ABSTRACT SUBMISSION

Please go to https://www.acmsm26.com/submit-your-contribution. If you wish to organize a special session, please email us the title of your proposed session together with at least six intended papers. Upon acceptance, the committee will invite the proposer to present as an invited speaker in the special session with a waived registration fee.
The Stan Shaw Best Paper Award will be awarded for the outstanding contribution to the field of mechanics of structures and materials. When submitting their abstracts, the first authors (age ≤ 35 on 3rd December 2023) may ask their work to be reviewed for Best Young Researcher Award.

PAPER REVIEW

The conference language is English. All papers will be rigorously peer-reviewed prior to acceptance and publication in the conference proceedings by Springer with Scopus indexing. Authors of selected papers will be invited to submit extended version of their papers for publication in the following international journals through a streamlined fast track process:

1) Materials (Impact factor of 3.748)
2) Engineering Structures (Impact factor of 5.582)
3) Australian Journal of Structural Engineering (Impact factor of 1.1)

IMPORTANT DATES

Receipt of abstract (maximum 250 words):	18 April 2023
Notification of abstract acceptance:	18 April 2023
Receipt of full manuscript:	8 June 2023
Notification of manuscript review:	22 July 2023
Receipt of revised manuscript:	12 August 2023
Notification of acceptance:	31 August 2023

REGISTRATION

The registration fee will be announced on the conference website https://www.acmsm26.com/, and a reduced student registration will be available.

Call for Papers

The 26th Australasian Conference on the Mechanics of Structures and Materials

3 - 6 December 2023 Auckland, New Zealand

SPONSORED BY:

THE UNIVERSITY OF AUCKLAND
Te Whare Wananga o Tamaki Makaurau
NEW ZEALAND

Asian Concrete Federation

Sci

CALL FOR PAPERS

INVITATION

You are invited to the 26th ACMSM in Auckland, New Zealand from 3rd to 6th December 2023. The organising committee will ensure the continuation of the traditional high standard of the previous ACMSM conferences. This provides a forum for participants from around the world to review, discuss, and present the latest research outcomes in the broad discipline of the mechanics of structures and materials in civil engineering.

INTRODUCTION

The Australasian Conference on the Mechanics of Structures and Materials will bring international experts and leaders together to disseminate recent research findings in the fields of structural mechanics, engineering and materials, i.e., the novel aspect of this conference is its very wide breadth. First held in Sydney in 1967 at the University of New South Wales, it is one of the longest running conferences of its kind, taking place every 2-3 years in Australia or New Zealand. Within this 55 plus years the conference series has become a significant event for academics, practicing engineers and researchers not only in the Australasian region but worldwide.

ACMSM26 in Auckland will celebrate the return of the conference to Auckland after more than 35 years. It will also be an ideal platform for participants to renew friendships, collaborations and experience the beauty of Aotearoa New Zealand. The conference will spark discussions which will facilitate young researchers in their future endeavour.

VENUE

The conference will be held at the University of Auckland, in central Auckland. Detailed information will be available on the conference website https://www.acmsm26.com/.

RECREATIONAL PROGRAMME

The registration fee includes a welcome reception, lunches and a banquet. A programme for accompanying persons and participants to visit unique and beautiful New Zealand places will be available.

KEYNOTE SPEAKERS

C.M. Wang, Professor of University of Queensland, QLD

C.M. Wang is a Professor in Structural Engineering, The University of Queensland. He is a Chartered Structural Engineer, a Fellow of the Australian Academy of Technology and Engineering, a Fellow of the Academy of Engineering Singapore, a Fellow of Institution of Structural Engineers, a Fellow of the Institution of Engineers Singapore, and a Fellow of the Society of Floating Solutions (Singapore). His research interests are in the areas of structural stability, vibration, optimization, plated structures, and Mega-Floats. He has published over 490 journal papers and co-authored 10 books such as Very Large Floating Structures, Structural Vibration, Shear Deformable Beams and Plates, and Exact Solutions for Buckling of Structural Members. He is an Editor-in-Chief of the International Journal of Structural Stability and Dynamics and an Editorial Board Member in several journals including Engineering Structures, International Journal of Applied Mechanics, and Structures. He holds patents on floating structures. Currently, he is the Leader of the Offshore Engineering Programme of the Blue Economy Cooperative Research Centre that conducts research projects that combine seafood, renewable energy, and offshore engineering for the first time, underpinned by a $70 million cash investment from the Australian Government and $259 million from industry partners over a 10-year period. He is a founding member and Engineering Science Leader of the International Engineering Science Consortium, a Council Member of the Society of Floating Solutions Singapore, and the Chairman of the East Asia Pacific Conference on Structural Engineering and Construction International Steering Committee. He has won many awards that include the 2019 Nishino Medal, 2019 JN Reddy Medal, Singapore's Minister of National Development's R&D Award (Special Mention Category), IStructE Singapore Structural Awards, Keith Eaton Award, Lewis Kent Award, IES Prestigious Engineering Achievement Award, IES/IStructE Best Paper Award and the Grand Prize of the Next Generation Container Port Challenge. He was the consultant and advisor on many structural and floating projects that include the world's largest floating performance stage at Marina Bay, a multi-purpose floating structures research project funded by the Land and Liveability National Innovation Committee and JTC Corporation, Maritime and Port Authority's project on uses of the underground space underneath container ports in Tuas, JTC project on floating hydrocarbon storage facility and HDB project on floating wetlands. He is currently conducting research on the next-generation offshore fish pens and seaweed cultivation platforms.

Title: **Floating Solutions to help meet UN Sustainable Development Goals**

Abstract: Prof Wang will present a variety of floating solutions to address a diverse set of global challenges and the UN Sustainable Development Goals, including energy insecurity, water and food shortages, and environmental threats to fragile coastal environments from rising sea levels, extreme storms, and pollution. Floating solutions offer a new approach to coastal urban development to support the blue economy while reducing the impact of coastal land pressures, increase community connections through infrastructure over deep waters and soft seabed conditions, and address large tidal variations in harbours to allow the port terminal expansion in deep waters. A vision of floating cities will also be presented.

David Hopkins PhD, David Hopkins Consulting Limited, NZ

Dr David Hopkins has over 40 years' experience in technical, management, business development and governance roles including in a major multi-discipline consultancy. Since 2001 he has specialized in earthquake risk management including making numerous assessments of earthquake damage to major assets for insurance purposes. From 2003 to 2014 he was a key advisor to New Zealand's central government building regulation authority on structural and earthquake engineering issues, notably on earthquake-prone buildings. He was the only technical member of the Canterbury Earthquake Recovery Commission after the 4 September 2010 Earthquake and helped lead the Christchurch City Council's Critical Buildings Team after the earthquake of 22 February 2011. He managed the Department of Building and Housing investigations into the collapse of the CTV building, drafted the Expert Panel Report and briefed the media, survivors and next-of-kin on technical aspects. Since 2012, with EQC support, he has led the development and promotion of QuakeStar, a rating system for New Zealand buildings. Dr Hopkins sees QuakeStar as an important tool to help structural engineers turn their thinking towards delivering resilient buildings, not just resilient structures.

Title: **Structural Design for Earthquake-Resilient Buildings in New Zealand – Paradigm shift or more of the same?**

Abstract: The impacts of the Canterbury and Kaikoura Earthquakes are both a wake-up call and an opportunity to implement fundamental changes in the structural design of buildings in New Zealand. In Christchurch City most buildings were demolished even though they had kept people safe. The Kaikoura Earthquake saw unexpectedly serious damage to buildings with precast floors and costly damage to finishes in other buildings, notably in modern flexible multi-storey buildings. Structural engineering is vital to overall building resilience. Approaches taken by structural engineers over the last few decades to achieve "resilience" include innovations such as capacity design, performance-based design, and low-damage design. Perspectives and approaches have changed over time, but the focus has been on structural rather than whole-of-building performance. The Canterbury and Kaikoura events have shown that structural engineers need to think well beyond life safety in designing New Zealand buildings for the 21st century. Not only must they achieve adequate safety, they need to deliver low damage to the overall building, and speedy repair / reoccupation times.

Structural engineers *can* deliver resilient buildings in these terms, but owners and developers, tenants and users, financiers, insurers, central government agencies, local government agencies and politicians (e.g. Members of Parliament) need to take the lead and show that they want resilient buildings - and see them as a worthwhile investment.

All stakeholders owe it to future generations to show that they have learnt from Canterbury and Kaikoura. There must be a major shift in thinking, attitudes and practice across all stakeholder groups. This shift should be evident in all new building designs and retrofits. Can we achieve a "paradigm shift" after Canterbury and Kaikoura? Or will we be satisfied with "more of the same"?

Debes Bhattacharyya, Distinguished Professor of University of Auckland, NZ

Dr. Debes Bhattacharyya is a Distinguished Professor in the Department of Mechanical Engineering and until early 2016 was the founding Director of the Centre for Advanced Composite Materials at the University of Auckland. In 2016, he was felicitated as the Dr A P J Abdul Kalam Professor by SRM University in Chennai, India. He also held an Adjunct Professor position at Washington State University, Pullman, USA (2011 – 2017). Professor Bhattacharyya was the Head of Mechanical Engineering Department from 1999 to early 2005. His research interest includes the mechanics and manufacturing of composite materials with recent emphasis on flammability and bioengineering applications. He has held visiting positions at various universities in Australia, Canada, Germany, Hong Kong and the US, and has been awarded a number of international awards, including German Science Foundation Fellowship, Du Pont research award, Institute of Polymer Science Fellowship. He has delivered > 65 keynote/plenary/invited lectures at international conferences. He is currently the Editor and Associate Editor of three international journals and has served/is serving on the Editorial Advisory Boards of several journals. Prof. Bhattacharyya has more than 500 scientific/technical publications including several edited/authored books and a number of book chapters. He has successfully implemented several international patents and has served as a reviewer for more than 40 journals and organisations. He is a Fellow of the Royal Society, NZ and a Distinguished Fellow of EngNZ. He was awarded an honorary 'Doctor of Engineering' (*honoris causa*) by the University of Southern Queensland, Australia in 2012. In that year he was awarded by EngNZ the Supreme Technical Award for his professional contributions. Apart from these he has received several civic awards including two gold medals at the House of Lords, London, UK and Capitol Hill, Washington D.C., USA.

Title: **Sustainable composites for commercial aviation and building infrastructure sectors**

Abstract: In the past few years, the aircraft interior industry has become innovative and very cost-conscious. Composite materials are getting increasingly used for interior furniture and fittings. However, sustainability is also a growing issue and some of these interior parts can be manufactured with innovative material systems that satisfy both mechanical and functional requirements, and at the same time could be sustainable. This paper will discuss the design and manufacture of some recyclable composite systems that can be used for aircraft interior items at reduced costs and with a more favourable environmental impact. We have developed relatively novel design and manufacturing techniques which could produce sustainable composites for various usages including those in the secondary structural load-bearing applications. The same techniques can also be extended into other facets of engineering, especially within the building infrastructure sectors for manufacturing interior light-weight panels. The paper will also discuss the flammability issues of these primarily natural fibre based products.

CONFERENCE THEMES

The conference provides the opportunity to cover all aspects of the mechanics of structures and materials in engineering. The topics are not limited to:

1. Mechanics of structures
2. Geomechanics
3. Coupled system mechanics
4. Numerical approaches
5. Resilient infrastructure
6. Floating structures
7. Concrete structures
8. Steel structures
9. Timber engineering
10. Soil-foundation-structure systems
11. Underground structures
12. Composite structures
13. Bridge structures
14. Coastal and offshore structures
15. Dynamic behaviour of structures
16. Fracture mechanics
17. Pavement materials and technology
18. Earthquake loading
19. Wave propagation in structures
20. Moving loads
21. Wind and wave loading
22. Man-made loading
23. Fire engineering
24. Design specifications
25. Composite materials
26. Soil-structure interaction
27. Numerical and experimental Simulation
28. Structural integrity
29. Structures under extreme loading
30. Optimisation of structures

John E. Haddock, Professor of Purdue University, USA

John E. Haddock is a registered professional engineer and a professor of civil engineering at Purdue University, where he also serves at the director of the Indiana Local Technical Assistance Program (LTAP), a university center designed to help local government transportation agencies. Prior to joining the Purdue faculty, Dr. Haddock worked in private industry as a pavement engineer, as a senior research associate for the National Center for Asphalt Technology, as a research engineer for the Indiana Department of Transportation, and as a district engineer for the Asphalt Institute. During his career he has worked in research, equipment and test method development, and criteria and specification writing. He has been responsible for asphalt mixture design production, forensic pavement investigations, and pavement design and analysis. Dr. Haddock is a member of the American Society of Civil Engineers, ASTM International, the International Society for Asphalt Pavements, and the Association of Asphalt Paving Technologists. He has served on several Transportation Research Board committees and is the past chair of AFK30, Committee on the Characteristics of Non-Asphalt Components of Asphalt Paving Mixtures. He currently serves as a member of TRB committee AFK10, Emerging Issues in Asphalt Technology. Dr. Haddock is the co-editor-in-chief of the ASTM International journal, *Advances in Civil Engineering Materials.*

Title: **Roads and Pavements for the 21st Century**

Abstract: In the United States, the current road infrastructure has mostly exceeded its design life and much of it needs rebuilding. In other parts of the world, many developing countries are in the process of building out their road infrastructure for the first time. With all the roads the world needs to be build, or rebuild in some areas, perhaps it is time as road engineers to stop and think about what changes can be made to build roads for the 21st Century, rather than the 20th Century. If we continue to design, build and maintain roadways and pavements as we have always done, then we will continue to get the same performance we have always experienced; much of which has been inadequate. During his talk, Dr. Haddock will explore possible new road and paving materials, as well as design and construction methods. He may even get you to rethink your definition of roadways and pavements.

Izuru Takewaki, Professor of Kyoto University, Japan

Dr Takewaki graduated in Architectural Engineering at Kyoto University, Kyoto, Japan. After his PhD in 1991 on structural optimization and inverse vibration problems at Kyoto University, he focused on critical excitation method and earthquake resilience at Kyoto University, where he is currently a professor. He is the 56th President of Architectural Institute of Japan (collaborative society of architects and architectural engineers with about 36,000 members) since 2019. He is the Field Chief Editor of Frontiers in Built Environment (Switzerland) and the Specialty Chief Editor of Section 'Earthquake Engineering' in the same journal. He is serving as an editorial board member in several world-leading international journals. He published over 200 international journal papers and his h-index is 32. He was awarded the 2008 paper of the year of The Structural Design of Tall and Special Buildings (Wiley).

Title: **Toward Resilience-Based Design: Lessons Learned from Past Earthquakes in Japan**

Abstract: Japan has faced many severe earthquakes. The Kobe earthquake of 1995 was a significant event which inflicted massive damage to the city and ports by creating severe shakings over a large area with subsequent liquefaction. The Tohoku earthquake of 2011 triggered substantial tsunamis involving long-period and long-duration ground motions over a wide region. High-rise buildings in Tokyo and Osaka were shaken severely, regardless of the low amplitude of ground shaking. It has been pointed out that the structure of the deep subsurface soil played an important role in the damage inflicted on high-rise buildings. The two Kumamoto earthquakes of 2016 reminded us that Intensity VII ground motions can occur and induce a so-called 'long-period pulse' resulting in a PGV of over 2 m/s.

The talk will address the overall consideration of earthquake ground motion generation, from the fault rupture, through wave propagation in the deeper rock, to the near-surface soil. The talk will also describe how these great earthquakes provided us with many lessons, an important being SSI, which will be used in explaining how the damage occurred during severe ground shaking. It must be remembered that these earthquake ground motions were above the design level for high-rise buildings. These intense ground motions, containing unusual features, should be considered in the design of important buildings. These observations lead to a consideration of a philosophy of resilience-based design (RBD) that will be addressed in this talk. While the conventional earthquake-resistant design philosophy is to upgrade the resistance against earthquake inputs, as a result of the intense ground motions described above, the emerging design philosophy is to improve both the resistance and recovery. Some examples of RBD will be presented by using buildings with passive structural control systems. Future directions developed, from the viewpoint of RBD, using innovative structural design technologies will be addressed.

Recreation activities prior to and following the conference:

Visit two of the 15 most beautiful islands in New Zealand

Rangitoto Island
(Enjoy native fauna and views of Hauraki gulf)

Waiheke Island
(visit vineyards and indulge in superb NZ wine)

Visit the enthralling world wonder Waitomo glow-worm caves

Take a mud bath, as indigenous people (Maori) do, in Rotorua

Milford Sound