



Shell Structures for Architecture: Form Finding and Optimization

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*** Featuring a foreword by Pritzker Prize Winner Shigeru Ban ***

Bringing together experts from research and practice, *Shell Structures for Architecture: Form Finding and Optimization* presents contemporary design methods for shell and gridshell structures, covering form-finding and structural optimization techniques. It introduces architecture and engineering practitioners and students to structural shells and provides computational techniques to develop complex curved structural surfaces, in the form of mathematics, computer algorithms, and design case studies.

* Part I introduces the topic of shells, tracing the ancient relationship between structural form and forces, the basics of shell behaviour, and the evolution of form-finding and structural optimization techniques.

* Part II familiarizes the reader with form-finding techniques to explore expressive structural geometries, covering the force density method, thrust network analysis, dynamic relaxation and particle-spring systems.

* Part III focuses on shell shape and topology optimization, and provides a deeper understanding of gradient-based methods and meta-heuristic techniques.

* Part IV contains precedent studies of realised shells and gridshells describing their innovative design and construction methods.

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Editorial Review

Review

'Computational form-finding has been pretty influential on my work over the past few years, and Philippe Block is one of the recognized leaders in the field. His new book really takes a deep look into the capabilities and potentials for these techniques, going into great detail about how, why, and when certain approaches should be considered. [...] this book gives an extensive look into some of the cutting edge work going on in the field.'

Wes McGee, Assistant Professor of Architecture, University of Michigan - SectionCut.com

'As the role of computational tools in structural design continues to grow, the form-finding techniques detailed here are more relevant than ever. Bringing together experts in the field, I expect *Shell Structures for Architecture* will be a valuable inspiration and reference for architecture and engineering students and professionals seeking a deeper understanding, which is essential to make full use of such tools and techniques.'

Daniel Piker, *Robert McNeel & Associates*

'This book should be in the library of designers of shells and grid shells.'

Bill Baker, Partner at *Skidmore, Owings & Merrill LLP*

'In their integration of technical and creative disciplines, shell structures are a fascinating typology – this is a valuable source book for architects and engineers alike.'

Xavier De Kestelier, Partner, *Foster + Partners*

'Shell Structures for Architecture expands architectural possibilities; a great influence on the thinking of contemporary architects.'

Toyo Ito, Founding partner, *Toyo Ito & Associates*

Users Review

From reader reviews:

Maureen Bonds:

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