PREFACE

Diagrids have emerged as one of the most innovative and adaptable approaches to creating building structures in this millennium. As a construction system it is highly dependent on the capabilities of steel in terms of design, (pre)fabrication and erection processes. Effective collaboration between the architect, engineer and steel fabricator/erector is also critical to the success of a diagrid project.

This text expands upon research initiated in *Understanding Steel Design: An Architectural Design Manual*, published in 2011. As the majority of diagrid buildings have been completed since 2002, and are increasing in number, this seemed a suitable topic for a first volume of further exploration in cutting edge developments in steel design. Of the many buildings visited during the research I conducted over the last dozen years to write this book, each is unique in its form and adaptation of the diagrid. Yet all have certain elements in common. The identification of these common elements and approaches to design have provided the basis for the structure of this book.

The design of a diagrid structure takes a very particular approach that modifies the more standard approach to orthogonal steel structures. This includes the transformation of steel connections into nodal points – *nodes* – that are often prefabricated to best accommodate non-standard and often-changing geometries. An overall modularity – *module* – is used to determine the placement of the nodes, which in turn are connected by straight members. The angularity necessarily influences *façade design*. The ability of the diagrid to assume all lateral loading allows for different considerations in the design and materiality of the *service core*. The interdependence of these components creates a decision-making process that is quite different from more standard structural types.

The book is therefore divided into three parts: first to examine the factors that led to the creation of the early diagrid buildings (Chapters 2 and 3); second to comparatively analyze a significant number of recent diagrid buildings to establish some precedents that can be used to assist with the design of diagrid buildings (Chapters 4 to 10); third to take a more detailed, focused look at several recent projects (Chapter 11).

Many of the photos used in the creation of the text were taken by me during my travels. Where I was unable to visit a project at a critical phase, or for important construction and fabrication photographs and drawings, images have been sourced from the engineers, fabricators and architects involved. These are specifically credited at the back of this text. Many thanks for your contribution of drawings and information. They lent to a wonderfully complex and rich research project.

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Thank you to the designers of diagrid buildings for creating such innovative and inspirational architecture.