Kung University)

4:30 PM - 4:50 PM
[250406-10-04]
Finite Element Informed Neural Networks (FEINN) for Solid Mechanics Problems
*Siew Jau Ling[1], Ming-Jyun Dai[1] (1. National Cheng Kung University)

4:50 PM - 5:10
[250406-10-05]
An Enhanced Artificial Viscosity Stabilization for the Material Point Method in Modeling Compressible Air Flow and Air-Structure Interaction with Shocks
*Sreehari Peddavarapu[1], Tsung-Hui Alex Huang[1] (1. Power Mechanical Engineering, National Tsing Hua University, Hsinchu, Taiwan)

[240201-05] MS-22-1
Innovative CAE for Vehicle Development and Cross-Industry Applications toward Safety and Sustainability
1:00 PM - 3:00
PM Room 402
Chairman:
Chenguang Lai (Chongqing University of Technology)

1:00 PM - 1:40 PM
[240201-05-01]
AI-Enhanced Closure Coefficients for RANS Simulations of the DrivAer Model
*Philipp Schlichter[1], Jutta Pieringer[2], Thomas Indinger[1] (1. Chair of Aerodynamics and Fluid Mechanics, Technical University of Munich, Germany, 2. AUDI AG Ingolstadt, Germany)

1:40 PM - 2:00 PM
[240201-05-02]
Development of a Robust Reduced-Order Turbulence Model for Vehicle Body Shape Changes
*Kazuto Ando[1,2], Rahul Bale[1,2], Akiyoshi Kuroda[1], Makoto Tsubokura[1,2] (1. RIKEN Center for Computational Science, 2. Kobe University)

2:00 PM - 2:20 PM
[240201-05-03]
Investigation of the impact of physical information on the accuracy of 3D-CNN surrogate model for vehicle aerodynamic simulation
*TAICHI OKAMOTO[1], Takuji NAKASHIMA[1], Takenori HIRAOKA[1], Kohei SEO2, Yusuke NAKAMURA[2], Keigo SHIMIZU[2], Hidemi MUTSUDA[1] (1. Hiroshima University Graduate School of Advanced Science and Engineering, 2. Technical Research Center, Mazda Motor Corporation)

2:20 PM - 2:40 PM
[240201-05-04]
Aerodynamic Analysis of VTOL Drone Using Coupled Simulations with Hierarchical Cartesian Mesh
*Ayato Takii[1], Yudai Hirai[1], Takateru Urakubo[1], Chihiro Kikumoto[2], Kousuke Suzuki[2], Makoto Tsubokura[1,3] (1. Kobe University, 2. Aerosense Inc., 3. RIKEN Center for Computational Science)

2:40 PM - 3:00 PM
[240201-05-05]
Multi-objective optimization of ducted rotor shape for flying cars
Zirui Wang[1,2,3], Jingyu Wang[1,2,3], Yu Liu[1,2,3], *Xingjun Hu[1,2,3], Keyuan Shi[1,2,3], Peng Guo[1,2,3], Zirui Wang[1,2,3], Yulong Lei[1,2,3], Tianming Yu[1,2,3] (1. College of Automotive Engineering,Jilin University, 2. National Key Laboratory of Automotive Chassis Integration and Bionics, 3. Institute of Automotive Aerodynamics)

[240206-10] MS-22-2
Innovative CAE for Vehicle Development and Cross-Industry Applications toward Safety and Sustainability
3:30 PM - 5:30 PM
Room 402
Chairman:
Thomas Indinger (Technical University of Munich)

3:30 PM - 4:10 PM
[240206-10-01]
RESEARCH ON SINGLE-PHASE HEAT TRANSFER PERFORMANCE OF MANIFOLD MICROCHANNEL WITH TOPOLOGY DESIGN
*Shuai Feng[1], Xin Li[1], Jie Song[1] (1. Chongqing University of Technology)

4:10 PM - 4:30 PM
[240206-10-02]
High-resolution topology optimization of instrument panel beams under plate manufacturing constraints
*Yuji Wada[1], Takeshi Kashiyama[2], Kei Nagasaka[2], Koji Nishiguchi[3],[4], Shigenobu Okazawa[5], Makoto Tsubokura[6],[4] (1. Institute of Science Tokyo, 2. Suzuki Motor Corporation, 3. Nagoya University, 4. RIKEN, 5. University of Yamanashi, 6. Kobe University)

4:30 PM - 4:50 PM
[240206-10-03]
Investigation and modeling of vehicle exterior impressions toward a multi-objective shape optimization for automotive aerodynamics and styling
*Keigo Shimizu[1], Ryota Mizoguchi[2], Takuji Nakashima[2], Takenori Hiraoka[2], Takahide Nouzawa[2], Iwao Koizumi[2], Asahi Kawasaki[3], Kohei Seo[1], Akira Oyama[4], Makoto Tsubokura[3],5 (1. Mazda Motor Corporation, 2. Hiroshima University, 3. Kobe University, 4. Japan Aerospace Exploration Agency, 5. RIKEN, Center for Computational Science)

4:50 PM - 5:10 PM
[240206-10-04]
Multi-objective aerodynamic shape optimization of automobiles using shape morphing based on the proportioning characteristics of production vehicles
*Takuji NAKASHIMA[1], Asahi KAWASAKI[2], Rahul BALE[2],[3], Keigo SHIMIZU[4], Ryota MIZOGUCHI[1], Takenori HIRAOKA[1], Takahide NOUZAWA[1], Iwao KOIZUMI[1], Akira OYAMA5, Makoto TSUBOKURA[2],[3] (1. Hiroshima University, 2. Kobe University, 3. RIKEN R-CCS, 4. Mazda Motor Corporation, 5. JAXA)

5:10 PM - 5:30 PM
[240206-10-05]
Sensitivity Analysis and Shape Optimization of Autonomous Vehicle Platoons Using the Adjoint Method
*Haochen Shuang[1] (1. Hiroshima University Graduate School of Advanced Science and Engineering)

[240701-04] MS-24-1
High Performance Computing for Environmental Problems
1:00 PM - 3:00 PM
Room 407
Chairman:
Takashi Shimokawabe (The University of Tokyo)

1:00 PM - 1:20 PM
[240701-04-01]
A study of a conversation system with a specific person using a database
*RUIYAN ZHU[1], Ryuji Shioya[1], Yasushi Nakabayashi[1] (1. Toyo University)

1:20 PM - 1:40 PM
[240701-04-02]
Predicting Oil-Immersed Transformer's Lifetime Using DGA Time Series Data
Hongjie Zheng[1], *Ryuji Shioya[1] (1. Toyo University)

1:40 PM - 2:00 PM
[240701-04-03]
The Development of AI-Based Motion Pictogram Generation and Effects on Visual Understanding
*Natsumi Okatani[1], Shioya Ryuji[1], Yasushi Nakabayashi[1] (1. Toyo University)

2:00 PM - 2:20 PM
[240701-04-04]
Accelerating stencil computation by using Tensor Core
*ZIHENG YUAN[1], Shimokawabe Takashi[2] (1. Department of Electrical Engineering and Information Systems Graduate School of Engineering, The University of Tokyo, 2. Information Technology Center, The University of Tokyo)

[240705-08] MS-24-2
High Performance Computing for Environmental Problems
3:30 PM - 5:30 PM
Room 407
Chairman:
Thomas Indinger (Technical University of Munich)

3:30 PM - 3:50 PM
[240705-08-01]
A study on quantum simulation of nonlinear reaction-diffusion equations using Schrodingerization
*Shoya Sasaki[1], Katsuhiro Endo[2], Mayu Muramatsu[1] (1. Keio University, 2. National Institute of Advanced Industrial Science and Technology (AIST))

3:50 PM - 4:10 PM
[240705-08-02]
Asynchronous parallel search using Bayesian optimization for input parameters enabling nonlinear finite element analysis
*Takuto Nimura[1], Yasunori Yusa[1] (1. The University of Electro-Communications)

4:10 PM - 4:30 PM
[240705-08-03]
Structure-Borne Noise Induced by Train Passage on a Steel Box Bridge: Analysis Using a Unified Solver and Experimental Validation
*Hua-Yu Lee[1], Wei-Lun Hsu[2] (1. Institute of Applied Acoustics Dept. of Systems Engineering and Naval Architecture, National Taiwan Ocean University, 2. Dept. of Systems Engineering and Naval Architecture, National Taiwan Ocean University)

4:30 PM - 4:50 PM
[240705-08-04]
Scalability Analysis of an In-House CFD Solver Using the OpenMP for Modeling VIV Circular Cylinder in Turbulent Flow
*Agus Suandi[1] (1. Department of Mechanical Engineering, National Taiwan University of Science and Technology)

Thu. Jul 3, 2025

Plenary Lecture

9:00 AM – 10:00 AM
Room 301
[330101-01] Recent Advances in Nonlocal Methods for Computational Mechanics
Prof. Jung-Wuk Hong (Korea Advanced Institute of Science and Technology)
Chairman:
Michael Kaliske (Technische Universität Dresden)

Semi-Plenary Lecture

10:20 AM - 11:00 AM
Room 501
[350101-01] Advances in Variational Multiscale Methods for Optimizing Wind and Marine Energy Systems
Prof. Artem Korobenko (University of Calgary)
Chairman:
Antonia Larse (Università degli Studi di Padova)

10:20 AM - 11:00 AM
Room 502
[350201-01] Earthquake simulation enhanced by high-performance computational science
Prof. Tsuyoshi Ichimura (The University of Tokyo)
Chairman:
Leszek Demkowicz (The University of Texas at Austin)

11:00 AM - 11:40 AM
Room 501
[350102-02] Landslide hazard assessment under changing climate conditions Landslide hazard assessment under changing climate conditions
Prof. Shabnam J. Semnani (University of California, San Diego)
Chairman:
Antonia Larse(Università degli Studi di Padova)

11:00 AM - 11:40 AM
Room 502
[350202-02] Digital Twins for Smart Disaster Prevention and Automatically Executing Disaster Simulations
Prof. Satoru Oishi (Kobe University)
Chairman:
Leszek Demkowicz (The University of Texas at Austin)

Oral Presentation

[350501-06] MS-01-3
Combustion Simulations for Safety and Environmental Problems
1:00 PM - 3:00 PM
Room 505
Chairman:
Yuji Nakamura (Toyohashi University of Technology)

1:00 PM - 1:20 PM
[350501-06-01]
Flame acceleration and possibility of deflagration-to-detonation transition in unconfined turbulent flow: 2D axisymmetric simulation of H2-O2 flame at elevated pressures
*Kazuya Iwata1, Sho Wada[2,1], Ryoichi Kurose[1] (1. Kyoto University, [2]. Stanford University)

1:20 PM - 1:40 PM
[350501-06-02]
Detonative wavelets in quasi-detonations with fine coal char particles
*Juntang Zhang[1], Huangwei Zhang[1] (1. National University of Singapore)

1:40 PM - 2:00 PM
[350501-06-03]
Numerical study of thermal degradation and ignition behavior for rigid polyurethane foam with multi-layer sandwich structures
*Xinyang Wang[1], Lizhong Yang[1], Xiaoyu Ju[1] (1. State Key Laboratory of Fire Science, University of Science and Technology of China, Jin Zhai Road 96, Hefei, Anhui, 230026 China)

2:00 PM - 2:20 PM
[350501-06-04]
Numerical investigation on the formation and development process of the mushroom cloud from the atomic bombing of Nagasaki
*Kenta Nakajima[1], Akiko Matsuo[1] (1. Keio University)

2:20 PM - 2:40 PM
[350501-06-05]
Numerical prediction on behavior of radioactive cesium transported by combustion gas flow in a municipal solid waste incinerator
*Kazuyuki Takase[1], Kazuaki Kusakabe[1] (1. Fukushima Prefectural Centre for Environmental Creation)

2:40 PM - 3:00 PM
[350501-06-06]
Modelling blow-off extinction by air vortex ring: entrainment induced fuel dilution and convective cooling
*Sainan Quan[1,2], Caiyi Xiong[1], Xinyan Huang[2] (1. School of Mechanical & Automotive Engineering, South China University of Technology, Guangzhou, China, 2. Department of Building Environment & Energy Engineering, The Hong Kong Polytechnic University, Hong Kong, China)

[350406-09] MS-02-1
Computational Methods for Water Environmental Problems and Coastal/Flood Disaster Mitigation
3:30 PM - 5:30 PM
Room 504
Chairman:
Kazuo Kashiyama (Chuo University)

3:30 PM - 4:10 PM
[350406-09-01]
Towards a modeling framework for cascading hazards of earthquake-induced land
subsidence and coastal flooding
*Ethan John Kubatko[1], Patrick Bassal[1], Derek Sawyer[1], Aaron Sines[1], Suranjan Nepal[1], Paola Rivera Soto[2] (1. The Ohio State University, 2. University of Puerto Rico)

4:10 PM - 4:30 PM
[350406-09-02]
Locally Adaptive Non-Hydrostatic Extension for Shallow Water Equations: Application to Moving Bottom-Generated Waves
*Kemal Firdaus[1,2], Jorn Behrens[1,2] (1. Department of Mathematics, Universitat Hamburg, Bundesstrasse 53-55, 20146 Hamburg, Germany, 2. Center for Earth System Research

and Sustainability (CEN), Universitat Hamburg , Bundesstrasse 53-55, 20146 Hamburg, Germany)

4:30 PM - 4:50 PM
[350406-09-03]
The Missing Link in Flood Inundation Models: High-Resolution Terrain Data and Its Accuracy Impact on Kabul River,
*Abdul Naser Asil[1], tsunakio iribe[2] (1. master second year student , 2. university professor)

4:50 PM - 5:10 PM
[350406-09-04]
High order asymptotic preserving WENO schemes for rotating shallow water equations
*Yulong Xing[1] (1. Ohio State University)

[340605-09] MS-03-1
Advances in Hypercomplex disaster simulation and modeling
3:30 PM - 5:30 PM
Room 406
Chairman:
Seizo Tanaka (Hiroshima Institute of Technology)

3:30 PM - 4:50PM

3:30 PM – 3:50 PM
[340605-09-02]
Earthquake induced slope failure patterns of embankment reinforced by nailing and frame simulated using Particle-Element coupled Method
*Takatoshi Kiriyama[1], Kiyoshi Fukutake[2] (1. Shimizu Corporation, 2. Osaki Research Institute)

3:50 PM - 4:10 PM
[340605-09-03]
Sequential updating of building fragility functions through large-scale seismic simulations and sensor integration
*Dongyang Tang[1], Sukulthanasorn Naruethep[1], Reika Nomura[1], Kazuya Nojima[3], Atsushi Mori[3], Susumu Ohno[1], Jia Guo[2], Seiichi Sato[3], Shuji Moriguchi[1], Masaaki Sakuraba[3], Kenjiro Terada[1] (1. Tohoku University, 2. Kyoto University, 3. Nippon Koei Co., Ltd)

4:10 PM – 4:30 PM
[340605-09-04]
Multihazard framework for regional-scale simulation of rain-induced flood and landslide disasters
*Nilo Lemuel Junio Dolojan[1], Takayuki Takahashi[1], Masakazu Hashimoto[2], Akihiro Shibayama[1], Reika Nomura[1], Kenjiro Terada[1], Shuji Moriguchi[1] (1. Tohoku University, 2. Kansai University)

4:30 PM - 4:50 PM
[340605-09-05]
Strain-rate dependent shear resistance model for debris flow simulations in 2D shallow water equation
*Reika Nomura[1], Chiho Otsuka[1], Soma Hidano[1], Nilo Lemuel Dolojan[1], Shuji Moriguchi[1], Takeshi Kodaka[2], Kenjiro Terada[1] (1. Tohoku University, 2. Meijo University)

[350103-08] MS-05-3
Novel Numerical Methods and Multi-Approach Strategies in Computational Mechanics
1:00 PM - 3:00 PM
Room 501
Chairman:
Naoki Morita (University of Tsukuba)

1:00 PM - 1:20 PM
[350103-08-01]
Flow Analysis with an Interface-Capturing Technique Using Neural Implicit Functions
*Takumi Nemoto[1], Nozomi Magome[1], Akinari Tsukamoto[1], Ming-Chen Hsu[2], Naoto Mitsume[1] (1. University of Tsukuba, 2. Iowa State University)

1:20 PM - 1:40 PM
[350103-08-02]
An Interface-Capturing Acoustic Analysis with Neural Implicit Fields
*Naoto Mitsume[1], Akinari Tsukamoto[1], Nozomi Magome[1], Naoki Morita[1], Ming-Chen Hsu[2] (1. University of Tsukuba, 2. Iowa State University)

1:40 PM - 2:00 PM
[350103-08-03]
Numerical Simulation of Coating Damage under High-Speed Particle Impact: A CFD-DEM Model and Wear Prediction Method
*Zihao Li[1], Naoto Mitsume[1], Shunhua Chen[2] (1. University of Tsukuba, 2. Sun Yat-sen University)

2:00 PM - 2:20 PM
[350103-08-04]
Image-data-driven flow simulation
*Nobuyuki Oshima[1], Nobuto Nakamichi[1], Younghwa Cho[1] (1. Hokkaido university)

2:20 PM - 2:40 PM
[350103-08-05]
Precise Boundary Representation in Multimaterial Topology Optimization
*Yi Cui[1], Rika Tsuji[1], Toshiro Matsumoto[1] (1. Nagoya University)

2:40 PM - 3:00 PM
[350103-08-06]
Three-dimensional seismic collapse simulation of irregular bridges using an implicit dynamic analysis procedure
*Muhammad Ali Rofiq[1,2], Tzu Ying Lee[1] (1. National Central University, 2. Universitas Muhammadiyah Surakarta)

[350109-13] MS-05-4
Novel Numerical Methods and Multi-Approach Strategies in Computational Mechanics
3:30 PM - 5:30 PM
Room 501
Chairman:
Shigeki Kaneko (Nagoya Institute of Technology)

3:30 PM - 4:10 PM
[350109-13-01]
New Framework of a dense EVD solver by Mixed-precision Iterative Refinement Scheme
*Toshiyuki Imamura Imamura[1], Yuki Uchino[1], Qianxiang Ma[1], Takeshi Terao[2] (1. RIKEN, 2. Kyushu University)

4:10 PM - 4:30 PM
[350109-13-02]
3D Generative AI Based on DeepSDF: Training and Evaluation with a Dataset of 21,998 Eulerian Elastoplastic Simulations
*Koji Nishiguchi[1,2], Issei Toida[1], Naoya Chiba[3], Junji Kato[1] (1. Nagoya University, 2. RIKEN, 3. University of Osaka)

4:30 PM - 4:50 PM
[350109-13-03]
The hydrodynamic effects of a swimming blue shark by the 6 DOF FSI approach
*Yun Hsin Lin[1], Che Wei Tsao[1], Wei Hsiang Wang[1] (1. National Chung Hsing University)

4:50 PM - 5:10 PM
[350109-13-04]
Development of a Defect Estimation Method for Carbon Fiber Reinforced Plastic Interstage Structures with Holes in Space Transportation Systems Using Finite Element Analysis and Graph Neural Networks
*Keisuke Nishioka[1], Yuta Kojima[1], Toshiya Saito[2], Masahito Washiya[2], Kosuke Kawakami[2], Mitsuo Matsunaga[2], Mayu Muramatsu[1] (1. Keio University, 2. Japan Aerospace Exploration Agency)

5:10 PM - 5:30 PM
[350109-13-05]
Deep Learning for 3D Shape Generation with Structural Mechanics and Thin-Plate Considerations
*Sora Takanezawa[1], Koji Nishiguchi[1], Keiichi Yonehara[2], Shigeki Kojima[2], Kosho Kawahara[2] (1. Nagoya University, 2. TOYOTA MOTOR CORPORATION)

[340301-06] MS-06-3
Multiscaling for Safety and Environmental Problems
1:00 PM - 3:00 PM
Room 403
Chairman:
Akiyuki Takahashi (Tokyo University of Science)

1:00 PM - 1:20 PM
[340301-06-01]
Algorithm of Polyhedral Mesh Generation with Surface Reconstruction for Complex Geometry and Its Applications
*Jongyeop Kim[1], Yi Yu[2], Kyoungsoo Park[1] (1. Yonsei University, 2. University of Porto)

1:20 PM - 1:40 PM
[340301-06-02]
Effect of modeling interfacial transition zone (ITZ) of concrete on evaluated properties from fluid-solid coupled analysis
Donghwi Eum[1], Se-Yun Kim[1], *Tong-Seok Han[1] (1. Yonsei University)

1:40 PM - 2:00 PM
[340301-06-03]
Investigation of void characteristics and properties of 3D printing concrete using micro-CT
*Ji-Su Kim[1], Chanho Yoo[1] (1. University of Seoul)

2:00 PM - 2:20 PM
[340301-06-04]
Shaking table tests of a small-scale system of metafoundation and its numerical verification to mitigate vibrations due to seismic waves
*Jin Ho Lee[1], An M.N. Nguyen[1], Pham M. Truong[1], Hieu V. Nguyen[1] (1. Pukyong National University)

2:20 PM - 2:40 PM
[340301-06-05]
An EB-PML for transient simulation of flexural waves in the time domain
*Hongju Kim[1], Jun Won Kang[1] (1. Hongik University)

2:40 PM - 3:00 PM
[340301-06-06]
A spectrogram-based CNN model for subsurface imaging of unbounded domains
*Hyeok jun Kwon[1], Jun Won Kang[1] (1. Hongik University)

[340307-11] MS-06-4
Multiscaling for Safety and Environmental Problems
3:30 PM - 5:30 PM
Room 403
Chairman:
Tong-Seok Han (Yonsei University)

3:30 PM - 3:50 PM
[340307-11-01]
Data Assimilation for Dislocation Behavior in Dislocation Dynamics Simulations Based on the Ensemble Kalman Filter
*Hiroki Murata[1], Shiro Ihara[2], Katsuhiro Endo[3], Mayu Muramatsu[1] (1. Keio University, 2. Kyushu University, 3. National Institute of Advanced Industrial Science and Technology (AIST))

3:50 PM - 4:10 PM
[340307-11-02]
Dislocation dynamics analysis of dislocation-precipitate interactions in small volumes
*Hiroki Saito[1], Atsuo Hirano[1], Akiyuki Takahashi[1] (1. Tokyo University of Science)

4:10 PM - 4:30 PM
[340307-11-03]
Dislocation dynamics analysis of the influence of off-angle on basal plane dislocation behavior in 4H-SiC
*Noboru Takahashi[1], Atsuo Hirano[1], Akiyuki Takahashi[1] (1. Tokyo University of Science)

4:30 PM - 4:50 PM
[340307-11-04]
A multiscale modeling strategy for diffusional creep mechanisms: Application to Coble creep deformation
*Yi Liu[1], Kota Sagara[1], Kazuki Shibanuma[1] (1. The University of Tokyo)

4:50 PM - 5:10 PM
[340307-11-05]
A model for quantitatively predicting Coble creep deformation and void nucleation/growth in three-dimensional polycrystalline solids
*Kota Sagara[1], Yi Liu[1], Kazuki Shibanuma[1] (1. The University of Tokyo)

[350203-07] MS-07-3
Multiscale modeling and multiscale analysis for computational materials and engineering applications
1:00 PM - 3:00 PM
Room 502
Chairman:
Tung-Yu Wu (National Taiwan University)

1:00 PM - 1:40 PM
[350203-07-01]
A time-dependent collocation framework for multi-phase coupling problems
*Judy P. Yang[1], Yu-Ruei Chen[1] (1. National Yang Ming Chiao Tung University)

1:40 PM - 2:00 PM
[350203-07-02]
Effects of internal length scales on the mechanical behavior of chiral Cosserat materials under high loading rates
*Yunche Wang[1], Wan-Chun Lo[1], Cheng-Wei Mai[1], Yasothorn Sapsathiarn[2] (1. National Cheng Kung University, 2. Mahidol University)

2:00 PM - 2:20 PM
[350203-07-03]
Dispersion analysis of cellular materials with size effect
*Yuh-Hao Hung[1], Zhen-En Jian[1], Li-Wei Liu[1] (1. Department of Civil Engineering, National Taiwan University)

2:20 PM - 2:40 PM
[350203-07-04]
YO-SAM2: A Novel Approach to Automated Cobb Angle Measurement in Scoliosis Diagnosis
*CHIH-YI Harper LU[1], CHUN-YI HSIEH[2], CHI-KUANG FENG[3], I-YUN Lisa HSIEH[1,4] (1. Department of Civil Engineering, National Taiwan University, 2. Division of Pedodontics, Department of Stomatology, Taipei Veterans
General Hospital, 3. Department of Orthopaedics and Traumatology, Taipei Veterans General Hospital, 4. Department of Chemical Engineering, National Taiwan University)

2:40 PM - 3:00 PM
[350203-07-05]
Classification of Mild Cognitive Impairment and Alzheimer's Disease with Handwriting Dynamic Features from Multiple Chinese Character Writing Tasks
*Ching-Wei Ye[1], Mong-Jen Kuo[1], Shu-Wei Chang[2], Chien-Liang Liu[3], Tsai-Yu Shih[1], Tien-Ni Wang[1,4], Hao-Ling Chen[1,4] (1. School of Occupational Therapy College of Medicine, National Taiwan University, 2. Department of Civil Engineering, National Taiwan University, 3. Department of Neurology, Taipei City Hospital, 4. Department of Physical Medicine and Rehabilitation, National Taiwan University Hospital)

[350208-11] MS-07-4
Multiscale modeling and multiscale analysis for computational materials and engineering applications
3:30 PM - 5:30 PM
Room 502
Chairman:
Judy P. Yang (National Yang Ming Chiao Tung University)

3:30 PM - 3:50 PM
[350208-11-01]
Experimental and Numerical Investigations on Dual-Mass Resonant Seismic Metamaterials
Nathan W. Halim[1], *Tung-Yu Wu[1], Shiang-Jung Wang[2] (1. National Taiwan University, 2. National Taiwan University of Science and Technology)

3:50 PM - 4:10 PM
[350208-11-02]
Stochastic Estimation of Stiffness/Strength for Polycrystalline Materials
*Tin Cong Le[1], Fumiya Tsujii[1], Tatsuya Fujise[1], Kazumi Matsui[1], Takahiro Yamada[1] (1. Yokohama National University)

4:10 PM - 4:30 PM
[350208-11-03]
Unraveling the mechanism of molecular structure and interaction of gellan gum molecules in bioengineering applications
Wei-Yuan Chiu[1], Jiashing Yu[1], *Chia-Ching Chou[1] (1. National Taiwan University)

4:30 PM - 4:50 PM
[350208-11-04]
The Effect of Sequence Environment on the Stability of Collagen Triple Helix with Glycineto-Cysteine Mutation
*Kao Yun Chu[1], Shu Wei Chang[1,2] (1. Department of Civil Engineering, National Taiwan University, 2. Department of Biomedical Engineering, National Taiwan University)

[340101-04] MS-08-3
Recent advances in impact and blast analyses
1:00 PM - 3:00 PM
Room 401
Chairman:
Yifei Hao (Hebei University of Technology)
Yusuke Kurihashi (Kanazawa University)

1:00 PM - 1:40 PM
[340101-04-01]
Performance of origami metastructure filled with shear thickening fluid (OM-STF) against blast loads
Lalin Lam[1], *Wensu Chen[1], Hong Hao[2,1], Zhejian Li[2] (1. Curtin University, 2. Guangzhou University)

1:40 PM - 2:00 PM
[340101-04-02]
Rationalization of the protective design against airplane impact
*Daiki Takahashi[1], Junji Tsujimura[1], Yukihiko Okuda[2], Akemi Nishida[2], Hiroshi Yamagata[1] (1. Nagaoka University of Technology, 2. Japan Atomic Energy Agency)

2:00 PM - 2:20 PM
[340101-04-03]
Study on dynamic fracture behavior of damaged concrete materials and beams
*Hiroki Tamai[1], Daisuke Yamamoto[2], Masuhiro Beppu3 (1. Kyushu University, 2. Oita National College of Technolog, 3. National Defense Academy)

2:20 PM - 2:40 PM
[340101-04-04]
Machine Learning-Based Surrogate Modeling of Blast Parameters for Cuboid Explosive Charges
*Tae Hee Lee[1], Dawon Park[1], Yena Lee[1], Jung-Wuk Hong[1] (1. KAIST)

[340105-09] MS-08-4
Recent advances in impact and blast analyses
3:30 PM - 5:30 PM
Room 401
Chairman:
Masato Komuro (Muroran Institute of Technology)
Thong Pham (University of South Australia)

3:30 PM - 3:50 PM
[340105-09-01]
Development of Meta-Blocks for Improved Energy Dissipation Capacity against Impact Loading
*Xihong Zhang[1], Nicolas Contreras[1], Hong Hao[2] (1. Curtin University, 2. Guangzhou University)

3:50 PM - 4:10 PM
[340105-09-02]
Fracture behavior simulations of film-laminated window glass subjected to colliding objects
*Yoichi Mukai[1], Haoyang Li[1], Yasunori Mizushima[1] (1. Kobe University)

4:10 PM - 4:30 PM
[340105-09-03]
Estimating Maximum Displacement of RC Beams Subjected to Impact LoadUsing HPC and AI
*Yusuke Kurihashi[1], Shion Kudo[1], Luong Thai Anh Duy[1] (1. Kanazawa University)

4:30 PM - 4:50 PM
[340105-09-04]
Applicability of DEM for Analyzing Damage Case of Steel Pipe Open Sabo Dams
*Toshiyuki Horiguchi[1] (1. National Defense Academy)

4:50 PM - 5:10 PM
[340105-09-05]
A study on aerosol explosion characteristics of hydrogen and gasoline spray mixtures
*Lingfeng He[1], Yong Hu[1], Ke Yu[1] (1. State Key Laboratory of Fire Science, University of Science and Technology of China)

[340501-04] MS-09-3
Recent Advances in Computational Fracture Mechanics and Failure Analysis
1:00 PM - 3:00 PM
Room 405
Chairman:
Hiroshi Okada (Tokyo University of Science)

1:00 PM - 1:20 PM
[340501-04-01]
Study on finite strain elastoplasitc crack propagation analysis using the redefined J-integral and J-integral range ΔJ
*Koichiro Arai[1], Hiroshi Okada[2] (1. HEXAGON, 2. Tokyo University of Science)

1:20 PM - 1:40 PM
[340501-04-02]
A semi-analytical approach for a piezoelectric material with slant mode-III cracks
*Ying-Te Lee[1], Shyh-Rong Kuo[1] (1. National Taiwan Ocean University)

1:40 PM - 2:00 PM
[340501-04-03]
SPH simulation for inter-/intra-granular crack propagation in micro-cantilevers
*Sewon Jeon[1], Xuelong Lyu[2], Kazumi Matsui[2], Takahiro Yamada[2] (1. Graduate School of Evironment and Information Sciences, Yokohama National University, 2. Faculty of Environment and Information Sciences, Yokohama National University)

2:00 PM - 2:20 PM
[340501-04-04]
Projectile Penetration Simulation in Thin Plate for Stainless Steel
*Jin-Ha Hwang[1], Yun-Jae Kim[2], Tomohisa Kumagai[3] (1. Pukyong National University, 2. Korea University, 3. Central Research Institute of Electric Power Industry)

[340401-05] MS-10-3
Deep and Machine Learning Methodology in the Context of Application to Computational Mechanics
1:00 PM - 3:00 PM
Room 404
Chairman:
Yoshitaka Wada (Kindai University)

1:00 PM - 1:20 PM
[340401-05-01]
GNN-Based Defect Detection Frameworks for Complex-Shaped CFRP Specimens Adaptable to Multiple Defect Shapes Based on Stress Distributions by Homogenized Finite Element Analysis
*Yuta Kojima[1], Julien Yvonnet[2], Yoshihisa Harada[3], Mayu Muramatsu[1] (1. Keio university, 2. Gustave Eiffel University, 3. National Institute of Advanced Industrial Science and Technology)

1:20 PM - 1:40 PM
[340401-05-02]
Advanced structural material design based on computational simulation and data-driven method
*Zhanli Liu[1] (1. Tsinghua University)

1:40 PM - 2:00 PM
[340401-05-03]
Research on surrogate models for earthquake damage prediction using numerical analysis
*Sota Nishioka[1], Yuichiro Yamabe[1], Satoru Oishi[1] (1. Kobe University)

2:00 PM - 2:20 PM
[340401-05-04]
Learning Stochastic Dynamical Systems for Complex System Prognosis Using RRAEs.
*Jad Mounayer[1,2], Sebastian Rodriguez[1], Jerome Tomezyk[2], Chady Ghnatios[3], Francisco Chinesta[1,4] (1. ENSAM, 2. SKF Magnetic Mechatronics, 3. University of North Florida, 4. CNRS@CREATE)

2:20 PM - 2:40 PM
[340401-05-05]
Three-Dimensional Crack Propagation Prediction Using Transfer Learning
*Ryosuke Akimoto[1], Yoshitaka Wada[1] (1. Kindai University)

[340601-04] MS-11-3
Structural Optimization for Creating a Better Society
1:00 PM - 3:00 PM
Room 406
Chairman:
Junji Kato (Nagoya University)
Akihiro Takezawa (Waseda University)

1:00 PM - 1:20 PM
[340601-04-01]
Structural Behavior of Ultra High Strength Fiber Reinforced Concrete Wind Tower Prestressed with CFRP Bars
*Mamy Andriatsitohaina RABOTOVAO[1], Tomohiro MIKI[1] (1. Kobe University, Graduate school of Engineering, Department of Civil Engineering)

1:20 PM - 1:40 PM
[340601-04-02]
Concurrent Topology Optimization for Energy Flow Control Based on the Poynting Vector
*Yuhao Bao[1], Zheng Ni[1], Xiaopeng Zhang[1] (1. Dalian University of Technology)

1:40 PM - 2:00 PM
[340601-04-03]
A B-scan imaging of concrete structures: An electrical impedance tomography approach
*Juhyeon Jo[1], Jun Won Kang[1] (1. Hongik University)

2:00 PM - 2:20 PM
[340601-04-04]
Mass constrained multi-material topology optimization applying quantum annealing
Kenshin Nakano[1], Hiroya Hoshiba[1], Koji Nishiguchi[1], *Junji Kato[1] (1. Nagoya University)

[340406-08] MS-13-1
Particle-Based Numerical Methods for Simulating Solid-Granular Interactions
3:30 PM - 5:30 PM
Room 404
Chairman:
TBA

3:30 PM - 3:50 PM
[340406-08-01]
Impact and Erosion Dynamics of Inclusion-Enriched Dry Granular Flows on Rigid Barriers
with Basal Openings: Insights from Hybrid MP-DEM Simulations
*Yupeng Jiang[1], Clarence Choi[2] (1. IBNM, Leibniz University Hannover, 2. Department of Civil Engineering, TheUniversity of Hong Kong)

3:50 PM - 4:10 PM
[340406-08-02]
Towards high-fidelity modelling of solid-fluid mixtures displacing and burying objects:hybrid MPM-DEM modelling
*Minghe Wang[1], Clarence Edward Choi[1] (1. Department of Civil Engineering, The University of Hong Kong)

4:10 PM - 4:30 PM
[340406-08-03]
Continuum modeling of collisional restitution in dilative dense granular flows
*Bodhinanda Chandra[1], Ken Kamrin[1] (1. University of California, Berkeley)

[350306-10] MS-14-1
Meshless and Particle method for safety problems
3:30 PM - 4:10 PM
Room 503
Chairman:
Seiichi Koshizuka (University of Tokyo)

3:30 PM - 4:10 PM
[350306-10-01]
Multi-scale SPH method for simulating tsunami propagation caused by submarine landslides
*Daniel Shigueo Morikawa[1], Mitsuteru Asai[2], Francisco Xavier[3] (1. JAMSTEC, 2. Kyushu University, 3. University of Rio de Janeiro State)

4:10 PM - 4:30 PM
[350306-10-02]
SPH simulation of wave runup on ecological seawalls
*Yafei Yang[1], Xiujia Su[1], Min Luo[1], Abbas Khayyer[2] (1. Zhejiang University, 2. Kyoto University)

4:30 PM - 4:50 PM
[350306-10-03]
SH-wave scattering problem of an arbitrary shaped hill by using the boundary integral quadrature method
*Jia-Wei Lee[1], Yu-Wei Wang[1], Shing-Kai Kao[2], Jeng-Tzong Chen[2] (1. Department of Civil Engineering, Tamkang University, 2. Department of Harbor and River Engineering, National Taiwan Ocean University)

4:50 PM - 5:10 PM
[350306-10-04]
Computational cost reduction for SPH applying vertical coordinate transformation
*Shujiro Fujioka[1], Kumpei Tsuji[2], Naoto Mitsume[3], Mitsuteru Asai[1] (1. Kyushu University, 2. Tohoku University, 3. University of Tsukuba)

5:10 PM - 5:30 PM
[350306-10-05]
Comparisons of Behavior for Simulations and Experiments of Spar Type Floating Wind Power Turbine by Particle Method
*Seiya Hagihara[1], Rikuto Ideta[1], Yuhi Uchino[1], Satoyuki Tanaka[2], Shinya Taketomi[1], Yuichi Tadano[1] (1. Saga University, 2. Hiroshima University)

[340505-08] MS-15-1
Direct Computation of Safety Margins for Structures and Materials
3:30 PM - 5:30 PM
Room 405
Chairman:
Konstantinos Vassilios Spiliopoulos (National Technical University of Athens)

3:30 PM - 3:50 PM
[340505-08-01]
Design for additive manufacturing: Direct method-based evaluation and optimization techniques applied to lightweight aircraft structures
*Geng Chen[1], Shengzhen Xin[1], Changxiong Huang[1], Konstantinos V. Spiliopoulos[2] (1. Beijing Jiaotong University,
2. National Technical University of Athens)

3:50 PM - 4:10 PM
[340505-08-02]

A computational framework for the direct estimation of asymptotic states of inelasticstructures
*Konstantinos Vassilios Spiliopoulos[1] (1. National Technical University of Athens)

4:10 PM - 4:30 PM
[340505-08-03]
Predicting the safety margins of structures made from anisotropic materials via shakedown analysis
*Lilian Aurora Ochoa Ontiveros[1], Reza Vafadari Komarolia[1], Lavakumar Veludandi[1], Jaan Willem Simon[1] (1. Computational Applied Mechanics, University of Wuppertal)

4:30 PM - 4:50 PM
[340505-08-04]
Data-driven FEM cluster-based basis reduction method for shakedown analysis ofheterogeneous material and structures under variable loads
*Yinghao Nie[1], Xiuchen Gong[1], Qian Zhang[1], Gengdong Cheng[1,2] (1. Dalian University of Technology, 2. State Key Laboratory of Structural Analysis, Optimization and CAE Software for Industrial Equipment)

[330102-07] MS-16-3
Advances in Numerical Methods for Enhancing Safety and Resilience of Structures in Civil and Architectural Engineering
1:00 PM - 3:00 PM
Room 301
Chairman:
Leong Hien Poh (National University of Singapore)

1:00 PM - 1:20 PM [330102-07-01]
Effect of frictional pot bearing defects on the seismic vulnerability assessment of girder bridges
*Dongho Kim[1], Jun Won Kang[1] (1. Hongik University)

1:20 PM - 1:40 PM
[330102-07-02]
Reanalysis of support structures for jacket-type offshore wind turbines
*Shih-Hsun Yin[1] (1. Department of Civil Engineering, National Taipei University of Technology)

1:40 PM - 2:00 PM
[330102-07-03]
Repairing simulation assessing strength recovery of damaged transmission tower under different seasonal loads and support movement
*Yuto Yamano[1], Kumpei Tsuji[1], Hiroki Mizoe[2], Tasuku Muroi[3], Yuki Yamakawa[1] (1. Department of Civil and Environmental Engineering, Tohoku University, 2. Carbon Neutrality and Power Plants Engineering, Research and Development Center, Tohoku Electric Power Co., Inc., 3. Power Transmission Division, Sendai Power Network Center, Tohoku Electric Power Network Co., Inc.)

2:00 PM - 2:20 PM
[330102-07-04]
Investigation of internal pressure capacity of prestressed concrete containment vessel under a severe accident
*Sangwoo Lee[1], Hoyoung Son[1], Bu-Seog Ju[1], Yoon-Suk Chang[1] (1. Kyunghee university, Republic of Korea)

2:20 PM - 2:40 PM
[330102-07-05]
A viscoelastoplastic model of asymmetric building structures and its application in seismic analysis
*Li-Wei Liu[1], Hao-Cheng Peng[1], Cheng-Yuan Chen[1] (1. National Taiwan University)

2:40 PM - 3:00 PM
[330102-07-06]
Reliability assessment of deep excavation support for implementing Digital Twin
*Menaka Kanagalingam[1], G. L. Sivakumar Babu[2] (1. Post Doctorate Fellow, Indian Institute of Science Bangalore, 2. Professor, Indian Institute of Science Bangalore)

[330108-12] MS-16-4
Advances in Numerical Methods for Enhancing Safety and Resilience of Structures in Civil and Architectural Engineering
3:30 PM - 5:30 PM
Room 301
Chairman:
Takuzo Yamashita (National Research Institute for Earth Science and Disaster Resilience)

3:30 PM - 4:10 PM
[330108-12-01]
A reduced order modelling approach for alternative load path analysis of reinforced concrete structures
Yu Chen[1], *Leong Hien Poh[1] (1. National University of Singapore)

4:10 PM - 4:30 PM
[330108-12-02]
Bespoke machine learning framework for solving structural engineering problems using graph neural networks: Toward specialized AI
*Kazuki Hayashi[1] (1. Kyoto University)

4:30 PM - 4:50 PM
[330108-12-03]
Baffle Characteristics Optimization of Rectangular And Prismatic Tank Using Surrogate Model And CFD Simulation
Nghiep Chan Nguyen[1], Tuong Vi Thi Quang[1], Anh Viet Nguyen[1], Nam Ha Tran[1], *Dianxiang Xiang[1] (1. TechnoStar Co., Ltd.)

4:50 PM - 5:10 PM
[330108-12-04]
Surrogate model for nonlinear response-history analysis and multi-objective design optimization of base-isolated reinforced concrete buildings
*I-HSIANG CHANG[1], Kuang-Yao Li[1], Wei-Tze Chang[2], Chuin-Shan Chen[1], Yin-Nan Huang[1] (1. National Taiwan University, 2. National Center for Research on Earthquake Engineering)

5:10 PM - 5:30 PM
[330108-12-05]
Cross-section design optimization of steel buildings using graph-based reinforcement learning and nonlinear response-history analysis
*Kuang-Yao Li[1], I-Hsaing Chang[1], Wei-Tze Chang[2], Yin-Nan Huang[1], Chuin-Shan Chen[1] (1. National Taiwan University, 2. National Center for Research on Earthquake Engineering)

[350301-05] MS-17-3
Stochastic simulation, uncertainty quantification, verification and validation
1:00 PM - 3:00 PM
Room 503
Chairman
Naoki Takano (Keio University)

1:00 PM - 1:20 PM
[350301-05-01]
Validation experiment and simulation for reinforced concrete beams
*Mao Kurumatani[1], Junki Hanyu[1], Eigo Watanabe[1], Yohta Kawachi[1], Hideyuki Sakurai[2] (1. Ibaraki University, 2. Shimizu Corporation)

1:20 PM - 1:40 PM
[350301-05-02]
Potential Seismic Damage in the Near-Fault Regions of the Southeastern Korean Peninsula
*Reza Sharbati[1], Dong Youp Kwak[2] (1. Postdoctoral Researcher, Department of Civil and Environmental Engineering, Hanyang University ERICA, South Korea, 2. Associate Professor, Department of Civil and Environmental Engineering, Hanyang University ERICA, South Korea)

1:40 PM - 2:00 PM
[350301-05-03]
Numerical verification procedure for dynamic problems of elastic solid structure
*Takahiro Yamada[1] (1. Yokohama National University)

2:00 PM - 2:20 PM
[350301-05-04]
A revisit on comparison between simulation and experiment responses in VVUQ process
*Tomohiko Morimo[1,2], Megumi Oishi[2], Chikako Natsumeda[2], Kazumi Matsui[2], Kazuyuki Kurata[3], Yuki Fukutani[4], Arata Tsuzuki[5], Takahiro Miura[6], Takashi Inoue[7], Hirofumi Sugiyama[8], Takeki Yamamoto[9], Dai Watanabe[10], Xuelong Lyu[2], Takahiro Yamada[2] (1. Gifu Prefecture Research Institute for Human Life Technology, 2. Yokohama National University, 3. Terumo Corporation, 4. Panasonic Connect Co., Ltd., 5. Dassault Systemes K.K., 6. ZUKEN Modelinx Inc., 7. Cybernet Systems Co., Ltd., 8. University of Yamanashi, 9. Ibaraki University, 10. Shibaura Institute of Technology)

2:20 PM - 2:40 PM
[350301-05-05]
NUMERICAL SIMULATION OF NOISE-INDUCED CHANGES TO NEURAL ACTIVITY
*Pedro Lima[1], Tiago Sequeira[2] (1. CEMAT /Instituto Superior Tecnico /University of Lisbon, 2. CEMAT/Instituto Superior Tecnico /University of Lisbon)

[350401-05] MS-20-3
Simulation-based Disaster Prediction and Mitigation
1:00 PM - 3:00 PM
Room 504
Chairman:
TBA

1:00 PM - 1:20 PM
[350401-05-01]
Phase-field modeling of fault rupture and growth
*Jinhyun Choo[1], Fan Fei[2], Md Shumon Mia[3], Ahmed E Elbanna[3] (1. KAIST, 2. Lawrence Livermore National Laboratory, 3. University of Illinois at Urbana-Champaign)

1:20 PM - 1:40 PM
[350401-05-02]
A Robust Material Point Method for Modeling Metallic Materials with Extreme Deformation
*Sung-Han Yu[1], Tsung-Hui Huang[1], Harshal Tangade[1] (1. National Tsing Hua University)

1:40 PM - 2:00 PM
[350401-05-03]
POTEKA ground surface observation technology and prediction methodology
*Hisato Iwashita[1], Fumiaki Kobayashi[2], Kazuomi Morotomi[3], Shigeharu Shimamura[3], Atsushi Higuchi[4], Hiroyo Ohya[4], Toshiaki Takano[4], Tamio Takamura[4] (1. Meisei Electric Co.,Ltd, 2. National Defense Academy, 3. Japan Radio Co.,Ltd, 4. Chiba University)

2:00 PM - 2:20 PM
[350401-05-04]
Impact of Underwater Pile Arrays on Turbulent Transport Processes and Dynamics of Gravity Currents
*Ching-Sen Wu[1], Jyun-Ting Ye[1] (1. National Ilan University, Civil Engineering)

2:20 PM - 2:40 PM
[350401-05-05]
An agent-based parametric analysis of miners' evacuation time from an underground fire for improved emergency planning
*Guang Xu[1] (1. Missouri University of Science and Technology)

[340201-06] MS-22-3
Innovative CAE for Vehicle Development and Cross-Industry Applications toward Safety and Sustainability
1:00 PM - 3:00 PM
Room 402
Chairman:
Makoto Tsubokura (RIKEN/Kobe University)

1:00 PM - 1:20 PM
[340201-06-01]
Hyperthermal erosion of multifunctional nanocomposites TPS through reactive molecular dynamics simulations
*Seunghwa Yang[1], Inseok Jeon[1] (1. Chung-Ang University)

1:20 PM - 1:40 PM
[340201-06-02]
Automotive electrodeposition coating simulation using edge-based smoothed finite element method
*Yuki Onishi[1] (1. Institute of Science Tokyo)

1:40 PM - 2:00 PM
[340201-06-03]
2-WAY coupled simulation of vehicle motion and aerodynamics to investigate the mechanism of unsteady flows acting on an overtaken vehicle
*Tokimasa Shimada[1], Shion Sugao[1], Kento Narita[1], Rahul Bale[1,2], Kunihiko Yoshitake[3], Fortunato Nucera[3], Takashi Yoshino[3], Makoto Tsubokura[1,2] (1. Kobe University, 2. RIKEN Center for Computational Science, 3. Honda R&D Co., Ltd.)

2:20 PM – 2:40PM
[340201-06-04]
Mechanism of Road Vehicle Wind Noise Modulated by Atmospheric Fluctuations and Reduction Measures

*Atsushi Tajima[1], Takumi Hirata[2], Jun Ikeda[2], Kosuke Nakasato[2], Takahiro Kamiwaki[2], Junichi Wakamatsu[2], Makoto Tsubokura[3] (1. Graduate School of System Informatics, Kobe University, 2. Nissan Motor Co.,Ltd., 3. Complex Phenomena Unified Simulation Research Team, RIKEN Center for Computational Science)

2:40 PM - 3:00 PM
[340201-06-05]
Analysis and Research on Split Front Wing and Vortex Generator of FSAE Racing Car
*Chenguang Lai[1], Zirui Hu[1], Junxiong Zeng[1] (1. Chongqing University of Technology)

[340701-05] MS-25-1
Creating a rational disaster response society through an automatic system for creating disaster prevention digital twins and numerous hazard simulations
1:00 PM - 3:00 PM
Room 407
Chairman:
Tomohide Takeyama (Kobe University)

1:00 PM - 1:20 PM
[340701-05-01]
Multi-Point Constraint System for High-Fidelity Finite Element Model Consisting of Structure Component Assembly
*Wataru Hotta[1], Naoto Mitsume[2], Naoki Morita[2], Muneo Hori[3] (1. Taisei Corporation, 2. University of Tsukuba, 3. JAMSTEC)

1:20 PM - 1:40 PM
[340701-05-02]
A Python-Based Framework for Automated Mesh Generation from IFC Data
*Stanislav Za.irej[1], Satoshi Komatsu[2], Taiju Yoneda[3] (1. Institute for Multidisciplinary Sciences, Yokohama National University, 2. Institute of Urban Innovation, Yokohama National University, 3. ICI General Center, Maeda
Corporation)

1:40 PM - 2:00 PM
[340701-05-03]
A Prototype System for Automatic Generation of Road Bridge Models using Limited Data and Automated Seismic Response Simulation
*Kahori Iiyama[1], Hideyuki O-tani[2], Hiroshi Tamura[3], Natsu Miura[1], Shuhei Takaya[1] (1. KAJIMA Technical Research Institute, 2. Japan Agency for Marine-Earth Science and Technology, 3. Yokohama National University)

2:00 PM - 2:20 PM
[340701-05-04]
Development of an algorithm for the automated generation of bridge models for disasterprevention urban digital twins
*Aleena Saleem[1], Yoshifumi Ito[1], Aqsa Jamil[1], Kahori Iiyama[2], Hiroshi Tamura[1] (1. Yokohama National University, Japan, 2. Kajima Technical Research Institute, Japan)

2:20 PM - 2:40 PM
[340701-05-05]
Validation of girder bridge models for earthquake response in disaster-prevention urban digital twins
Naota Tadokoro[1], Aleena Saleem[1], * Aleena Saleem [1], Hiroshi Tamura[1], Kahori Iiyama[2] (1. Yokohama National University, 2. Kajima Technical Research Institute)

[340706-08] MS-25-2
Creating a rational disaster response society through an automatic system for creating disaster prevention digital twins and numerous hazard simulations
3:30 PM - 5:30 PM
Room 407
Chairman:
Satoru Oishi (Kobe University)

3:30 PM - 3:50 PM
[340706-08-01]
Automated River Elevation Data Construction Using River Cross-sectional Survey Data for Flood Inundation Simulation
*Masanobu Takahashi[1], Kazuki Yamanoi[2], Katsushi Aso[3], Takanari Hori[3], Takumi Igarashi[3], Nobuyuki Iwamae[1], Satoru Oishi4 (1. KAJIMA Technical Research Institute, 2. Disaster Prevention Research Institute, Kyoto University, 3. NiX JAPAN Co., Ltd., 4. Kobe University)

3:50 PM - 4:10 PM
[340706-08-02]
Development of Probabilistic Hazard Map Incorporating River Embankment Breach Probability
*Takumi Igarashi[1], Katsushi Aso[1], Kazuki Yamanoi[2], Satoru Oishi[3] (1. NiX JAPAN Co., Ltd., 2. Disaster Prevention Research Institute, Kyoto University, 3. Research Center for Urban Safety and Security Department of Civil Engineering, Graduate School of Engineering KOBE)

4:10 PM - 4:30 PM
[340706-08-03]
Investigation on Rapid Assimilation Methods of Satellite Images into Digital Twins After Earthquake Disasters
*MASATO ISHII[1], Katsuji Aso[1], Satoru Oishi[2], Kazuki Yamanoi[3] (1. NiX JAPAN Co. Ltd., 2. Research Center for Urban Safety and Security Department of Civil Engineering, Graduate School of Engineering KOBE, 3. Disaster Prevention Research Institute, Kyoto University)

Fri. Jul 4, 2025

Plenary Lecture

9:00 AM - 10:00 AM
Room 301
[430101-01]
Physics-informed Machine Learning: a powerful computer modelling framework for engineering and science
Prof. Yuan Tong Gu (Queensland University of Technology)
Chairman:
Hiroshi Okada(Tokyo University of Science)

Semi-Plenary Lecture

10:20 AM - 11:00 AM
Room 501
[450101-01]
Revealing respiratory physiology defence of inhaled airborne particles through multiphase flow simulations
Prof. Kiao Inthavong (RMIT University)
Chairman:
Kazuhide Ito (Kyushu University)

10:20 AM - 11:00 AM
Room 502
[450201-01]
Generative-AI Design and Intelligent Optimization of Building Structures
Prof. Xin zheng Lu (Tsinghua University)
Chairman:
Junji Kato(Nagoya University)

11:00 AM - 11:40 AM
Room 501
[450102-02]
Autonomous finite element analysis of fracture prediction in human bones applied in clinical practice
Prof. Zohar Yosibash (Tel Aviv University)
Chairman:
Kazuhide Ito (Kyushu University)

11:00 AM - 11:40 AM
Room 502
[450202-02]
Intelligent design of topology optimization considering physics-related information
Prof. Jun Yan (Dalian University of Technology)
Chairman:
Junji Kato(Nagoya University)

Oral Presentation

[450401-06] MS-02-2
Computational Methods for Water Environmental Problems and Coastal/Flood Disaster Mitigation
1:00 PM - 3:00 PM
Room 504
Chairman:
Ethan Kubatko (Ohio State University)

1:00 PM - 1:20 PM
[450401-06-01]
AI-driven coastal change detection on large radar datasets using HPC
*Alexander Ruettgers[1], Wadim Koslow[1], Kathrin Rack[1], Fabian Hoppe[1], Luca Dell'Amore[2], Paola Rizzoli[2] (1. German Aerospace Center (DLR), Institute of Software Technology, 2. German Aerospace Center (DLR), Microwaves and Radar Institute)

1:20 PM - 1:40 PM
[450401-06-02]
Assessing The Impact of The CYGNSS Mission's Level-3 Merged Storm Wind Fields On ADCIRC Surge Simulations
*Mohammad Al-Khaldi[1], Joel T Johnson[1], Ethan Kubatko[1], Aaron Sines[1], Suranjan Nepal[1] (1. The Ohio State University)

1:40 PM - 2:00 PM
[450401-06-03]
Seasonally Adaptive Data Compression in LoRaWAN Using Huffman Coding
*Airi Kokuryo[1], Kohei Inoda[1], Akihito Kohiga[1], Takahiro Koita[1] (1. Doshisha University)

2:00 PM - 2:20 PM
[450401-06-04]
Study of sensor network construction using LoRaWAN for natural disaster prediction
*Kohei Inoda[1], Airi Kokuryo[1], Akihito Kohiga[1], Takahiro Koita[1] (1. Doshisha University)

2:20 PM - 2:40 PM
[450401-06-05]
Development of a real-time flood prediction model using dimensionality compression
*Ryuya Nakayama[1], Kanta Yamaguchi[1], Yuto Habutsu[1], Masayuki Hitokoto[2], Kazuo Kashiyama[1] (1. Chuo University, 2. Nippon Koei Co., Ltd.)

2:40 PM - 3:00 PM
[450401-06-06]
Gas-liquid-solid three-phase flow analysis with multiple objects using stabilized MINI element
*Junichi Matsumoto[1], Tomohiro Sawada[1] (1. National Institute of Advanced Industrial Science and Technology (AIST))

[450407-10] MS-02-3
Computational Methods for Water Environmental Problems and Coastal/Flood Disaster Mitigation
3:30 PM - 5:30 PM
Room 504
Chairman:
Junichi Matsumoto (AIST)

3:30 PM - 3:50 PM
[450407-10-01]
Parameter Aware Koopman Operators For Surrogate Modeling
*Nishant Panda[1], Himanshu Singh[1], Sourav Dutta [2] (1. Los Alamos National Lab, 2. University of Texas at Austin)

3:50 PM - 4:10 PM
[450407-10-02]
Research on visualization for disaster prevention education using XR technology
*Kazuya Nojima[1], Yuji Kozono[2], Takuma Kontani[1], Shingo Zenkoji[2], Masaaki Sakuraba[3] (1. Digital Design Center, Research and Development Center, Nippon Koei Co., Ltd., 2. Center for Technology Development, Research and
Development Center, Nippon Koei Co., Ltd., 3. Research and Development Center, Nippon Koei Co., Ltd.)

4:10 PM - 4:30 PM

[450407-10-03]
Deep Learning for Underwater Object Classification Using Synthetic Datasets from CAD and Physically-Based Rendering
*Hiroshi Okawa[1], Shota Yagi[1], Seiji Itano[1], Kazuo Kashiyama[2] (1. Eight-Japan Engineering Consultants Inc., 2. Chuo University)

4:30 PM - 4:50 PM
[450407-10-04]
Development of a land use classification model based on deep learning using aerial photographs and its application to flood inundation
*Yusuke Odate[1], Yuto Habutsu[1], Masayuki Hitokoto[2], Kazuo Kashiyama[1] (1. Chuo University, 2. Nippon Koei Co., Ltd.)

[440601-05] MS-03-2
Advances in Hypercomplex disaster simulation and modeling
1:00 PM - 3:00 PM
Room 406
Chairman:
Takatoshi Kiriyama (Shimizu Corporation)

1:00 PM - 1:20 PM
[440601-05-01]
Nonlinear interaction between thermodynamic and hydrodynamic instability with partially miscible fluids in porous medium
*Ching-Yao Chen[1], Priya Verma[1] (1. National Yang Ming Chiao Tung University)

1:20 PM - 1:40 PM
[440601-05-02]
Spatial Distribution Estimation of Geotechnical Properties and Slope Stability Evaluation Using the Hachinohe City Geotechnical Database
*Kenta Tozato[1], Shota Yamauchi[1], Haruka Furusato[1], Shinsuke Takase[1], Kenji Kaneko[1] (1. Hachinohe Institute of Technology)

1:40 PM - 2:00 PM
[440601-05-03]
Fluid-Structure Interaction analysis using Finite Cover Method
Haruka Furusato[1], *Shinsuke Takase[1], Seizo Tanaka[2], Tozato Kenta[1], Kenji Kaneko[1] (1. Hachinohe Institute of Technology, 2. Hiroshima Institute of Technology)

2:00 PM - 2:20 PM
[440601-05-04]
Development of a fluid-structure interaction model based on the finite cover method and the finite element method
*Guoming Ling[1], Mitsuteru Asai[1], Kenjiro Terada[2] (1. Kyushu University, 2. Tohoku University)

2:20 PM - 2:40 PM
[440601-05-05]
Mass-Preserving Particle Level Set Method with Kernel Function Correction for the simulation of multiphase flow
*Shunsuke KURIOKA[1], Changhong HU[1] (1. Kyushu University)

[440201-05] MS-04-1
Numerical Simulation in Geomechanics and Geodisasters Co-organized by TC103 of International Society for Soil Mechanics and Geotechnical Engineering
1:00 PM - 3:00 PM
Room 402
Chairman:
Kazunori Fujisawa (Kyoto University)

1:00 PM - 1:20 PM
[440201-05-01]
Numerical reproduction of wave-induced seabed liquefaction and solidification
*Takumi Iijima[1], Tomohiro Toyoda[1], Noda Toshihiro[1] (1. Nagoya University)

1:20 PM - 1:40 PM
[440201-05-02]
Identification of hydro-mechanical parameters in rainfall-induced seepage and deformation of unsaturated slopes using a particle filter
Shin Niira[1], Sanchitha H.S. Jayakody[2], Kyohei Ueda[1], *Ryosuke Uzuoka[1] (1. Kyoto University, 2. National Building Research Organisation)

1:40 PM - 2:00 PM
[440201-05-03]
Numerical simulation of landslide-induced consequences on underwater infrastructure
*Pavel A. Trapper[1] (1. Ben-Gurion University of the Negev)

2:00 PM - 2:20 PM
[440201-05-04]
Application of velocity-based Space-Time Finite Element Method for wave propagation problems in elasto-plastic media
*Shion Shimizu[1], Vikas Sharma[1], Kazuma Takenaka[1], Kazunori Fujisawa[1] (1. Graduate School of Agriculture, Kyoto-University)

2:20 PM - 2:40 PM
[440201-05-05]
Arbitrary higher order space-time finite element methods for wave propagation problems
*Vikas Sharma[1], Kazunori Fujisawa[1], Ryoya Matsumoto[1], Shion Shimizu[1] (1. Graduate School of Agriculture, Kyoto University)

[440206-09] MS-04-2
Numerical Simulation in Geomechanics and Geodisasters Co-organized by TC103 of International Society for Soil Mechanics and Geotechnical Engineering
3:30 PM - 5:30 PM
Room 402
Chairman:
Vikas Sharma (Kyoto University)

3:30 PM - 3:50 PM
[440206-09-01]
Large-area Slope Stability Analysis using Three-dimensional Limit Equilibrium Method with Ellipsoidal Slip Surfaces and Particle Swarm Optimization
*Daichi Sugo[1], John Yeonjun Choe[2], Kenta Tozato[3], Reika Nomura[1], Kenjiro Terada[1], Kosuke Watanabe[4], Shuji Moriguchi[1] (1. Tohoku University, 2. University of Washington, 3. Hachinohe Institute of Technology, 4. Chubu Electric Power)

3:50 PM - 4:10 PM
[440206-09-02]

Comparison of failure modes in steep slopes using centrifugal models and 3D DEM simulations
*Thirapong Pipatpongsa[1], Shanzhi Tao[2], Yosuke Higo[2] (1. National Yang Ming Chiao Tung University, 2. Kyoto University)

4:10 PM - 4:30 PM
[440206-09-03]
Effect on particle resolution to a seismic response 3D peridynamics analysis with friction
*Taiki Shimbo[1], Chia Kanada[1], Tomoki Kawamura[2], Yutaka Fukumoto[3] (1. National Institute of Technology, Ishikawa College, 2. Godai Kaihatsu Corporation, 3. Okayama University)

4:30 PM - 4:50 PM
[440206-09-04]
Validation experiment for resolved DEM-CFD solid-fluid coupling method considering object shapes
*Yutaka Fukumoto[1], Takatoshi Kiriyama[2], Kumpei Tuji[3], Koichi Hosaka[4], Daisuke Nishiura[5], Mitsuteru Asai[6] (1. Okayama University, 2. Institute of Technology, Shimizu Corporation, 3. Tohoku University, 4. Yachiyo Engineering Co., Ltd., 5. Japan Agency for Marine-Earth Science and Technology, 6. Kyushu University)

[450103-04] MS-05-5
Novel Numerical Methods and Multi-Approach Strategies in Computational Mechanics
1:00 PM - 3:00 PM
Room 501
Chairman:
Koji Nishiguchi (Nagoya Univeristy / RIKEN)

1:00 PM - 1:20 PM
[450103-04-01]
Multiscale analysis of sound absorption and mechanical properties of porous materials based on homogenization method
*Kenshin Miyama[1], Tetsuya Matsuda[1], Gai Kubo[2], Kenichiro Nagai[2] (1. University of Tsukuba, 2. Japan Aerospace Exploration Agency)

1:20 PM - 1:40 PM
[450103-04-02]
An iterative SPH-FEM coupling method based on fictitious domain approach
*Hiroyuki Omura[1], Kumpei Tsuji[2], Takuzo Yamashita[1], Naoto Mitsume[3], Mitsuteru Asai[4] (1. National Research Institute for Earth Science and Disaster Resilience, 2. Tohoku University, 3. University of Tsukuba, 4. Kyushu
University)

[450203-07] MS-07-5
Multiscale modeling and multiscale analysis for computational materials and engineering applications
1:00 PM - 3:00 PM
Room 502
Chairman:
Li-Wei Liu (National Taiwan University)

1:00 PM - 1:40 PM
[450203-07-01]
Hybrid Classical-Quantum Machine Learning Models Predicting the Energetics of Complex Materials
Hsu-Kai Cheng[1], Po-Yu Yang[1], *Chun-Wei Pao[1] (1. Academia Sinica)

1:40 PM - 2:00 PM
[450203-07-02]
Investigating the Impact of Chemical Short-Range Order on the Mechanical Properties of High-Entropy Intermetallic Alloys Using Machine Learning Potential Model
*Po-Yu Yang[1], Meng-Jung Hsieh[2], Yu-Hsiang Wang[1], Chun-Wei Pao[1] (1. Research Center for Applied Sciences, Academia Sinica, 2. Institute of Applied Mechanics, National Taiwan University)

2:00 PM - 2:20 PM
[450203-07-03]
Enhancing the Hydrogen Evolution Reaction Activity of the Lithium-intercalated MoS2: A First-principles Study
*Jui-Cheng Kao[1,2], Yu-Chieh Lo[1], Chun-Wei Pao[2] (1. Department of Materials Science and Engineering, National Yang Ming Chiao Tung University, 2. Research Center for Applied Sciences, Academia Sinica)

2:20 PM - 2:40 PM
[450203-07-04]
Impact-Induced Erosion in Steam Turbine Blades Using Finite Element Analysis
*Wan Fathul Hakim W Zamri[1], Nazar Julasrin[2], Muhamad Faiz Md Din[3] (1. Universiti Kebangsaan Malaysia, 2. Taisek Lamick Asia (Malaysia) Sdn. Bhd, 3. The National Defence University of Malaysia)

2:40 PM - 3:00 PM
[450203-07-05]
Auxetic Metamaterials for Regional Seismic Protection Strategy
*Ahmed Abdalfatah Saddek[1], Tzu-Kang Lin[2], Wen-Kuei Chang[3] (1. Postdoctoral Research Fellw, 2. Professor, 3. Master student)

[440101-05] MS-08-5
Recent advances in impact and blast analyses
1:00 PM - 3:00 PM
Room 401
Chairman:
Weifang Xiao (Tongji University)
Toshiyuki Horiguchi (National Defense Academy)

1:00 PM - 1:20 PM
[440101-05-01]
Improved constitute model for steel fibre reinforced concrete
Tung T Tran[2], *Thong Pham[1], Hong Hao[3,4] (1. University of South Australia, 2. Aup Perth, 3. Curtin University, 4. Guangzhou University)

1:20 PM - 1:40 PM
[440101-05-02]
Investigation of the Fracture Mechanisms of the Human Acetabulum Under DynamicImpact Loading
*Ching Chi Hsu[1], Kao Shang Shih[2], Shang Jia Huang[1] (1. National Taiwan University of Science and Technology,
2. Shin Kong Wu Ho-Su Memorial Hospital)

1:40 PM - 2:00 PM
[440101-05-03]
Analytical study on damage behavior of reinforced concrete slabs subjected to impact of falling objects considering slab geometry
*Masato Mizuta[1], Yasunori Mizushima[1], Yuki Ikeda[1], Ryoko Shimada[2] (1. Kobe university, 2. Building Structure Engineering Department, JFE Metal Products Corporation)

2:00 PM - 2:20 PM
[440101-05-04]
Estimation of internal blast loads within single rectangular rooms using RMOI
*Weifang Xiao[1], Mingtao Wu[1], Hui Li[1] (1. Tongji University)

2:20 PM - 2:40 PM
[440101-05-05]
Study on response of a reinforced concrete structure with internal equipment subjected to projectile impact
*Zuoyi Kang[1], Yukihiko Okuda[1], Akemi Nishida[1], Haruji Tsubota[1], Masaharu Itoh[1] (1. Japan Atomic Energy Agency)

[440301-05] MS-12-1
Simulation of Earthquake Hazards and Disasters with HPC
1:00 PM - 3:00 PM
Room 403
Chairman:
Takane Hori (Japan Agency for Marine-Earth Science and Technology)

1:00 PM - 1:40 PM
[440301-05-01]
Massively parallel algorithms for efficient Bayesian inference of earthquake fault parameters
*Kai Nakao[1], Tsuyoshi Ichimura[1], Kohei Fujita[1], Takane Hori[2], Tomokazu Kobayashi[3], Hiroshi Munekane[3] (1. The University of Tokyo, 2. Japan Agency for Marine-Earth Science and Technology, 3. Geospatial Information Authority of Japan)

1:40 PM - 2:00 PM
[440301-05-02]
Accelerating implicit unstructured finite-element simulation by converting random accessbased computation to sequential access-based computation
*Kohei Fujita[1], Tsuyoshi Ichimura[1], Muneo Hori[2], Lalith Maddegedara[1] (1. The University of Tokyo, 2. Japan Agency for Marine-Earth Science and Technology)

2:00 PM - 2:20 PM
[440301-05-03]
Large-scale simulation of fault rupture subjected to far-field loading and an MPI+MPI hybrid parallel computational model
*Elia Nicolin[1], Lalith Maddegedara[2], Lionel Quaranta[3], Kohei Fujita[2], Tsuyoshi Ichimura[2], Muneo Hori[4] (1. Department of Civil Engineering, The University of Tokyo, 2. Earthquake Research Institute, The University of Tokyo, 3. GE Vernova, Taichung City, Taiwan, 4. Japan Agency for Marine-Earth Science and Technology)

2:20 PM - 2:40 PM
[440301-05-04]
Seismic analysis of transmission tower-line system considering soil-structure interaction
*Eiji Tanaka[1], Kosei Yachi[1], Yasuhiro Ohashi[1] (1. Shimizu Corporation)

2:40 PM - 3:00 PM
[440301-05-05]
Application of HPC-FEM to large-scale 3D seismic response analysis in the area around nuclear power plants using the supercomputer "Fugaku"
*Yuichi Otsuka[1], Ayako Maene[2], Kohei Fujita[3], Tsuyoshi Ichimura[3] (1. Tokyo Electric Power Services Co., Ltd, 2. Tokyo Electric Power Company Holdings, Incorporated, 3. Earthquake Research Institute, The University of Tokyo)

[440306-11] MS-12-2
Simulation of Earthquake Hazards and Disasters with HPC
3:30 PM - 5:30 PM
Room 403
Chairman:
Kohei Fujita (The University of Tokyo)

3:30 PM - 3:50 PM
[440306-11-01]
Road to "AI for Science": Exploring Software Sustainability through "Couplers"
*Kengo Nakajima[1] (1. The University of Tokyo/RIKEN R-CCS)

3:50 PM - 4:10 PM
[440306-11-02]
Prototype System for Forecasting of Plate Boundary Sliding Behavior Based on Sequential Data Assimilation in the Nankai Trough
*Takane Hori[1], Ryoko Nakata[1,2], Takeshi Iinuma[1], Yoshihisa Hiyoshi[1], Mamoru Hyodo[3], Daisuke Sato[1] (1. Japan Agency for Marine-Earth Science and Technology, 2. The University of Tokyo, 3. Kochi Local Meteorological
Office)

4:10 PM - 4:30 PM
[440306-11-03]
Dispersive tsunami simulations using JAGURS
*Toshitaka Baba[1] (1. Tokushima University)

4:30 PM - 4:50 PM
[440306-11-04]
Long period ground motion propagation in the Kanto Plain caused by an earthquake on the Japan Sea side
*Yu Yamamoto[1], Masashi Nishimoto[1], Yuji Yagi[2], Yoshihisa Hiyoshi[3], Takane Hori[3] (1. Taisei Corporation, 2. University of Tsukuba, 3. Japan Agency for Marine-Earth)

4:50 PM - 5:10 PM
[440306-11-05]
Three-dimensional Ground Motion Simulations for Evaluation of Site Amplification
*On-Lei Annie Kwok[1], Hsin-Chen Chou[1], Pai-Chen Guan[2] (1. National Taiwan University, 2. National Taiwan Ocean University)

5:10 PM - 5:30 PM
[440306-11-06]
GMSS3.0: An Efficient Computational Tool for Broadband Ground Motion Simulation
*Yuxiang Tang[1], Hiroe Miyake[2], P. Martin Mai[3] (1. The University of Melbourne, 2. University of Tokyo, 3. King Abdullah University of Science and Technology)

[440401-02] MS-13-2
Particle-Based Numerical Methods for Simulating Solid-Granular Interactions
1:00 PM - 3:00 PM
Room 404
Chairman:
TBA

1:00 PM - 1:20 PM
[440401-02-01]
Extended B-spline-based mixed implicit material point method stabilized by variational multiscale method
*Riichi Sugai[1], Reika Nomura[1], Shuji Moriguchi[1], Kenjiro Terada[1]

(1. Tohoku University)

1:20 PM - 1:40 PM
[440401-02-02]
A Stress-controlled Void Nucleation GTN Model for Ductile Fracture Simulation Using Smoothed Particle Hydrodynamics
*Xuelong LYU[1], Sewon Jeon[1], Hidefumi Yukawa[1], Hitoshi Nakamura[1], Kazumi Matsui[1], Takahiro Yamada[1] (1. Yokohama National University)

[450301-05] MS-14-2
Meshless and Particle method for safety problems
1:00 PM - 3:00 PM
Room 503
Chairman:
Abbas Khayyer (Kyoto University)

1:00 PM - 1:40 PM
[450301-05-01]
Refined resolved-unresolved SPH-DEM coupling framework based on SPH(2)
*Kumpei Tsuji[1], Hiroyuki Omura[2], Shujiro Fujioka[3], Mitsuteru Asai[3] (1. Tohoku University, 2. National Institute for Earth Science and Disaster Resilience, 3. Kyushu University)

1:40 PM - 2:00 PM
[450301-05-02]
An SPH and RBD Coupling Approach for Multiphase Water Entry Simulations
*Chaoyang Guo[1], Moubin Liu[1] (1. Peking University)

2:00 PM - 2:20 PM
[450301-05-03]
Resolved Coupling of Stony Debris Flows With a Two-Point Multi-Phase Method
*Yangfan Ma[1], Mitsuteru Asai[1] (1. Kyushu University)

2:20 PM - 2:40 PM
[450301-05-04]
Semi-resolved CFD-DEM modeling of particle-pore clogging in pervious asphalt concrete: Implications for road safety
*Jiayi Chi[1], Moubin Liu[1] (1. Peking University)

2:40 PM - 3:00 PM
[450301-05-05]
A Semi-resolved SPH-DEM method for the submerged granular collapse simulation
*Sijie Wang1, Moubin Liu1 (1. Peking University)

[450306-11] MS-14-3
Meshless and Particle method for safety problems
3:30 PM - 5:30 PM
Room 503
Chairman:
Mitsuteru Asai (Kyushu University)

3:30 PM - 3:50 PM
[450306-11-01]
Stabilization of peridynamic differential operators through diagonal scaling preconditioning
*Sunwoo Kim[1], Suyeong Jin[1], Jung-Wuk Hong[1] (1. KAIST)

3:50 PM - 4:10 PM
[450306-11-02]
Numerical simulation of bubble rising behaviors based on MPS-MALF and LSMPS methods
*Juanli Zuo[1], Seiichi KOSHIZUKA[1] (1. The University of Tokyo)

4:10 PM - 4:30 PM
[450306-11-03]
Development of snowplow simulator coupled with vehicle dynamics analysis
*Kohei Murotani[1], Yuki Akiyama[1], Risa Saito[1], Hidenori Ishii[1], Hiroki Tsuji[1], Yasushi Kamata[1], Masakazu Takagaki[1] (1. Railway Technical Research Institute)

4:30 PM - 4:50 PM
[450306-11-04]
Advanced SPH simulation for anisotropic seepage flow with an unresolved coupling approach
*Yoshitaka Inoue[1], Kazuma Takahashi[1], Kumpei Tsuji[1], Mitsuteru Asai[2] (1. Tohoku University, 2. Kyushu University)

4:50 PM - 5:10 PM
[450306-11-05]
Velocity and pressure monolithic scheme based on SPH for fluid flow simulations with arbitrary solid wall boundaries
*Shodai Okano[1,2], Daniel Morikawa[3], Louis Ge[2], Mitsuteru Asai[1] (1. Kyushu University, 2. National Taiwan University, 3. Tongji University)

5:10 PM - 5:30 PM
[450306-11-06]
A Massive Parallel SPH Framework with Adaptive Resolution and Load Balancing for Largescale Simulations
*Lingxiao Ma[1], Xiufeng Yang[2], Moubin Liu[1] (1. Peking university, 2. Beijing Institute of Technology)

[440501-03] MS-15-2
Direct Computation of Safety Margins for Structures and Materials
1:00 PM - 3:00 PM
Room 405
Chairman:
Geng Chen (Beijing Jiatong University)

1:00 PM - 1:20 PM
[440501-03-01]
A topology optimization algorithm for elastoplastic structures based on their safety margins against cyclic loading
Changxiong Huang[1], Geng Chen[1], Lele Zhang[2], *Konstantinos V. Spiliopoulos[3] (1. School of Mechanical, Electronic and Control Engineering, Beijing Jiaotong University, Beijing 100044, CHINA, 2. National International Science and Technology Cooperation Base, Beijing Jiaotong University, Beijing 100044, CHINA, 3. Institute for Structural Analysis & Antiseismic Research, Department of Civil Engineering, National Technical University of Athens, Athens 15780, GREECE)

1:20 PM - 1:40 PM
[440501-03-02]
Multiscale design and loading capacity evaluation of additive manufactured lattices
*Min chen Chen[1], zhouyi xiang[1], shunqi zhang[2] (1. Xi'an Jiaotong-Liverpool University, 2. Shanghai University)

1:40 PM - 2:00 PM
[440501-03-03]
Shakedown solutions of cavities in cohesive-frictional materials and their applications in underground compressed air energy storage
*Juan Wang[1], Pin-Qiang Mo[2], Xiaojun Tang[1,3] (1. Department of

Civil Engineering, University of Nottingham Ningbo China, 2. State Key Laboratory of Intelligent Construction and Healthy Operation & Maintenance of Deep Underground Engineering, School of Mechanics and Civil Engineering, University of Mining and Technology, 3. Engineering and Technology Research Institute, Ningbo Jiangong Engineering Group Co., Ltd.)

[430102-07] MS-16-5
Advances in Numerical Methods for Enhancing Safety and Resilience of Structures in Civil and Architectural Engineering
1:00 PM - 3:00 PM
Room 301
Chairman:
Wei-Tze Chang (National Center for Research on Earthquake Engineering)

[430102-07-01]
Structural Damage Detection using Modal Information and Interpretable Variational Autoencoder
*Shieh-Kung Huang[1], You-Jing Li[1] (1. National Chung Hsing University)

1:20 PM - 1:40 PM
[430102-07-02]
Damage identification of braces in steel-framed school gymnasiums using echo state networks
*Jing yao Zhang[1], Taisei Toyama[2], Jun Fujiwara[3] (1. Kyoto University, 2. West Japan Railway Company, 3. National Research Institute for Earth Science and Disaster Resilience)

1:40 PM - 2:00 PM
[430102-07-03]
Identification of instantaneous stiffness for mid- and low-rise buildings using optimization techniques
*Daichi Ukita[1], Jingyao Zhang[1], Jun Fujiwara[2] (1. Department of Architecture and Architectural Engineering, Kyoto University, 2. Hyogo Earthquake Engineering Research Center, NIED)

2:00 PM - 2:20 PM
[430102-07-04]
Estimation of Hysteretic Shapes for Reinforced Concrete Columns Using Conditional Generative Adversarial Network
Han-Xhing Chen[1], Ci-Xin Hsu[1], *Peng-Yu Chen[1] (1. National Central University)

2:20 PM - 2:40 PM
[430102-07-05]
Inverse identification of steel material properties using Bayesian approach
*Makoto Ohsaki[1], Do Kim Bach[2] (1. Kyoto University, 2. University of Houston)

2:40 PM - 3:00 PM JST
[430102-07-06]
A Smart Method of the Performance-Based Design and RSET Prediction for Complex Building Based on Deep Learning
*Tong Lu[1], Yuxin Zhang[1], Xinyan Huang[1] (1. The Hong Kong Polytechnic University)

[440403-06] MS-18-1
Damage Evaluation and Structural Application of Cementitious Materials
3:30 PM - 5:30 PM
Room 404
Chairman:
Rena Chengxiang Yu (University of Castilla-La Mancha)

3:30 PM - 3:50 PM
[440403-06-01]
Influence of confinement loss on bursting failure mechanism for various rocks under polyaxial loading conditions
*Selahattin Akdag[1], Murat Karakus[2], Giang D. Nguyen[3] (1. WASM: Minerals, Energy and Chemical Engineering, Curtin University, 2. School of Chemical Engineering, Mining and Petroleum Engineering, The University of Adelaide, 3. School of Architecture and Civil Engineering, The University of Adelaide)

3:50 PM - 4:10 PM
[440403-06-02]
Strength and water resistance improvement of magnesium oxychloride cement: An overview
*Inzimam Ul Haq[1], Joon Ho Seo[1], H.K. Lee[1] (1. Department of Civil and Environmental Engineering, Korea Advanced Institute of Science and Technology (KAIST), 291 Daehak-ro, Yuseong-gu, Daejeon 34141, Republic of Korea)

4:10 PM - 4:30 PM
[440403-06-03]
3D Analysis Approach for the Analysis of Crack Growth in NC-VFC Interface
*elham abouelabass mahmoud[1], Tomohiro Miki[2] (1. phd student, 2. An associate professor)

4:30 PM - 4:50 PM
[440403-06-04]
A numerical model for the dynamic fracture propagation in fibre-reinforced concrete
*Rena Chengxiang Yu[1], Elisa Poveda[1], Gonzal Ruiz[1] (1. University of Castilla-La Mancha)

[440504-07] MS-21-1
Mathematical Modelling and Simulation for Social, Environmental, and Disaster Prevention Issues
3:30 PM - 5:30 PM
Room 405
Chairman:
Hideki Fujii (University of Tokyo)

3:30 PM - 3:50 PM
[440504-07-01]
Method for Accelerating Microscopic Crowd Simulation and Its GPU Implementation
*Naoto Fujikawa[1], Hideki Fujii[1] (1. Department of Systems Innovation, School of Engineering, The University of Tokyo)

3:50 PM - 4:10 PM
[440504-07-02]
Traffic Flow Simulation in Mixed Traffic Situation of Vehicle Platoon and General Vehicle
Daisuke Ishizawa[1], *Haifa Hasna Zahrah[1], Eisuke Kita[1] (1. Nagoya University)

4:10 PM - 4:30 PM
[440504-07-03]
Research on evacuation guidance considering the distribution of

residents in the building using multi-agent simulation
*Yuichiro Yamabe[1] (1. KOBE University)

4:30 PM - 4:50 PM
[440504-07-04]
Porous Media-Based Thermal Modeling for Urban Heat Island Mitigation: A Coupled Problem Approach with Optimal Control
*Mohammed Louaked[1] (1. University of Caen Normandie)

[450501-05] MS-23-1
Computational Fluid and Particle Dynamics of the Nose and Airway in association with SCONA
1:00 PM - 3:00 PM
Room 505
Chairman:
Kazuhide Ito (Kyushu University)

1:00 PM - 1:20 PM
[450501-05-01]
In silico modelling of inhalation exposure to droplets and droplet nuclei in indoor environments as influenced by human close contact behavior
*Ruth Nyabonyi Onkangi[1], Kazuki Kuga[1], Kazuhide Ito[1] (1. Kyushu University)

1:20 PM - 1:40 PM
[450501-05-02]
The effect of metabolic heat generation on dermal exposure heterogeneity
*Hyun-Gyu Park[1], Eisaku Sumiyoshi[2], Hiroshi Harashima[2], Kazuki Kuga[1], Kazuhide Ito[1] (1. Faculty of Engineering Sciences, Kyushu University, JAPAN, 2. Technology Research Institute, Obayashi Corporation, JAPAN)

1:40 PM - 2:00 PM
[450501-05-03]
Linked between-host and within-host modeling of viral exposure dynamics using highperformance computing
*Alicia Murga[1], Tokiya Tanaka[1], Rahul Bale[1,2], Kazuhide Ito[3], Makoto Tsubokura[1,2] (1. Kobe University, 2. Riken Center for Computational Sciences, 3. Kyushu University)

2:00 PM - 2:20 PM
[450501-05-04]
Numerical study on the transport characteristics of toxic chemical gases and aerosols in human respiratory system
*Jialin Wu[1], Meijie Liu[1], Feifan He[2], Jinghong Wang[1] (1. College of Safety Science and Engineering, Nanjing Tech University, Nanjing, CHINA., 2. School of Safety Science, Tsinghua University, Beijing, CHINA.)

2:20 PM - 2:40 PM
[450501-05-05]
Impact of Lateral Neck Angle on Droplet Transport
*Nonoka Ikenaga[1], Ayato Takii[2], Masashi Yamakawa[1], Minsuok Kim[3] (1. Kyoto Institute of Technology, 2. Kobe University, 3. Loughborough University)

[450506-10] MS-23-2
Computational Fluid and Particle Dynamics of the Nose and Airway in association with SCONA
3:30 PM - 5:30 PM
Room 505
Chairman:
Kazuhide Ito (Kyushu University)

3:30 PM - 3:50 PM
[450506-10-01]
Computational Modeling and Deposition Analysis of Indoor Microplastics/Microfibers in the Realistic Human Respiratory System
*Yuan Ni[1], Khoa Nguyen Dang[1], Ito Kazuhide[1] (1. kyushu university)

3:50 PM - 4:10 PM
[450506-10-02]
Unveiling Microplastic Dynamics in Airways: A Hybrid Framework for Transport, Deposition and Toxicity Analysis
*Mohammad S. Islam[1], Md. Z. Islam[2], Md Mizanur Rahman[3], YuanTong Gu[4], Emilie Sauret[4] (1. Senior Lecturer, School of Mechanical and Mechatronic Engineering, University of Technology Sydney, 2. High Performance Computing (HPC) Laboratory, Department of Mathematics, Jashore University of Science and Technology, Jashore-7408, Bangladesh, 3. mz.islam@just.edu.bd 3Department of Mathematics, Islamic University, Kushtia- 7003, Bangladesh , 4. School of Mechanical, Medical and Process Engineering, Queensland Uni. of Technology,
Brisbane, QLD 4000, Australia.)

4:10 PM - 4:30 PM
[450506-10-03]
Indoor air quatlity assessment of near ideal displacement and mixing ventilation systems
*Rahul Bale[1,2], Haruhiro Yamamoto[2], Alicia Murga[2], Makoto Tsubokura[1,2] (1. RIKEN Center for Computational Science, 2. Kobe Univerisity)

4:30 PM - 4:50 PM
[450506-10-04]
Minimizing droplet inhalation exposure in a sustainable indoor environment using HPC and optimization algorithms
*Haruki Nakagawa[1], Raful Bale[1,2], Alicia Murga[1], Makoto Tubokura[1,2] (1. Kobe University, 2. RIKEN Center for Computational Sciences)

4:50 PM - 5:10 PM
[450506-10-05]
Numerical Investigation of Inhalation Exposure to Spherical and Nonspherical Particles Assuming Pollen in Semi-outdoor Environments
*Ruru Sakata[1], Islam M.S. Abouelhamd[1], Yuan Ni[1], Kazuki Kuga[2], Kazuhide Ito[2] (1. Interdisciplinary GraduateSchool of Engineering Sciences, Kyushu University, 2. Faculty of Engineering Sciences, Kyushu University)

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APPLICATIONS

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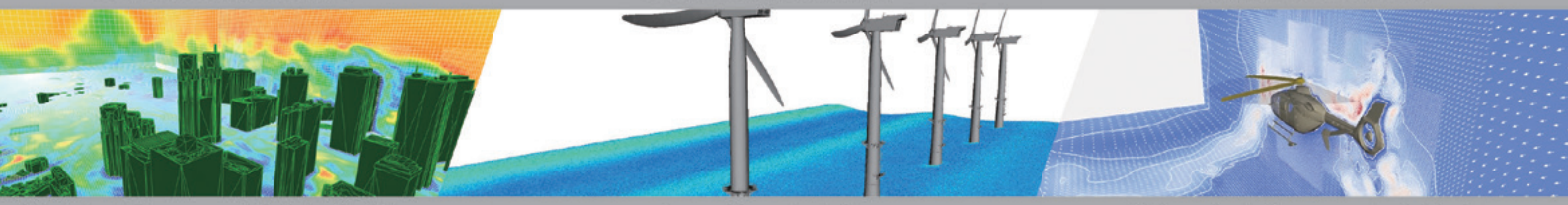

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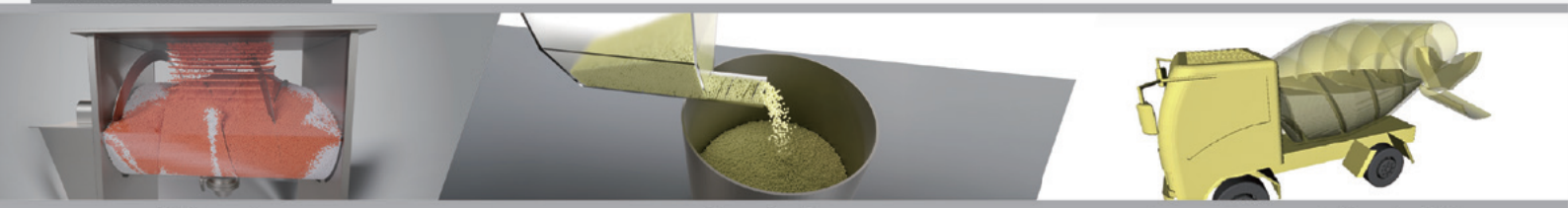
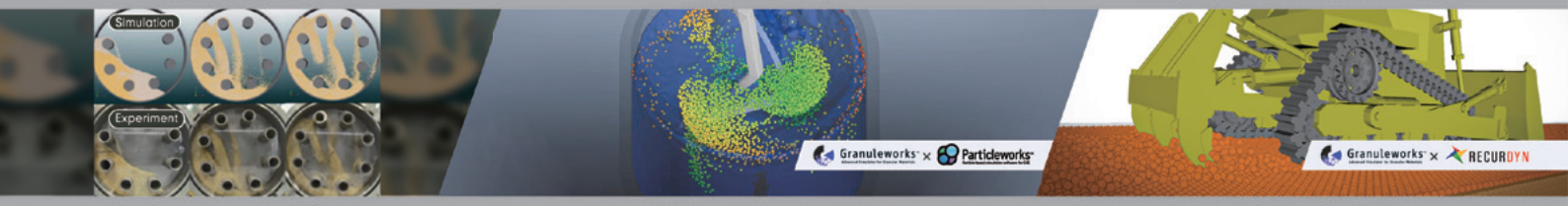
APPLICATIONS



Ribbon mixer | Screw feeder | Aggregate concrete flow simulation



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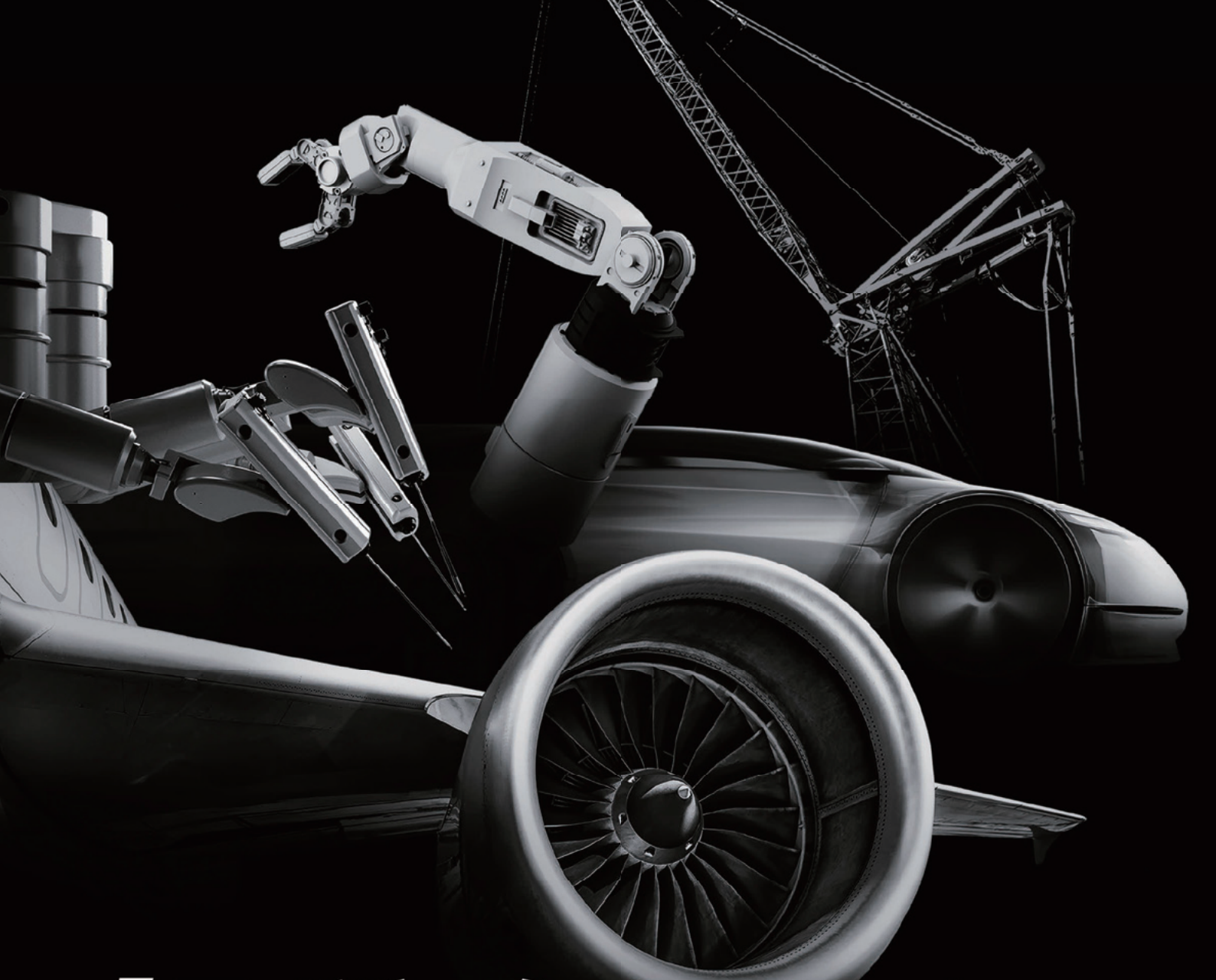

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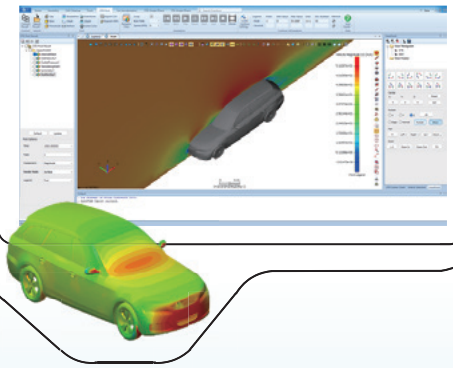

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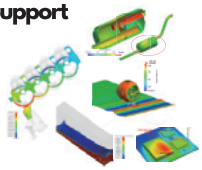
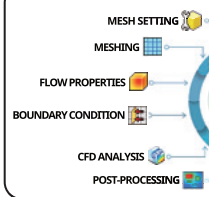
- Incompressible
- Multiphase flows with turbulence and heat transfer models.



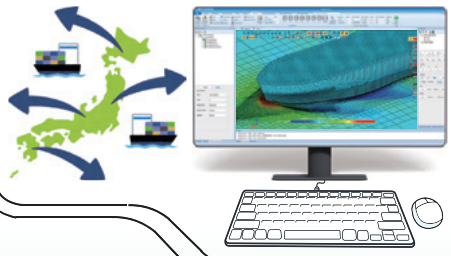
UPGRADE

Customizable Solvers



- Client-driven
- Custom
- Flexible
- Model-based

- ☑ Compatible with external CFD-Solvers
- ☑ Allows Windows clients to run solvers directly on Linux HPC servers

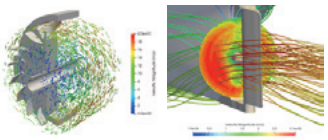


Post-Processing

MULTI-FORMAT RESULTS

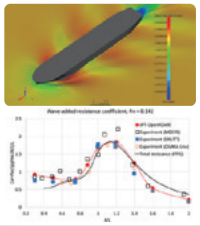
Supports various result formats

- CGNS
- EnSight
- VTK
- PVD, etc.

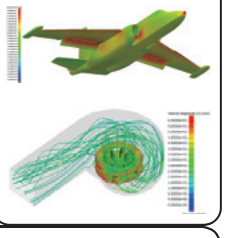


FAST CFD POST - PROCESSING

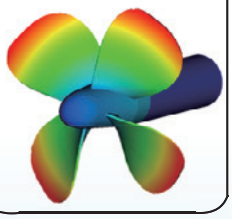
High - performance Post - Processing for CFD simulations



Fast visualization for complex flow interpretation



Improves decision - making and design optimization



Automation & Customization

Streamline your CFD workflow with our powerful automation and tailored customization solutions by Python Script in Jupiter-CFD

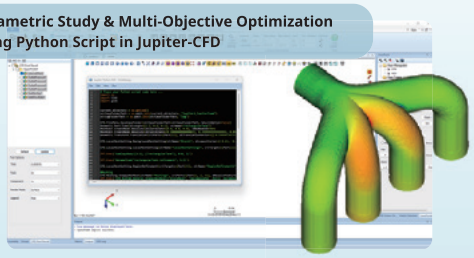
PROBLEMS
Repeated operation can make CFD user boring and uncomfortable
Manual operation by human can create mistake

DISCUSSION
Each firm has its own design rule/process, design specification/template, etc

IDEAS
Customize specified UI to each user, company will be more convenient and helpful

SOLUTION
Python Script in Jupiter-CFD is developed with friendly, functional, fast and flexible flatform

Parametric Study & Multi-Objective Optimization using Python Script in Jupiter-CFD



PSJ supports DAKOTA coupling for efficient CFD optimization

TechnoStar Co., Ltd.
Aoyama Yasuda Building 6F, 7-1-1,
Akasaka, Minato-ku, Tokyo
+81-(0)3-6434-9577

EXCELITAS TECHNOLOGIES

pco.

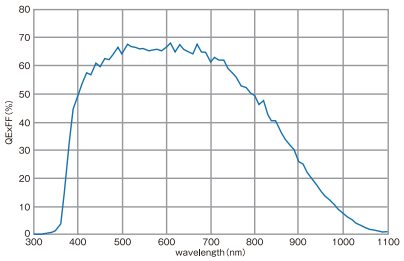
camera systems

High Performance	High-Speed	Gated Imaging	Cost Effective	OEM
pco.edge	**pco.dimax**	**pco.dicam**	**pco.pixelfly**	**Customization**
 deep-cooled stabilized	 High data bandwith	 Image intensifier	 SWIR imaging	• High cleanliness • Medical research • Special optics • Robust design (shock, vibration, waterproof) • FW functionality
pco.flim	**pco.panda**			
 Fluorescence lifetime imaging	 ultra compact design			

pco.dimax 3.6 ST high speed streaming camera

● Key features

- custom global shutter image sensor
- Pixel size 11 µm x 11 µm
- up to 2100 fps @ 3.6MP
- temperature stabilized sensor
- high-speed streaming platform
- no memory, low latency image transfer
  → “unlimited” high speed image recording
- up to 400 Gbit/s per CLHS FOL,
  on the fly image correction



pco.pixelfly SWIR

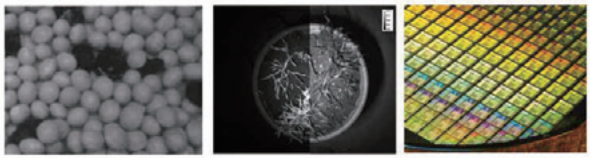
● Key features

- sensitive in VIS & SWIR range
- InGaAs sensor technology
- 1.3 Mpixel resolution
- robust & ultra-compact design
- single cable solution (power & data) via USB

Excelitas TDI line scan

● Key features

- time delay integration
- two photosensitive bands
- up to 600 kHz line frequency
- flexible thermal management
- temperature stabilized image sensor
- camera link HS or gigabit ethernet



Marubun Since 1844

Fluid Dynamics Simulation Software: The Next Generation

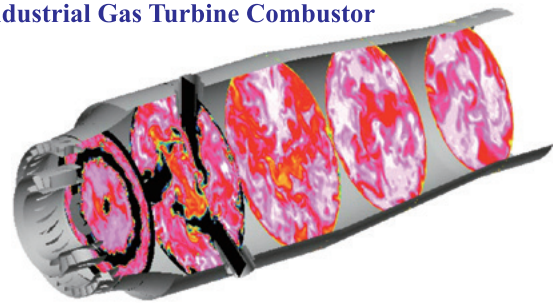
NuFD®/FrontFlowRed

Large Eddy Simulation (LES) can be conducted by using high performance computing (HPC) techniques for turbulence simulation in engineering fields. The unstructured-grid LES code "NuFD/FrontFlowRed" based on the finite volume method (FVM) is optimized for the execution on HPC. "NuFD/FrontFlowRed" provides not only turbulence simulation, but also simulation for the complex multi-physics problems, such as turbulent combustion, multi-phase flow and so on.

NuFD/FrontFlowRed : Next-generation IT program of MEXT/Revolutionary Simulation Software project Entity Developer：Institute of Industrial Science, the University of Tokyo

Study of Combustion by using Fluid Dynamics Simulation Software "*NuFD/FrontFlowRed*"

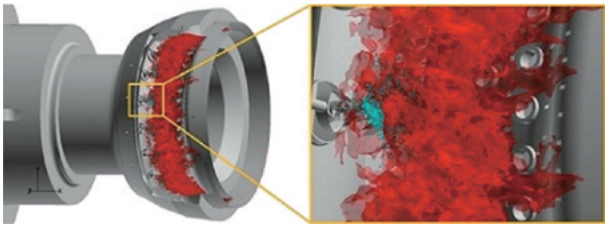
Industrial Gas Turbine Combustor



- LES-FLAMELET gaseous combustion
- Flamelet NOx modeling
- Prediction of temperature and NOx distribution inside of the combustor
- 6million cells, 160 cores

Provision of data: Kyoto University

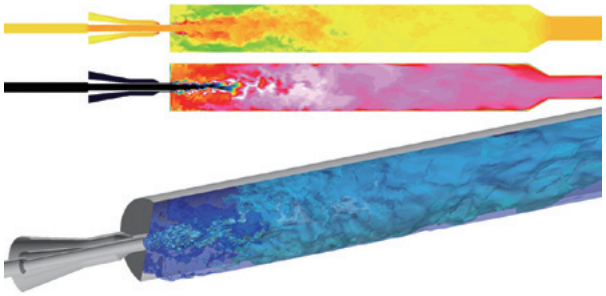
Full Annular Combustor for Aircraft Engine



- LES-FLAMELET spray combustion
- Lagrangian particle tracking and vaporization of liquid fuel
- Prediction of combustor exit temperature distribution
- Simulation of ignition and flame propagation
- 120million cells, 10,000 cores, K computer

Provision of data：Kyoto University, JAXA

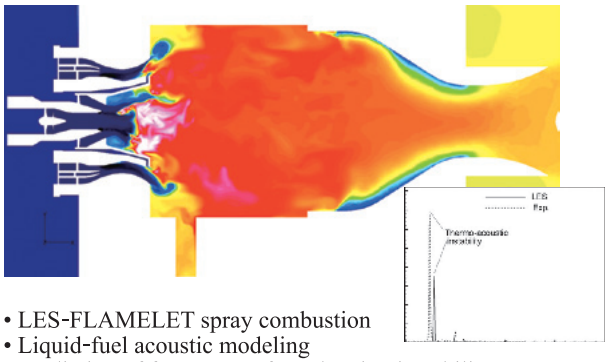
Single Element Coaxial Combustor for Rocket Engine



- LES-FLAMELET supercritical fluid combustion
- Non-adiabatic flamelet modeling
- Prediction of wall heat flux distribution
- 8.2million cells, 256 cores

Provision of data: Kyoto University

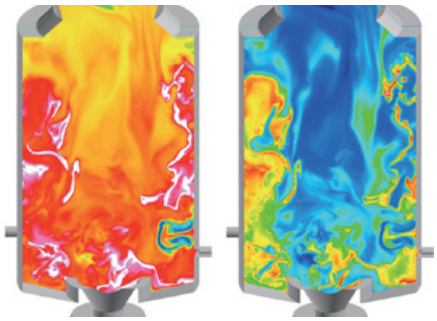
Combustion Instability of an Aero-Engine Combustor



- LES-FLAMELET spray combustion
- Liquid-fuel acoustic modeling
- Prediction of frequency of combustion instability
- 20million cells, 512 cores

Provision of data：Kyoto University, JAXA

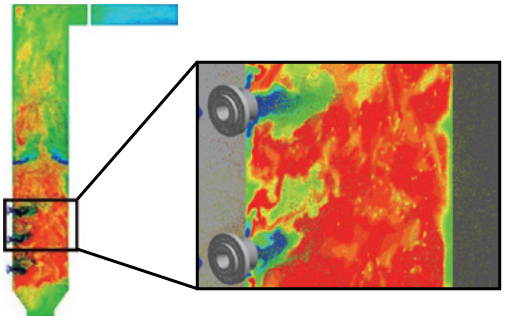
Lab-Scale Coal Gasifier



- LES of CRIEPI coal gasification
- Simulation of devolatilization, char gasification, and gas-phase reaction
- Prediction of gasification characteristics
- 100million cells, 10,000 cores, K computer

Provision of data: Kyushu University

Multi-Burner Test Furnace



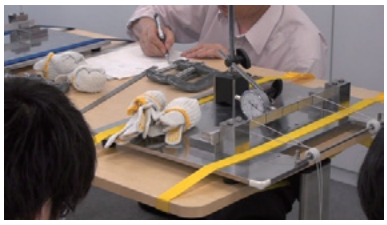
- LES of CRIEPI pulverized coal combustion
- Simulation of devolatilization, char gasification, and gas-phase reaction
- Prediction of temperature and NOx emission
- 100million cells, 10,000 cores, K computer

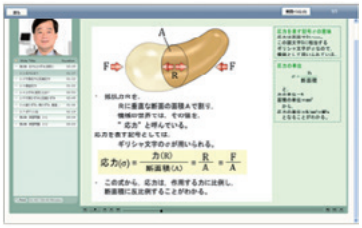
Provision of data：Kyoto University, Kyushu University

NuFD Numerical Flow Designing

Numerical Flow Designing Co., Ltd.
1-10-10 Higashi-Gotanda, Shinagawa-ku, Tokyo 141-0022, JAPAN
E-mail: info@nufd.jp URL: http://www.nufd.jp

CAE総合教育サービス
CAEユニバーシティ





CAE教育のプランニングも実施も、丸ごとおまかせ！

弊社提供のCAE教育サービスを組み合わせ、
お客様のご利用環境に合わせた最適な教育プランをご提案します。

ゼロから実務レベルまで多彩な学習内容

実験で学ぶ基礎理論からCAEソフトウェアの操作、実務のノウハウ、CAE評価者向けセミナーまで。必要なものだけをカスタマイズして、CAE関連のお悩みに幅広くご対応できます。

導入しやすい柔軟な学習形態

セミナーでは、ニーズや学習内容に合わせて、対面/オンラインでの座学・実習・ワークショップ開催が可能。また、動画コンテンツ、eラーニングなど多様な学習方法をご用意しています。

CAE社内活用をコンサルティング

お客様のCAE環境における課題抽出からお手伝い。調査・分析で解決すべき課題を把握し、長期的な教育指針のご提案も可能です。
まずはお問い合わせください！

お問い合わせ先

サイバネットシステム株式会社

デジタルエンジニアリング事業本部
エンジニアリング統括部
E-mail：cae-univ@cybernet.co.jp

WEBページ

https://www.cybernet.co.jp/cae-univ/

CYBERNET

POD/DMD analysis system using AI machine learning

VFBasis 2.1

AI/machine learning automatically extracts the critical fluid mechanisms that determine and dominate the aerodynamic performance of the product ! Further performance improvement and noise reduction of the product!

VFBasis is a commercial software developed by VINAS based on JAXA' s research. It features enhanced large-scale data analysis with parallel processing, GUI-based function evaluation and video display, commercial solver support, efficient CFD file handling, and essential industrial functions like processing tools and PIV support.

POD/DMD analysis package for CFD simulation and PIV measurement results

Automatic extraction of important vortex vibration modes that determine product fluid performance

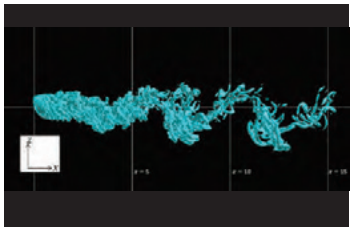
Extraction of user-specified number of important modes by AI machine learning as a result of modal analysis by POD/DMD

Fast, memory-saving POD/DMD analysis of big unsteady CFD results

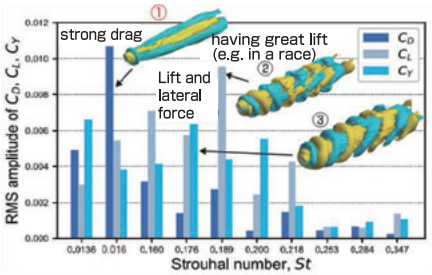
"Data Reduction Function" for compressing CFD analysis results for post-processing

Reduction in data transfer time, improvement in post-processing speed

Extracting the characteristic structure of the wake vortex of an atmospheric entry capsule.



▲ Large-scale, unsteady CFD analysis results



▲ Results of analysis of important feature structure Aerodynamic forces exerted by each mode

(i) Drag fluctuation; dominant longitudinal vortex mode with St = 0.0159
(ii) Lifting force fluctuation; dominant alternating vortex mode with St = 0.189
(iii) Helical vortex mode (St = 0.176) has equal lift and lateral force

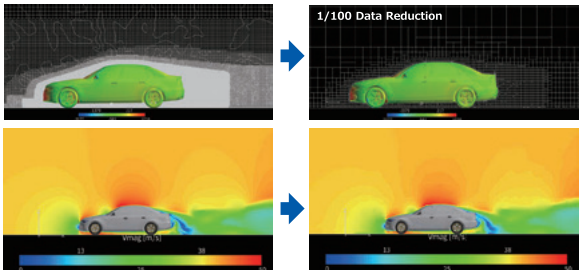
Operating environment	■ Linux system Linux 64-bit (Ubuntu 18.04LTS, Ubuntu 22.04LTS, RedHat 7, CentOS 7) ■ Windows system Windows 64-bit (Windows 10, Windows 11)
Supported Solvers and Data Formats	Acusolve, ADINA CFD, ANSYS CFX, ANSYS FLUENT CONVERGE, CRUNCH-CFD, FrontFlow/Blue, FrontFlow/red, HELYX, iconCFD, OpenFOAM, PowerFLOW, CUBE, SCRYU/Tetra STAR-CD, STAR-CCM+, STREAM, VECTIS Direct reader : OpenFOAM, iconCFD, HELYX, etc., to be supported in the future General-purpose formats : FV-UNS, Ensight Gold, PLOT3D (Q files)
Supported post processors	FieldView, **EnSight**, post processor with commercial CFD solver, ParaView FieldView, EnSight Gold, and PLOT3D format files are supported. ParaView is available but not supported.

Example of application of the Data Reduction Module to the DrivAer model

Reduces the number of elements in large CFD analysis data, streamlining visualization and engineering evaluation. The GUI allows users to downsize solver results, minimizing data transfer time and significantly speeding up post-processing.

■ input data
Total number of grids:150 million
13GB/1step

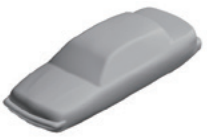
■ **reduction data**
Total number of grids:1,000,000
66MB/1step



Example of the use of characterization graphs in vehicle aerodynamic analysis

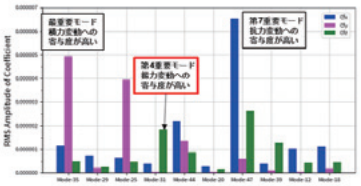
By using VFBasis' aerodynamic characteristic graph function, which visualizes fluid force fluctuations by mode, it is now possible to identify modes highly contributing to aerodynamic cubic force something conventional CFD struggled to evaluate. By comparing spatial flow patterns with surface fluid forces, aerodynamic fluctuations can be easily analyzed, providing valuable feedback for shape design.

■ Calculation target



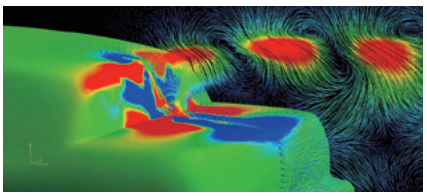
▲ Bluff body of automobile

■ Aerodynamic characteristics graph



▲ Intensity of variation of important modes and aerodynamic characteristic values extracted by machine learning

■ Visualization of flow patterns and fluid forces



▲ Velocity vector and lift force component (Fz) distribution acting on the body surface at the center cross-section

Developer: Vinas Corporation

Sales Support
VINAS Visual Integration & Numerical Analysis Systems
www.vinas.com E-MAIL : selas@vinas.com

Headquarters Keihan Dojima Building, 2-1-31 Dojima, Kita-ku, Osaka 530-0003 Japan
TEL +81-(0)6-6440-8117 FAX +81-(0)6-6440-8112

Tokyo Branch DENPA Bld, 1-11-15 Higashigotanda, Shinagawa, Tokyo 141-0022 Japan
TEL +81-3-5791-2643 FAX +81-3-5791-2649

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BluStellar

未来へ導く、光となる。

お問い合わせ先

BluStellarお問い合わせ窓口
blustellar@inquire.jp.nec.com

Webサイト
https://jpn.nec.com/dx/index.html

RIKEN Center for Computational Science (R-CCS)

R-CCS operates the supercomputer Fugaku, leveraging its world-class computing power across various research fields. R-CCS is engaged in cutting-edge research integrating simulation, big data analysis and AI through high performance computing (HPC) to solve scientific and social issues, and to drive revolutionary societal development.

▲ R-CCS Website
www.r-ccs.riken.jp

Future Initiatives of R-CCS

AI for Science, accelerating research processes by applying rapidly advancing AI directly to scientific research, with a focus on developing foundational models for science with the Advanced General Intelligence for Science Program (AGIS) by RIKEN.

JHPC-Quantum Platform, constructing a quantum-supercomputer hybrid platform that enables computing in areas previously challenging for traditional supercomputers.

FugakuNEXT, a next-generation supercomputer that combines simulation and AI to achieve global technological leadership.

Industrial Collaboration

At R-CCS, two consortia play a central role in the industry alliance and share knowledge gained through the use of the supercomputer Fugaku.

- Consortium for Next Generation Automotive CAE using HPC
- Consortium for Next Generation Combustion System CAE

R-CCS Collaborations ▶

Featured Event

SCA/HPCAsia 2026:

SupercomputingAsia(SCA)and the International Conference on High Performance Computing in the Asia-Pacific Region (HPC Asia),will jointly host the major international conference and event on HPC in Osaka from January 26 to 29, 2026.

We enthusiastically encourage you to join us for this special event.

See you in Osaka!

SCA/HPCAsia 2026 Website
www.sca-hpcasia2026.jp/ ▶

CAEが切り開く
デジタルトランスフォーメーション

CAEとデータサイエンスの融合が、製造業のデジタルトランスフォーメーションを推進。
最先端のシミュレーション技術とデータの力で、新たな価値創造と競争力強化を実現します。

データドリブン設計

- サロゲートモデルによるフロントローディング
- 深層学習・機械学習自動設計
- 既存設計検索/類似形状検索
- 機械学習による不具合検知
- マテリアルズ・プロセスインフォマティクス

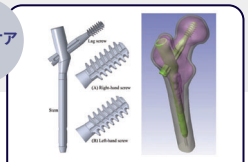

解析結果の非階層的クラスタリング

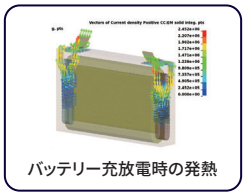
State of Art Simulation

- ギガキャスティングパーツ
- ヘルスケア　品質管理、人体解析
- 新離散化手法による表現力拡張
  - IGA/CADとの一体化
  - SPG/破断、接着剤塗布
- 流体構造連成
- バッテリー安全性

ビーム要素による
自動車ボディ解析

ヘルスケア


大腿骨インプラントの応力検討

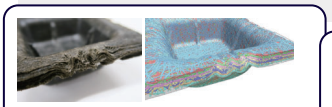

バッテリー充放電時の発熱

DX

材料設計領域

- マルチスケール
  分子動力学～
  第一原理
- 分子動力学による創薬・製薬
- バッテリー電極材料設計
- 無機材料/半導体
- 複合材特性設計
- RVE・リバースエンジニアリング

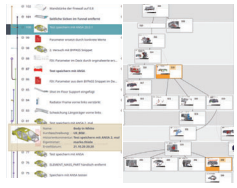

ドラッグデリバリー/
タンパク質


炭素繊維複合材 材料設計及び製品設計


環境配慮型素材

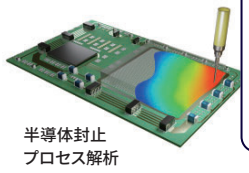
データ管理・活用・共有

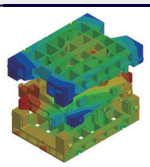
- バーチャルテストに向けて
  - サプライヤー/OEM間データ共有
  - データトレーサビリティ
- データ共有プラットフォーム
- SDMによるCAEプロセス管理
- モデル履歴管理
- アクセスセキュリティマネジメント


自動車ボディー設計
履歴管理/
トレーサビリティ

生産技術領域

- 金型設計/SE検討
  - プレス金型・射出金型・鍛造金型
- 高品質金型面作成
- 半導体/封止解析
- プロセス連携/加工硬化、繊維異方性
- 接着剤塗布
- 溶接設計、公差解析


半導体封止
プロセス解析


難加工材のプレス成型
金型たわみ

Ansys LS-DYNA	Jvision	IGA Tool	JSTAMP	JWELD	FEMZIP-L
Ansys Mechanical	JFOLD	NSafe	OmniCAD	J-Composites	ODYSSEE
Ansys Discovery	J-SEATdesigner	ARUP software	MatPara	J-OCTA	SCALE.sdm
Ansys nCode DesignLife	J-SimRapid	IMPETUS	MatYLD	Digimat	EMCoS Studio
Ansys optiSLang	HYCRASH	VALIMAT	AFDEX	SIESTA	
Ansys Twin Builder	DIFFCRASH	JOH/NIKE	Moldex3D	Simpleware Software	

JSOL

https://www.jsol-cae.com/

FUJITSU

2026年先行トライアル開始・2027年リリース

Armベースプロセッサ FUJITSU-MONAKAサーバ

電力コスト削減と高性能を同時に実現する次世代サーバ

高性能・省電力を実現するArmベースプロセッサ「FUJITSU-MONAKA」を搭載、最新のデータセンターの多様な要件に応えビジネス成果を創出する次世代サーバ

「FUJITSU-MONAKA」は、「富岳」をはじめとするスーパーコンピュータ開発で培われた富士通独自の設計技術と最先端2nmプロセスを融合。比類なき性能と電力効率でTCO削減を実現、AIからシミュレーション処理までお客様の多様な要件にも幅広くお応えします。

FUJITSU-MONAKAサーバが実現する価値

TCO※削減 ※総保有コスト

高性能と省電力の両立により**TCO削減に貢献**

- アプリケーション性能 他社CPU比 **x2倍**[1]
- 電力効率 他社CPU比 **x2倍**[1]

TCO **55%**[2]削減

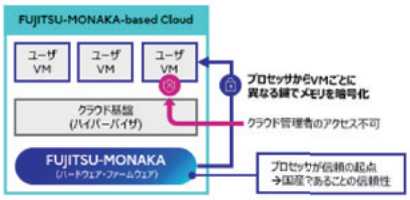
高いAI処理性能

AI推論からデータベースまで**あらゆるワークロードで性能発揮・FUJITSU-MONAKA基盤上で完結**

- ML/DL Workload
- Data Analytical Workload
- Simulation Workload

安心安全

メインフレームで培った堅牢技術と国産プロセッサによる暗号化機構で**重要データを強固に保護**



ユースケース

企業A様（業種：CSP）
プライベートLLMのコスト最適化

企業B様（業種：製造）
流体解析の高速化

企業C様（業種：小売業）
多数カメラを用いたAI画像分析コスト抑制

効果

GPUレスでのLLM推論 性能達成・設備コスト抑制

シミュレーション高速化・設計期間短縮

処理性能向上による サーバ台数と総コスト削減

お客様のニーズに合わせたご提案を承ります。ぜひお気軽にお問い合わせください。

サーバ仕様

	SAS SSD Model	PCIe SSD Model
CPU	FUJITSU-MONAKA CPU x2　最大288コア (144コア/CPU x2)	
メモリスロット数	DIMM DDR5 x24 (最大)　最大 6TiB (256GiB x24)	
拡張スロット	Low Profile x5 (PCI Express 6.0 / CXL 3.0 x 16 lane)　フルサイズGPU (オプション) x2	
内臓ストレージ	2.5" SAS SSD x24 (最大)　最大 368.64 TB (15.36TB x24)	EDSFF E3.S SSD x24 (最大)　最大 61.44 TB (15.36TB x4)
サイズ	19インチ (W) x 800mm (D) x 2U (H)	
電源	AC200V 2,000W(Titanium) / 2,700W(Titanium)　(1+1 完全冗長, ホットプラグ対応)	
冷却方式	空冷	
設置環境条件(温度)	10～35℃	
対応OS	RHEL, SLES	

記載の仕様、デザインについては通知なく変更となる可能性があります。他バリエーションについてはぜひお気軽にお問い合わせください。

[1]2027年リリース時期を想定した当社性能推定値に基づく。性能は、使用状況、構成、その他の要因によって異なります。
[2]2027年リリース時期を想定した当社性能推定値に基づく。性能指標としてSPECrate2017_intを使用。他社CPUの同等価格帯性能（富士通推定）で見積もり。TCOには 設備投資費用・電気代・不動産費用・管理者費用を含む。サーバ稼働年数5年を想定。
本資料に記載の内容は現在開発中であり、予告なしに仕様・性能・デザインを変更する可能性があります。

この成果は、NEDO（国立研究開発法人新エネルギー・産業技術総合開発機構）の助成事業の結果得られたものです。

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