IABSE British Group
FUTURE OF DESIGN

Future of Design

London 21.09.2023

Proudly sponsored by

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A word from the chair

We are very excited to be welcoming you back to Future of Design London 2023; after a four-year gap it is fantastic to be celebrating young designers in person once again. The conference aims to promote design and inspire the future leaders of the industry.

This is the 19th UK Young Engineers' Conference, organised by the International Association of Bridge and Structural Engineering (IABSE) British group. In my experience, the event is a unique platform for networking and inspiration, with leading figures from the design world talking about cutting-edge projects and the future challenges in our profession. Meeting in person is a superb opportunity to create the network of like-minded individuals across the industry that make working as a designer enjoyable and fulfilling.

I look forward to meeting many of you today, and I hope that the stimulating and engaging discussions will provide food for thought for a long time to come.

David Knight
Chair, British Group of IABSE

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Conference sponsors

IABSE Future of Design London 2023 is proudly sponsored by the following organisations. We would like to kindly thank our sponsors, this conference could not happen without their support.

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Special thanks

We would also like to thank The Engineering Club for their support with the conference organisation.

The Engineering Club

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Programme

09:00	**Registration opens**	Level 2, Skempton Building, Imperial College London, SW7 2BU		
09:30	**Opening address**		**David Knight,** *IABSE British Group Chair*	
09:40	**Keynote Session 1**	Chaired by **Russell Whitehead,** *Robert Bird Group*	**Julia Barfield,** *Marks Barfield Architects*	Towards a Circular, Regenerative Future
			Jorg Stamm, *Jorg Stamm Bamboo Construction*	Light, Long and Strong: Innovation in Bamboo
			Mark Tillett, *Heyne Tillett Steel*	The Art of Refurbishment
11:10	**Tea break**			
11:40	**Workshop**		**Jenny Haines and Dan Cole,** *Webb Yates Engineers*	Form-Finding Techniques for Efficient Structure Design
13:10	**Lunch**			
14:10	**Keynote Session 2**	Chaired by **Andrew Scoones,** *The Engineering Club*	**Manja von de Worp,** *YIP Structural Engineering London*	Working with the Future. Life-Long Design Strategies
			Moritz Meiselbach, *schlaich bergermann partner*	Sustainable Approaches to Concrete Designing
15:10	**Paper competition results**			
15:20	**Tea break**			
15:50	**Panel discussion**	Hosted by **Nick Cole,** *Robert Bird Group*	**Christian Málaga-Chuquitaype,** *Imperial College London* **Peter Debney,** *Oasys/ARUP* **Alice Cicirello,** *University of Cambridge* **Luke Whale,** *DAISY AI Inc.*	What Roles Can AI Play in the Future of Design?
17:20	**Closing address**		**David Knight,** *IABSE British Group Chair*	
17:30	**Drinks recepetion**	Zetland Arms, 2 Bute Street, SW7 3DU		

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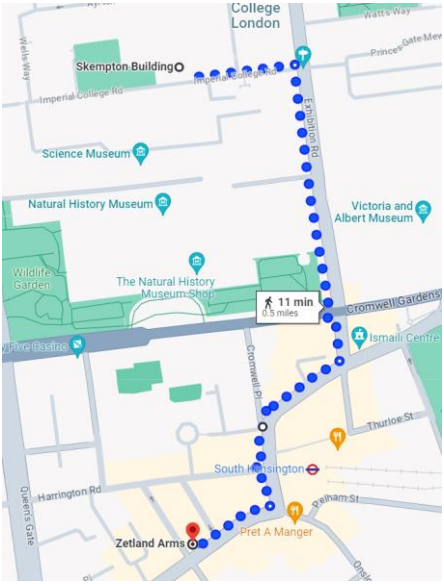
Logistics

The conference takes place in:
Room 201
Skempton Building
Imperial College London
SW7 2AZ

When entering the building, make your way to the Level 2 concourse where you will find the organising committee ready to welcome you from 9.00am for a strict 9.30am start.



Following the conference, join us for our networking event at the Zetland Arms:
Zetland Arms
2 Bute St
London SW7 3DU

Keynote speakers

Julia Barfield
Marks Barfield Architects

Towards a Circular, Regenerative Future

Marks Barfield Architects, as a design-led practice, has always strived to build sustainably since the practice was formed over thirty years ago. Now, driven by the urgency for drastic change, and feeling the responsibility of the construction industry's huge environmental impact, Julia Barfield is leading the practice towards regenerative design, with a focus on retrofit and the circular economy. Rapidly developing the knowledge required to provide pre-retrofit audits, material passports and promote material reuse; a commissioned project designed to be built solely from re-used building materials is putting ideas into reality. Additional research to mitigate future extreme weather conditions and equipping other architects with the practical knowledge to design for deconstruction, also provide valuable new design principles.

Julia is a leading member of Architects Declare, initiated climate training for design panels, arranges forums and workshops to share and increase the understanding of the new methodology for designing to combat the climate crisis, and is an external university examiner at UCL. Julia recently travelled to Sweden, Romania, Greece and Italy by train.

Keynote speakers

Moritz Meiselbach
schlaich bergermann partner

Sustainable Approaches to Concrete Designing

Moritz is an accomplished Structural Engineer with a wealth of experience spanning over 8 years. Since graduating with a Master of Science degree in Civil Engineering from the Technische Universität Berlin, Moritz's journey has been defined by a fervent commitment to innovative design and sustainable solutions.

Moritz has been working at sbp since 2015, with significant contributions to a diverse portfolio of projects that exhibit his proficiency in pushing the boundaries of structural possibilities, across Europe and Asia. Notable Projects include the VW Campus in Sandkamp, an 80,000 m2 Education and Research Centre with cutting-edge sustainability standards, the Second Hooghly Bridge in Kolkata, India which involves the renovation of a cable-stayed bridge, and the Storstrøm Bridge in Denmark, where Moritz led the Independent Design Check for the cable-stayed bridge spanning a strait. Moritz is an active member of Baukammer Berlin and the International Association for Bridge & Structural Engineering (IABSE). His dedication to advancing engineering excellence is underscored by his publications in technical magazines, including the ASCE Journal of Bridge Engineering.

Keynote speakers

Mark Tillett
Heyne Tillett Steel

The Art of Refurbishment

Mark is committed to great design and loves his work. Mark gives projects momentum with his energy and innovation. He values the long-term collaborations built up over 25 years of working with leading architects and clients on challenging award-winning schemes. He cherishes projects where he can significantly contribute to creating successful buildings. Working on new buildings and re-imagining existing sites in all sectors and materials, Mark applies the true principles of sustainability; long-life, loose-fit and doing more with less, focused on the benefits good design can bring over many years. He particularly enjoys opportunities to contribute to quality architecture.

Mark promotes an approach of 'Total Engineering' wherever possible with all responsibility from the existing building through to the finished structure encompassing all temporary and permanent works in between. He is happiest sketching through designs with the team and walking and photographing sites, allowing him to remain intimate with the project from concept through to completion. He enjoys the detail and the process.

Mark co-founded Heyne Tillett Steel in 2007 and has helped to build a practice with a culture of excellence and constant learning. Prior to this Mark worked at design offices in London and Sydney.

Keynote speakers

Jorg Stamm
Jorg Stamm Bamboo Construction

Light, Long and Strong: Innovation in Bamboo

Jorg learned his trade as a conventional furniture maker in a small town in Germany and upgraded his skills as a traditional journeyman with some structural carpentry skills in the late 80s. He moved to Colombia in the early 90s, where he learned about local bamboo construction from local masters like Simon Velez, who invited him to contribute to the Zeri Pavilion at Expo 2000 in Hannover.

His technical background allowed him to quickly develop his own style, rationalizing insect treatment and cost-effective construction methods. He even brought the first prefabricated bamboo pavilion to the United States, fully certified by City Hall in Vero Beach, Florida – which survived Category 4 Hurricane Rita in 2004. Back in Colombia, in the aftermath of a major earthquake, Jorg began to focus on big buildings like bridges and large roofs for community centres and schools. This earnt him a reputation for working on reconstruction projects for the UN and national development agencies all over the world, wherever a Tsunami, an earthquake or a man-made disaster required bamboo experts.

Through an introduction by the well-known Bamboo Queen Linda Garland to John Hardy, the founder of Greenschool in Bali, Jorg developed a completely new bamboo construction style that went well beyond the standard post and beam structures seen before. The well-sponsored, creative, and norm-free school environment became his favourite playground, where spiralling towers, shells and hypars on a gigantic scale could be tested, analysed and approved.

Working together with teams of architects, civil engineers and testing laboratories since 2000, Jorg has published a few papers on bamboo and was even awarded last year in Vietnam as Bamboo Pioneer, by the World Bamboo Organization.

Keynote speakers

Manja von de Worp
YIP Structural Engineering London

Working with the Future: Life-Long Design Strategies

Manja van de Worp is the director of YIP Structural Engineering London (formerly NOUS Engineering London), holding Master's degrees in Architecture, Structural Engineering and in Emergent Technologies and Design. She is a structural engineer with 15 years of professional experience in the Construction Industry focusing on Structure Geometry and Fabrication, while teaching at the RCA & IAAC.

She has worked for Arup in London in the Advanced Geometry Unit and at the Advanced Technology and Research group in ARUP, designing structures with complex geometry and moveable structures. Manja has Launched NOUS Engineering LONDON (now YIP) in 2013 an engineering consultancy bearing extensive knowledge of advanced structural analysis tools, complex structural systems, materials and fabrication technologies. Current projects involve an FRP shell and a modular steel roof structure. YIP also focuses on structural product design and research-based projects, looking at innovative ways to use timber and 3d printing of concrete, searching how materials not conventionally used in structural design and how they could find their way into building engineering.

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Keynote sessions

Keynote Session 1 is chaired by

Russell Whitehead
Robert Bird Group

Keynote Session 2 is chaired by

Andrew Scoones
The Engineering Club

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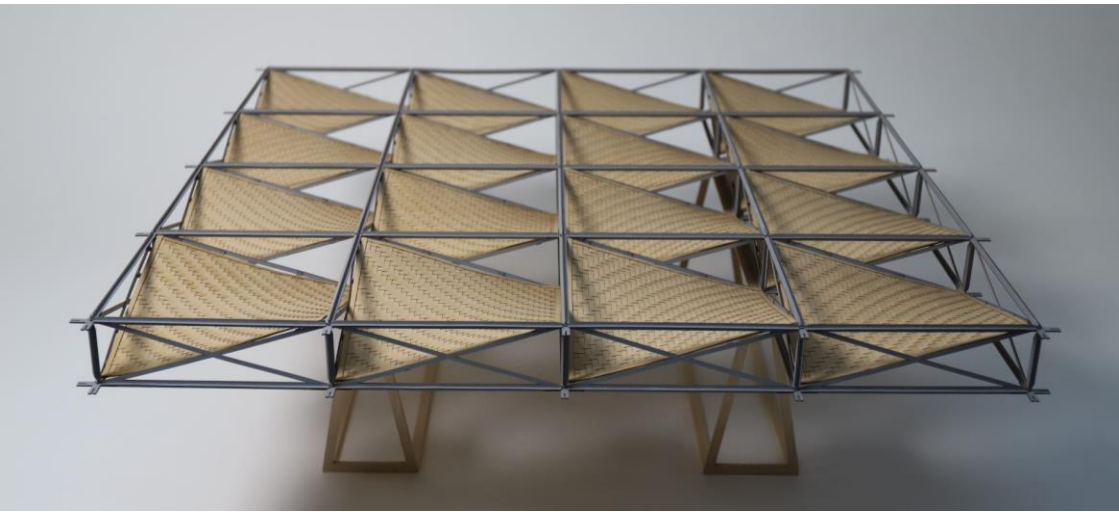
Workshop

This practical and interactive workshop introduces attendees to form-finding techniques for designing efficient structures. From past to present, we will look at the historical context of form-finding techniques used to design some of the world's most recognised buildings. This will include the work of engineers and architects such as Heinz Isler, Frei Otto, Antoni Gaudí and more, providing case studies of their works and their methods.

The session will break down the topic into different structural forms such as membrane structures, catenaries, grid shells and arches. Each of these structures is suited to different form-finding methods which will be explored during the workshop. There will also be 2 practical break-out sessions to get involved in. In the first, we will have a go at building physical models to build tension and compression structures. The second will demonstrate using graphic statics by hand to determine the form of a bridge structure.

Finally, we will review some of the modern methods of form-finding using computational approaches.



Craft Not Carbon Pavilion model, Webb Yates

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Workshop hosts

The workshop will be hosted by Jenny Haines and Dan Cole, Senior Structural Engineers at Webb Yates Engineers. Jenny and Dan are both key members of Webb Yates internal taskforce aimed at advancing computational knowledge within the company. They are both passionate about parametric modelling and using digital design approaches to optimise buildings and reduce carbon.

Jenny Haines
Webb Yates

Jenny has worked on several complex projects at Webb Yates, including a striking new home in Canada utilising structural stone to support tied vaulted masonry roofs, and several residential projects throughout the UK with exposed concrete and timber frames. She has previously gained varied structural engineering experience at a large engineering practice, which included working extensively in the sports and infrastructure sectors.

Dan has gained experience on a range of projects; from residential refurbishments, including an award-winning house refurbishment and extension utilising traditional timber connections, through to large scale projects, such as an underground structure that supports airport traffic at a major London airport. He works collaboratively with everyone involved in his projects to ensure elegant, sustainable, and efficient structural solutions.

Dan Cole
Webb Yates

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Essay competition

Over recent years, Artificial Intelligence (AI) has undergone remarkable advancements, revolutionizing various industries and design disciplines. The objective of this competition was to encourage participants to reflect on the profound transformations that AI can bring to the design of structures.

Participants were asked to reflect on the transformative potential of AI in structural engineering by imagining how past projects would be designed in a different manner 30 years from now, after 2050, and how the outcomes of the project would differ.

Papers were judged on depth of analysis, originality and creativity, clarity and structure, impact and sustainability. Presentation and relevance to the brief were also assessed. The following essays have been shortlisted and will be showcased at the conference, where the winner will be announced:

- **Acuner Acun** – Evolutionary Structural Engineering: AI-Driven Dynamic Load Combinations for Sustainable Design
- **Joe Almond** – New Danube Bridge
- **Harrison Lees** – AI Utilisation for Self Healing Concrete in the design of the Hong Kong Zhuhai Macau Bridge
- **Annel Pond** – Hong Kong-Zhuhai-Macao Bridge

We would like to thank all participants to the competition.

We would also like to extend our appreciation to the judges of the competition for taking the time to review:

- **Peter Debney** *Oasys / ARUP*
- **Filip Kirazov** *Robert Bird Group*
- **Dr Christian Málaga-Chuquitaype** *Imperial College London*
- **Dr Luke Whale** *DAISY AI Inc.*

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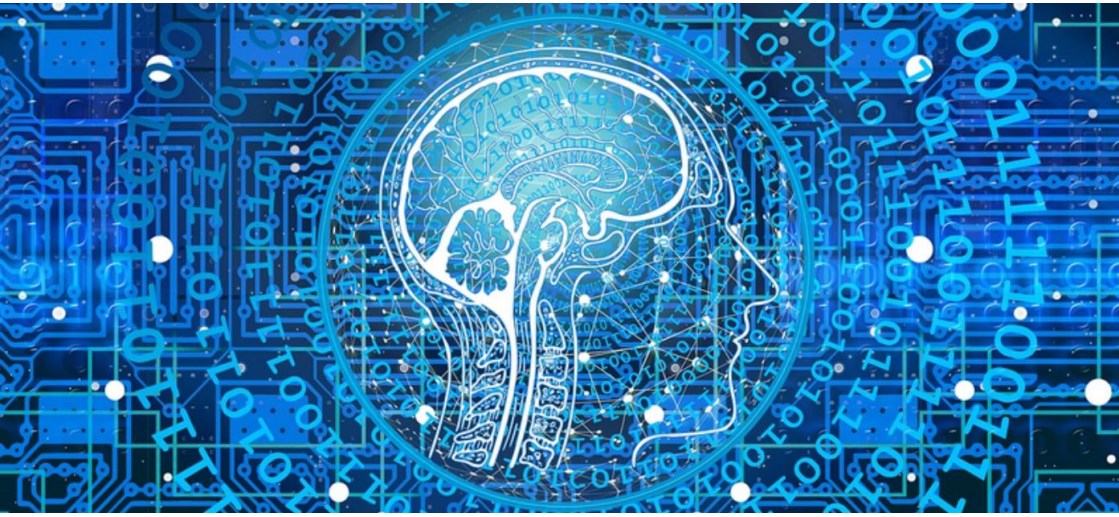
Panel discussion

Following the announcement of the essay competition results, the topic of Artificial Intelligence (AI) will be further explored by experts in AI in an open panel discussion. The panellists all have a particular interest in the topic and come from the Architecture, Engineering and Construction (AEC) industry, academia and wider circles to ensure a rich and enthusiastic conversation. Audience participation, through questions and comments, is very welcome.

The panel discussion is hosted by

Nick Cole
Robert Bird Group



Panellists

Dr Alice Cicirello
University of Cambridge

Dr Alice Cicirello is a University Assistant Professor in Applied Mechanics at the Cambridge University Engineering Department and a Fellow of Churchill College. She is the founder of the Data, Vibration and Uncertainty group. Her research is focused on three Engineering overarching grand-challenges: (i) Design under uncertainty and nonlinearity; (ii) Monitoring and modelling complex systems for remaining useful life assessment under uncertainty, nonlinearity and sparse noisy data; (iii) Development of explainable and interpretable machine learning strategies for engineering applications. Alice enjoys exploring exciting new techniques based on physics-enhancing machine learning, uncertainty quantification, dynamic testing and advanced physics-based models… including those of spiders! She has experience working on research challenges related to energy, automotive, aerospace and civil engineering.

Alice obtained her PhD from the University of Cambridge in 2013 and was a Marie Curie Early Stage Researcher (2009-2012) and a Research Associate (2012-2014) at the same institution. Alice worked as a Senior Research Scientist at SLB (2014-2017) and returned to academia as a Lecturer at the University of Oxford (2017-2019), and then continued as an Associate Professor at TU Delft (2020-2023). She held visiting positions at several research institutions, including MIT and the Alan Turing Institute, and is currently an Alexander von Humboldt Experienced Research Fellow (2023-present), a Visiting Fellow at the Oxford Engineering Science Department (2020 – present), and an Editorial Board member of the Data-Centric Engineering journal.

Panellists

Peter Debney
Oasys / ARUP

Throughout his career, Peter has been exploring how structural engineers can make their work easier and more efficient, often via the application of computer technology. While he started his career as a pioneer of CAD and BIM, over the last twenty years he has focused on structural analysis, optimisation and computational design.

He has worked as a structural engineer in general consulting as well as the water and petrochemical industry, as a CAD product manager, and now as the customer service leader at Oasys Software (the software house of Arup). He has been a Royal Academy of Engineering Visiting Professor at Bradford University and regularly guest lectures on high-tech structural engineering at many others.

Among his many talks and other writings, he is perhaps best known for his book Computational Engineering: an introduction to computing for structural engineers, covering everything from parametric design to quantum computing via finite element analysis and artificial intelligence.

Peter is a Chartered Engineer, a member of the British Computer Society, and a Fellow of the Institute of Structural Engineers.

Panellists

Dr Christian Málaga-Chuquitaype
Imperial College London

Christian Málaga-Chuquitaype is a researcher, engineer, and educator currently working as Associate Professor (Senior Lecturer) in the Department of Civil and Environmental Engineering at Imperial College London where he leads the Emerging Structural Technologies Research Group.

His research covers a wide range of topics where he leverages innovative technological tools and state-of-the-art numerical and experimental techniques to provide solutions to a wide range of structural engineering questions. Of particular interest are engineering problems arising in extreme or hostile environments such as earthquake-prone areas and extra-terrestrial settings. His research has received several prizes including the Tso Kung Hsieh Research Award from the ICE, the Structures Best Research Paper Prize from the IStructE and the Unwin Prize from Imperial College London.

Having practised for several years in large and small infrastructure projects in Latin America, Christian continues to be involved in specialised consultancy and expert advice internationally and serves on a number of committees related to international code development and the advancement of engineering practice.

Panellists

Dr Luke Whale
DAISY AI Inc.

A Civil Engineer by training, Luke began his career in research before becoming Technical Director of Gang-Nail Systems in the UK truss plate industry.

He ran consultancy companies TimberSolve then C4Ci for over 18 years, before joining Staircraft Group as Technical Director in 2015. In 2019 he co-founded DAISY AI Inc – a start-up aimed at developing and commercialising AI applications for use in the residential construction market.

Luke has chaired the BSI structural timber committee for over 30 years, and is co-author of the European timber design standard Eurocode 5.

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Organising committee

Cameron Archer-Jones
COWI
IABSE British Group

With an increasing focus on carbon in bridges, Cameron is a strong advocate for engineers taking a proactive role in carbon management on projects. Cameron is an Associate for COWI in their bridge department in London and is also the Carbon Management Lead for their international business line. He has worked on small and large scale bridges in the UK and abroad, such as Dukes Meadows Footbridge in London, West End Bridges in Brisbane, Padma Bridge in Bangladesh and a concept design for an ultra-long span bridge between Scotland and Ireland. Cameron recently joined the Executive Committee of the IABSE British Group and is excited to meet the attendees of FoD London 2023.

Laura is a structural engineer working at Robert Bird Group since 2020. She joined the company following a PhD where she developed optimisation tools to assist efficient and sustainable building design. During that time she developed a passion for computational engineering which she now uses whilst working on challenging structural projects. She endeavours to contribute to socially ethical and environmentally responsible designs.

Laura Bellamy
Robert Bird Group

Javier Cañada Pérez-Sala
Fosters + Partners

Javier is a structural engineer with a passion for studying complex engineering problems. Formed as a civil engineer in Spain and France, he just finished his PhD on bridges for high-speed trains and is now working within the structural engineering team at Foster and Partners. Among his interests are conceptual design of structures, graphic statics in 2D and 3D, prestressing systems, and parametric tools for structural design.

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Organising committee

Harry Forbes
COWI

Harry is a bridge engineer working in COWI UK's London office with a keen interest in structural dynamics and digital design. Since joining COWI Harry has worked on a family of 11 footbridges over HS2, which has given the opportunity to tackle interesting design challenges such as high-speed train pressure wave analysis and develop a parametric modelling workflow to automate the creation of 3d models. He is also responsible for the development of embodied carbon calculation tools which enable us to understand the environmental impact of our projects, which Harry believes is a key component of the 'Future of Design' in conjunction with digital innovation.

Luke Lapira
UCL

Luke, a structural engineer, completed his PhD at Imperial College London in 2022 where he conducted research on the instabilities of flat and warped webs under shear loads. He is presently working as a post-doctoral researcher at UCL, focusing on the post-fire resilience of stainless-steel connections, in addition to his research interests in structural stability and health monitoring. Luke is set to assume the role of Lecturer in Structural Engineering and Design at UCL, commencing in October 2023, where he hopes to share his passion for research, design, and engineering with the next generation of engineers.

Floss Willcocks
COWI

Since graduating with an MEng in Civil & Environmental Engineering in 2021, Floss has worked as an engineer in the Bridges Team at COWI UK in their London office. A research internship in Japan, along with summer placements at COWI, has exposed Floss to a range of civil applications. She has enjoyed taking a role on the conference committee as her first formal involvement with IABSE.

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Future events

Thank you very much for attending IABSE Future of Design London 2023!
We hope that you have enjoyed the day and had fulfilling interactions.

We look forward to meeting again, maybe at some of the events below. More information can be found the IABSE British Group website.

Study Tour // Dublin 2023
13.10.23 to 15.10.23
Tickets still available until the end of September for what promises to be a superb tour of the bridges along the Liffey, accompanied by the designers and other key stakeholders involved in construction. All welcome to attend.

Journey to Success // London 2023
26.10.2023
An event for early career engineers and designers where leading figures who have been in practice in the fields of buildings and transportation infrastructure discuss their own personal career journeys.