

Revolutionising concrete and composites through micro- and nano-engineering for circular economy solutions in railway and other civil construction

Kaewunruen, Sakdirat

License:

Creative Commons: Attribution (CC BY)

Document Version

Publisher's PDF, also known as Version of record

Citation for published version (Harvard):

Kaewunruen, S 2024, 'Revolutionising concrete and composites through micro- and nano-engineering for circular economy solutions in railway and other civil construction', The 10th Anniversary of the BRIDGE partnership between the University of Birmingham and University of Illinois Urbana-Champaign, Edgbaston, United Kingdom, 10/04/24 - 10/04/24.

[Link to publication on Research at Birmingham portal](#)

General rights

Unless a licence is specified above, all rights (including copyright and moral rights) in this document are retained by the authors and/or the copyright holders. The express permission of the copyright holder must be obtained for any use of this material other than for purposes permitted by law.

- Users may freely distribute the URL that is used to identify this publication.
- Users may download and/or print one copy of the publication from the University of Birmingham research portal for the purpose of private study or non-commercial research.
- User may use extracts from the document in line with the concept of 'fair dealing' under the Copyright, Designs and Patents Act 1988 (?)
- Users may not further distribute the material nor use it for the purposes of commercial gain.

Where a licence is displayed above, please note the terms and conditions of the licence govern your use of this document.

When citing, please reference the published version.

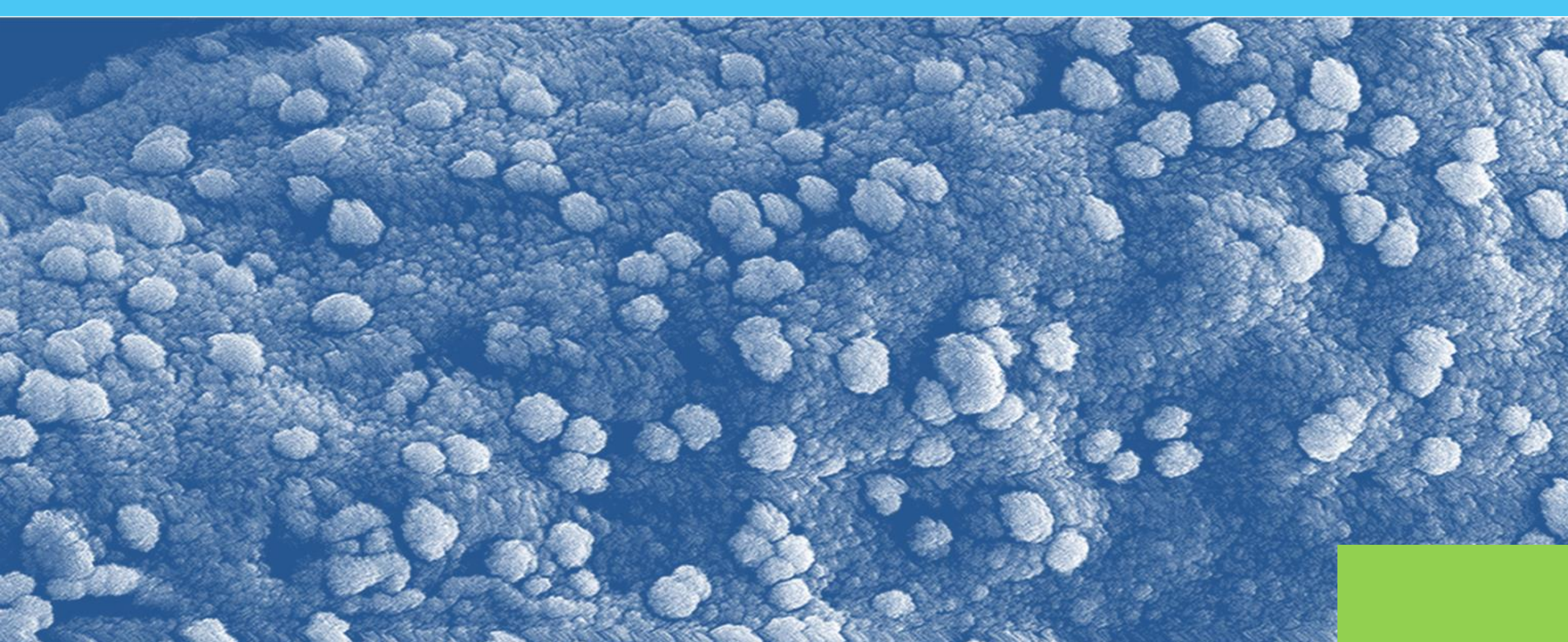
Take down policy

While the University of Birmingham exercises care and attention in making items available there are rare occasions when an item has been uploaded in error or has been deemed to be commercially or otherwise sensitive.

If you believe that this is the case for this document, please contact UBIRA@lists.bham.ac.uk providing details and we will remove access to the work immediately and investigate.

Revolutionising concrete and composites through *micro-* and *nano-*engineering for circular economy solutions in railway and other civil construction

Dr Sakdirat Kaewunruen, PhD, MBA, FIEAust, CPEng, NER, RPEQ, FHEA, MPWI
School of Engineering



Synopsis: This BRIDGE project built on research strengths of both the University of Birmingham (UoB) and the University of Illinois at Urbana Champaign (UIUC) to perform fundamental investigations on performance, dynamic damping, durability, dielectric property, and dynamic resistance of micro and nano-engineered CRC (crumbed rubber concrete). Both in the UK and USA, millions of tons of non-biodegradable waste rubber is produced annually. Significant researches into the recycle of waste rubber in structural concrete have been carried out over recent years; however, most research still shows that the increase in damping is achieved while sacrificing strength. In this project, for the first time, micro and nano-sized rubber inclusions with various surface characteristics along with silica fume are used in order to achieve high strength (over 50 MPa) while maintaining high damping for real-world solutions.

Materials
Testing



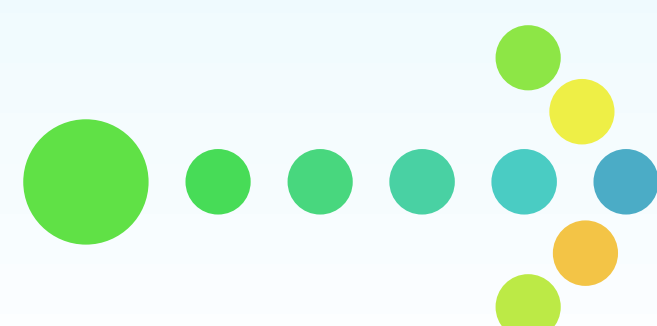
“BRIDGE grant offers critical support to expand our research horizon, resulting in multiple joint scientific outputs, new collaborators, and larger research grants. *Together we can change the world...*”

UoB Collaborators:

Dr Sakdirat Kaewunruen (PI)
Prof Peter Robery
Prof Ravindra Dhir

UIUC Collaborators:

Dr Paramita Mondal (PI)
Dr Ange-Therese Akono (PI)
Prof Christopher P.L. Barkan
Prof Erol Tutumluer
Prof Bill F. Spencer
Dr Riley Edwards



We are building bridges to make a difference

Impacts



6 journal articles; 4 keynotes;
7 conference papers



Sustained & enhanced
partnerships



Research grants with total
award > £1 million



UNIVERSITY OF
BIRMINGHAM

