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KEY=GEOMETRY - LEBLANC BEARD

Architectural Geometry

Architectural Geometry is the first book to introduce a revolutionary new approach to design. Geometry lies at the core of the architectural design process. It is omnipresent, from the initial form-finding stages to the actual construction. Modern constructive geometry provides a variety of tools for the efficient design, analysis, and manufacture of complex shapes. This results in new challenges for architecture. However, the architectural application also poses new problems to geometry. Architectural geometry is therefore an entire research area, currently emerging at the border between applied geometry and architecture. Written for students, architects, construction engineers, and industrial designers – Architectural Geometry is a source of inspiration for scientists interested in applications of geometry processing in architecture and art. With over 700 pages, including 2,100 full-color images of built architecture, architectural projects, and artwork, Architectural Geometry takes readers from basic to advanced geometry then leads them to the cutting-edge of research in the architectural geometry field.

Advances in Architectural Geometry 2014

Springer *This book contains 24 technical papers presented at the fourth edition of the Advances in Architectural Geometry conference, AAG 2014, held in London, England, September 2014. It offers engineers, mathematicians, designers, and contractors insight into the efficient design, analysis, and manufacture of complex shapes, which will help open up new horizons for architecture. The book examines geometric aspects involved in architectural design, ranging from initial conception to final fabrication. It focuses on four key topics: applied geometry, architecture, computational design, and also practice in the form of case studies. In addition, the book also features algorithms, proposed implementation, experimental results, and illustrations. Overall, the book presents both theoretical and practical work linked to new geometrical developments in architecture. It gathers the diverse components of the contemporary architectural tendencies that push the building envelope towards free form in order to respond to multiple current design challenges. With its introduction of novel computational algorithms and tools, this book will prove an ideal resource to both newcomers to the field as well as advanced practitioners.*

Geometry in Architecture

Texas Buildings Yesterday and Today

University of Texas Press *Pioneer Texas Buildings opened people's eyes when it was first published in 1968. At a time when "progress" meant tearing down the weathered houses, barns, churches, and stores built by the original settlers of Central Texas, this book taught people to see the beauty, simplicity, and order expressed in the unadorned geometric forms of early Texas buildings. It inspired the preservation and restoration of many of the remaining pioneer buildings, as well as the design of modern buildings that employ the same simple geometries. This revised edition of Pioneer Texas Buildings juxtaposes the historic structures with works by twenty contemporary architects who are inspired by the pioneer tradition to show how seamlessly the basic geometries translate from one era to another. As in the first edition, sketches and brief commentary by Clovis Heimsath explain how squares, triangles, and circles take shape in the cubic, triangular, and cylindrical forms that comprise houses and other buildings. Then black-and-white photographs, the heart of the book, illustrate these geometric forms in historic and modern buildings. The book also includes two essays in which Heimsath discusses the factors that led him and his wife Maryann to document early Texas buildings and the results in historic preservation and timeless architectural designs that have followed from their efforts.*

The Geometry of Creation

Architectural Drawing and the Dynamics of Gothic Design

Routledge *The flowering of Gothic architecture depended to a striking extent on the use of drawing as a tool of design. By drawing precise "blueprints" with simple tools such as the compass and straightedge, Gothic draftsmen were able to develop a linearized architecture of unprecedented complexity and sophistication. Examination of their surviving drawings can provide valuable and remarkably intimate information about the Gothic design process. Gothic drawings include compass pricks, uninked construction lines, and other telltale traces of the draftsman's geometrically based working method. The proportions of the drawings, moreover, are those actually intended by the designer, uncompromised by errors introduced in the construction process. All of these features make these drawings ideal subjects for the study of Gothic design practice, but their geometry has to date received little systematic attention. This book offers a new perspective on Gothic architectural creativity. It shows, in a series of rigorous geometrical case studies, how Gothic design evolved over time, in two senses: in the hours of the draftsman's labor, and across the centuries of the late Middle Ages. In each case study, a series of computer graphics show in unprecedented detail how a medieval designer could have developed his architectural concept step by step, using only basic geometrical operations. Taken together, these analyses demonstrate both remarkable methodological continuity across the Gothic era, and the progressive development of new and sophisticated permutations on venerable design themes. This rich tradition ultimately gave way in the Renaissance not because of any inherent problem with Gothic architecture, but because the visual language of Classicism appealed more directly to the pretensions of Humanist princes than the more abstract geometrical order of Gothic design, as the book's final chapter demonstrates.*

Fractal Geometry in Architecture and Design

Springer Science & Business Media *na broad sense Design Science is the grammar of a language of images Irather than of words. Modern communication techniques enable us to transmit and reconstitute images without needing to know a specific verbal sequence language such as the Morse code or Hungarian. International traffic signs use international image symbols which are not specific to any particular verbal language. An image language differs from a verbal one in that the latter uses a linear string of symbols, whereas the former is multi dimensional. Architectural renderings commonly show projections onto three mutual ly perpendicular planes, or consist of cross sections at different altitudes capa ble of being stacked and representing different floor plans. Such renderings make it difficult to imagine buildings comprising ramps and other features which disguise the separation between floors, and consequently limit the cre ative process of the architect. Analogously, we tend to analyze natural struc tures as if nature had used similar stacked renderings, rather than, for instance, a system of packed spheres, with the result that we fail to perceive the system of organization determining the form of such structures. Perception is a complex process. Our senses record; they are analogous to audio or video devices. We cannot, however, claim that such devices perceive.*

Advances in Architectural Geometry 2016

vdF Hochschulverlag AG The Advances in Architectural Geometry (AAG) symposia serve as a unique forum where developments in the design, analysis and fabrication of building geometry are presented. With participation of both academics and professionals, each symposium aims to gather and present practical work and theoretical research that responds to contemporary design challenges and expands the opportunities for architectural form. The fifth edition of the AAG symposia was hosted by the National Centre for Competence in Research Digital Fabrication at ETH Zurich, Switzerland, in September 2016. This book contains the proceedings from the AAG2016 conference and offers detailed insight into current and novel geometrical developments in architecture. The 22 diverse, peer-reviewed papers present cutting-edge innovations in the fields of mathematics, computer graphics, software design, structural engineering, and the design and construction of architecture.

Ad Quadratum

The Practical Application of Geometry in Medieval Architecture

Routledge The purpose of the project is to provide the most up-to-date survey on issues dealing with practical geometry and how it might have been applied in the design of medieval architecture. Chronologically, the topics cover a wide span - from early Medieval through Late Gothic. Geographically, the monuments under discussion range from Early Medieval Florence through Carolingian Germany, Crusader Cyprus, Romanesque France and Gothic England. The applications of both geometry and metrology are considered in this volume, often with illustrations generated by computer-assisted design (CAD) software. The project therefore offers recent scholarship in the field, as well as cutting-edge technology which helps propel the pursuit of such studies. To this end, the project is the first of its kind both in terms of its focus and its comprehensiveness. Such a project is sorely needed to introduce this highly specialized discipline to other historians of art, history, and science of the Middle Ages, as well as historians in most humanistic areas.

Advances in Architectural Geometry 2010

Springer Geometry lies at the core of the architectural design process. It is omnipresent, from the initial determination of form to the final construction. Modern geometric computing provides a variety of tools for the efficient design, analysis, and manufacturing of complex shapes. On the one hand this opens up new horizons for architecture. On the other, the architectural context also poses new problems for geometry. The research area of architectural geometry, situated at the border of applied geometry and architecture, is emerging to address these problems. This volume, presenting the papers accepted at the 2010 Advances in Architectural Geometry conference in Vienna, reflects the substantial progress made in this field. The interdisciplinary nature of architectural geometry is reflected in the diversity of backgrounds of the contributing authors. Renowned architects, engineers, mathematicians, and computer scientists present novel research ideas and cutting-edge solutions at the interface of geometry processing and architectural design.

Parametric Geometry of Curves and Surfaces

Architectural Form-Finding

Springer Nature This textbook provides a thorough introduction to the differential geometry of parametrized curves and surfaces, along with a wealth of applications to specific architectural elements. Geometric elements in architecture respond to practical, physical and aesthetic needs. Proper understanding of the mathematics underlying the geometry provides control over the construction. This book relates the classical mathematical theory of parametrized curves and surfaces to multiple applications in architecture. The presentation is mathematically complete with numerous figures and animations illustrating the theory, and special attention is given to some of the recent trends in the field. Solved exercises are provided to see the theory in practice. Intended as a textbook for lecture courses, Parametric Geometry of Curves and Surfaces is suitable for mathematically-inclined students in engineering, architecture and related fields, and can also serve as a textbook for traditional differential geometry courses to mathematics students. Researchers interested in the mathematics of architecture or computer-aided design will also value its combination of precise mathematics and architectural examples.

Advances in Architectural Geometry 2010

Birkhäuser Geometry lies at the core of the architectural design process. It is omnipresent, from the initial determination of form to the final construction. Modern geometric computing provides a variety of tools for the efficient design, analysis, and manufacturing of complex shapes. On the one hand this opens up new horizons for architecture. On the other, the architectural context also poses new problems for geometry. The research area of architectural geometry, situated at the border of applied geometry and architecture, is emerging to address these problems. This volume, presenting the papers accepted at the 2010 Advances in Architectural Geometry conference in Vienna, reflects the substantial progress made in this field. The interdisciplinary nature of architectural geometry is reflected in the diversity of backgrounds of the contributing authors. Renowned architects, engineers, mathematicians, and computer scientists present novel research ideas and cutting-edge solutions at the interface of geometry processing and architectural design.

Geometry in Architecture

N Geometry in Architecture, William Blackwell, A.I.A. reviews the timeless geometric relationships that govern architectural design. In doing so, he uncovers new principles that will surprise the most seasoned geometer. The writing and beautiful illustrations reflect an enthusiasm for pure form and patterns, because the author appreciates geometry in its own right, not just as something to be applied to his trade. This application of fundamental laws of harmony, symmetry and order is a valuable resource which promises to enrich the knowledge of students and teachers alike.

The Topkapi Scroll

Geometry and Ornament in Islamic Architecture

Getty Publications Since precious few architectural drawings and no theoretical treatises on architecture remain from the premodern Islamic world, the Timurid pattern scroll in the collection of the Topkapi Palace Museum Library is an exceedingly rich and valuable source of information. In the course of her in-depth analysis of this scroll dating from the late fifteenth or early sixteenth century, Gülrü Necipoğlu throws new light on the conceptualization, recording, and transmission of architectural design in the Islamic world between the tenth and sixteenth centuries. Her text has particularly far-reaching implications for recent discussions on vision, subjectivity, and the semiotics of abstract representation. She also compares the Islamic understanding of geometry with that found in medieval Western art, making this book particularly valuable for all historians and critics of architecture. The scroll, with its 114 individual geometric patterns for wall surfaces and vaulting, is reproduced entirely in color in this elegant, large-format volume. An extensive catalogue includes illustrations showing the underlying geometries (in the form of incised "dead" drawings) from which the individual patterns are generated. An essay by Mohammad al-Asad discusses the geometry of the muqarnas and demonstrates by means of CAD drawings how one of the scroll's patterns could be used to design a three-dimensional vault.

Drawing Geometry

A Primer of Basic Forms for Artists, Designers and Architects

Floris Books - Floris Books *Geometry* is both elegantly simple and infinitely profound. Many professionals find they need to be able to draw geometric shapes accurately, and this unique book shows them how. It provides step-by-step instructions for constructing two-dimensional geometric shapes, which can be readily followed by a beginner, or used as an invaluable source book by students and professionals.

Geometry of Construction

Routledge *Geometry of Construction* has long been acknowledged as the most concise and instructive guide to the technical geometry of the construction industry, and a vital resource for students in architecture, carpentry, stonemasonry and engineering. Beginning with the very basics of technical drawing, it provides a series of increasingly complex exercises to clearly explain all that the reader needs to know about geometry. Each topic is covered with a detailed diagram and carefully written instructions, enabling the student to progress from basics such as the circle and construction of scales, to some of the most complex challenges including the entasis of a column, an ionic volute, the hemispherical dome and the setting out of barrel vaulting. The authors, T. B. Nichols and N. P. Keep, both worked extensively in the construction industry before moving into teaching, so they were ideally suited to produce this highly practical guide. First published in 1947, a revised edition, incorporating numerous suggestions from students and lecturers on Raking Sections, the Projection of Points, of Lines, and of Planes, the True Lengths of Lines, the Oblique Plane and on Roof Surfaces, was produced in 1954. Last published in 1966, it has been unobtainable since then. It remains one of the most useful books for any student in the construction industry.

Architecture After Geometry

Academy Press *This issue features and explores architectural and urban design projects which derive from non-Euclidean geometries.*

The Projective Cast

Architecture and Its Three Geometries

MIT Press *Robin Evans recasts the idea of the relationship between geometry and architecture, drawing on mathematics, engineering, art history, and aesthetics to uncover processes in the imagining and realizing of architectural form. Anyone reviewing the history of architectural theory, Robin Evans observes, would have to conclude that architects do not produce geometry, but rather consume it. In this long-awaited book, completed shortly before its author's death, Evans recasts the idea of the relationship between geometry and architecture, drawing on mathematics, engineering, art history, and aesthetics to uncover processes in the imagining and realizing of architectural form. He shows that geometry does not always play a stolid and dormant role but, in fact, may be an active agent in the links between thinking and imagination, imagination and drawing, drawing and building. He suggests a theory of architecture that is based on the many transactions between architecture and geometry as evidenced in individual buildings, largely in Europe, from the fifteenth to the twentieth century. From the Henry VII chapel at Westminster Abbey to Le Corbusier's Ronchamp, from Raphael's S. Eligio and the work of Piero della Francesca and Philibert Delorme to Guarino Guarini and the painters of cubism, Evans explores the geometries involved, asking whether they are in fact the stable underpinnings of the creative, intuitive, or rhetorical aspects of architecture. In particular he concentrates on the history of architectural projection, the geometry of vision that has become an internalized and pervasive pictorial method of construction and that, until now, has played only a small part in the development of architectural theory. Evans describes the ambivalent role that pictures play in architecture and urges resistance to the idea that pictures provide all that architects need, suggesting that there is much more within the scope of the architect's vision of a project than what can be drawn. He defines the different fields of projective transmission that concern architecture, and investigates the ambiguities of projection and the interaction of imagination with projection and its metaphors.*

Geometry for Naval Architects

Butterworth-Heinemann *Geometry for Naval Architects* is the essential guide to the principles of naval geometry. Formerly fragmented throughout various sources, the topic is now presented in this comprehensive book that explains the history and specific applications of modern naval architecture mathematics and techniques, including numerous examples, applications and references to further enhance understanding. With a natural four-section organization (Traditional Methods, Differential Geometry, Computer Methods, and Applications in Naval Architecture), users will quickly progress from basic fundamentals to specific applications. Careful instruction and a wealth of practical applications spare readers the extensive searches once necessary to understand the mathematical background of naval architecture and help them understand the meanings and uses of discipline-specific computer programs. Explains the basics of geometry as applied to naval architecture, with specific practical applications included throughout the book for real-life insights Presents traditional methods and computational techniques (including MATLAB) Provides a wealth of examples in MATLAB and MultiSurf (a computer-aided design package for naval architects and engineers) Includes supplemental MATLAB and MultiSurf code available on a companion site

Architecture and Geometry in the Age of the Baroque

University of Chicago Press *The age of the Baroque—a time when great strides were made in science and mathematics—witnessed the construction of some of the world's most magnificent buildings. What did the work of great architects such as Bernini, Blondel, Guarini, and Wren have to do with Descartes, Galileo, Kepler, Desargues, and Newton? Here, George Hersey explores the ways in which Baroque architecture, with its dramatic shapes and playful experimentation with classical forms, reflects the scientific thinking of the time. He introduces us to a concept of geometry that encompassed much more than the science we know today, one that included geometrics (number and shape games), as well as the art of geomancy, or magic and prophecy using shapes and numbers. Hersey first concentrates on specific problems in geometry and architectural design. He then explores the affinities between musical chords and several types of architectural form. He turns to advances in optics, such as artificial lenses and magic lanterns, to show how architects incorporated light, a heavenly emanation, into their impressive domes. With ample illustrations and lucid, witty language, Hersey shows how abstract ideas were transformed into visual, tactile form—the epicycles of the cosmos, the sexual mystique surrounding the cube, and the imperfections of heavenly bodies. Some two centuries later, he finds that the geometric principles of the Baroque resonate, often unexpectedly, in the work of architects such as Frank Lloyd Wright and Le Corbusier. A discussion of these surprising links to the past rounds out this brilliant reexamination of some of the long-forgotten beliefs and practices that helped produce some of Europe's greatest masterpieces.*

Geometry of Design

Studies in Proportion and Composition

Princeton Architectural Press *This work takes a close look at a broad range of 20th-century examples of design, architecture and illustration, revealing underlying geometric structures in their compositions.*

Advances in Architectural Geometry 2012

[Springer Vienna Architecture](#) *Advances in Architectural Geometry* is a symposium presenting both theoretical and practical work linked to new geometric developments applicable to architecture. This symposium aims to gather the diverse components of contemporary architectural trends which push the building envelope towards free form, and which respond to these design challenges with a renewed mathematical rigor. A research section of 26 papers is preceded by an interview with Frederic Migayrou (Deputy director of the Musée National d'Art Moderne, Centre de Création Industrielle Pompidou Centre), where he explores the larger context of free-form architecture with respect to contemporary architectural design and the last two centuries of structural engineering.

Shape as Memory

A Geometric Theory of Architecture

[Walter de Gruyter](#) *How do buildings store information and experience in their shape and form? Michael Leyton has attracted considerable attention with his interpretation of geometrical form as a medium for the storage of information and memory. In this publication he draws specific conclusions for the field of architecture and construction, attaching fundamental importance to the complex relationship between symmetry and asymmetry. Wie können Gebäudeformen Erfahrungen und Inhalte speichern? Leyton hat eine viel beachtete neue Theorie der geometrischen Form entwickelt. Er interpretiert die geometrische Form – im Gegensatz zur gesamten Tradition – als Informations- und Gedächtnisträger. In vorliegender Darstellung zieht er die spezifischen Konsequenzen davon für den Bereich der Architektur und des Bauens.*

Infinite Measure

Learning to Design in Geometric Harmony with Art, Architecture, and Nature

[George F. Thompson](#) *The desire for harmony is universal among all cultures. In "Infinite Measure," we rediscover a fundamental starting point for designers of all ages: the simple act of drawing with a compass and a rule can sensitize the designer to the rich subtleties of spatial harmony, no matter how one ultimately chooses to express it.*

Architectural Geometry

A World of Applications

The Symbol at Your Door

Number and Geometry in Religious Architecture of the Greek and Latin Middle Ages

[Routledge](#) *Is the display of number and geometry in medieval religious architecture evidence of intended symbolism? This book offers a new perspective in the retrieval of meaning from architecture in the Greek East and the Latin West, and challenges the view that geometry was merely an outcome of practical procedures by masons. Instead, it attributes intellectual meaning to it as understood by Christian Platonist thought and provides compelling evidence that the symbolism was often intended. In so doing, the book serves as a companion volume to *The Wise Master Builder* by the same author, which found the same system implicit in plans of cathedrals and abbeys. The present book explains how the architectural symbolism proposed could have been understood at the time, as supported by medieval texts and its context, since it is context that can confer specific meaning. The introduction locates the study in its critical context and summarizes Christian Platonism as it determined the meaning of number and geometry. The investigation opens with the recurrent symbolism of the dome and the cube as heaven and earth in the Byzantine world and moves to the duality of the temple and the body in the East and West as reflections of Plato's universal macrocosm and human microcosm. The study then examines each of the figures of Platonic geometry in the architecture of the West against the background of their mathematics and metaphysics, before proceeding to their synthesis with the circle, as seen in circular and polygonal structures, the divisions of circles in Christian art, and their display in window tracery, culminating in the rose window. In view of the multivalency of the symbolism, the investigation establishes systematic occurrences of it, which strongly suggest patterns of thought underlying systems of design. The book concludes with a series of test cases, which show the after-life of the same symbolism as it overlapped with the Renaissance.*

ICGG 2018 - Proceedings of the 18th International Conference on Geometry and Graphics

40th Anniversary - Milan, Italy, August 3-7, 2018

[Springer](#) *This book gathers peer-reviewed papers presented at the 18th International Conference on Geometry and Graphics (ICGG), held in Milan, Italy, on August 3-7, 2018. The spectrum of papers ranges from theoretical research to applications, including education, in several fields of science, technology and the arts. The ICGG 2018 mainly focused on the following topics and subtopics: Theoretical Graphics and Geometry (Geometry of Curves and Surfaces, Kinematic and Descriptive Geometry, Computer Aided Geometric Design), Applied Geometry and Graphics (Modeling of Objects, Phenomena and Processes, Applications of Geometry in Engineering, Art and Architecture, Computer Animation and Games, Graphic Simulation in Urban and Territorial Studies), Engineering Computer Graphics (Computer Aided Design and Drafting, Computational Geometry, Geometric and Solid Modeling, Image Synthesis, Pattern Recognition, Digital Image Processing) and Graphics Education (Education Technology Research, Multimedia Educational Software Development, E-learning, Virtual Reality, Educational Systems, Educational Software Development Tools, MOOCs). Given its breadth of coverage, the book introduces engineers, architects and designers interested in computer applications, graphics and geometry to the latest advances in the field, with a particular focus on science, the arts and mathematics education.*

Inside Smart Geometry: Expanding the Architectural Possibilities of Computational Design

[John Wiley & Sons](#)

The Nature of Order

Moral Architectural Geometry

Architecture and Geometry in the Age of the Baroque

[University of Chicago Press](#) *The age of the Baroque—a time when great strides were made in science and mathematics—witnessed the construction of some of the world's most magnificent buildings. What did the work of great architects such as Bernini, Blondel, Guarini, and Wren have to do with Descartes, Galileo, Kepler, Desargues, and Newton? Here, George Hersey explores the ways in which Baroque architecture, with its dramatic shapes and playful experimentation with classical forms, reflects the scientific thinking of the time. He introduces us to a concept of geometry that encompassed much more than the science we know today, one that included geometrics (number and shape games), as well as the art of geomancy, or magic and prophecy using shapes and numbers. Hersey first concentrates on specific problems in geometry and architectural design. He then explores the affinities between musical chords and several types of architectural form. He turns to advances in optics, such as artificial lenses and magic lanterns, to show how architects incorporated light, a heavenly emanation, into their impressive domes. With ample illustrations and lucid, witty language, Hersey shows how abstract ideas were transformed into visual, tactile form—the epicycles of the cosmos, the sexual mystique surrounding the cube, and the imperfections of heavenly bodies. Some two centuries later, he finds that the geometric principles of the Baroque resonate, often unexpectedly, in the work of architects such as Frank Lloyd Wright and Le Corbusier. A discussion of these surprising links to the past rounds out this brilliant reexamination of some of the long-forgotten beliefs and practices that helped produce some of Europe's greatest masterpieces.*

Fundamentals of architectural geometry

Urban Geometry

From Stockholm to Seoul, Tartu to Taipei, Spanish photographer Andres Gallardo Albajar has travelled the globe to capture the mesmerising silhouettes, colourful juxtapositions and angular forms of the world's most exciting buildings. Set against vivid skies, these buildings pop with colour, shape and geometric patterns making the book a riotous celebration of contemporary architecture.

The Wise Master Builder: Platonic Geometry in Plans of Medieval Abbeys and Cathedral

Platonic Geometry in Plans of Medieval Abbeys and Cathedral

[Routledge](#) *This title was first published in 2000: Did the plan of medieval churches have any underlying symbolic meaning? This work re-opens the debate about the importance of geometry and symbolism in medieval architectural design and argues the case for attributing an intellectual meaning to the planning of abbeys and cathedrals. In challenging prevailing claims for the use of arithmetical ratios in architectural design, notably those based on the square root of two, Dr Hiscock advances a perspective consisting of proportions derived from the figures of Platonic geometry - the square, the equilateral triangle and the pentagon - and provides evidence for the symbolic interpretation of these figures. The investigation further reveals whole series of geometric relationships between some of England's most celebrated Norman cathedrals, such as Norwich or Durham, together with a wide sample from the Continent, from Old St Peter's in Rome to Chartres Cathedral, and sets out a comprehensive design method in each case. Hiscock first demonstrates the proposition that the ideas of Christian Platonism, including number and geometry, remained current and were employed in the thought of the early Middle Ages. In particular, he argues that they can be associated with the leading persons in the 10th-century revival of monasticism and that they found expression in the "white mantle of churches" that spread across Western Europe at the end of the first millennium AD. The book then provides a detailed analysis of the geometric proportions of church plans between the 9th and 12th centuries in Germany, France and in England. This research seeks to demonstrate that a coherent sequence of geometric forms can be seen in these plans, forms which correspond to the key figures of Platonic geometry as understood in the context of Christian Platonist thought. In conclusion, the author shows how the system of design proposed could be set out on site using the known working methods of medieval masons.*

ICGG 2020 - Proceedings of the 19th International Conference on Geometry and Graphics

[Springer Nature](#) *This book covers various aspects of Geometry and Graphics, from recent achievements on theoretical researches to a wide range of innovative applications, as well as new teaching methodologies and experiences, and reinterpretations and findings about the masterpieces of the past. It is from the 19th International Conference on Geometry and Graphics, which was held in São Paulo, Brazil. The conference started in 1978 and is promoted by the International Society for Geometry and Graphics, which aims to foster international collaboration and stimulate the scientific research and teaching methodology in the fields of Geometry and Graphics. Organized five topics, which are Theoretical Graphics and Geometry; Applied Geometry and Graphics; Engineering Computer Graphics; Graphics Education and Geometry; Graphics in History, the book is intended for the professionals, academics and researchers in architecture, engineering, industrial design, mathematics and arts involved in the multidisciplinary field.*

Structures: A Geometric Approach

Graphical Statics and Analysis

[Springer](#) *Graphic methods for structural design essentially translate problems of algebra into geometric representations, allowing solutions to be reached using geometric construction (ie: drawing pictures) instead of tedious and error-prone arithmetic. This was the common method before the invention of calculators and computers, but had been largely abandoned in the last half century in favor of numerical techniques. However, in recent years the convenience and ease of graphic statics has made a comeback in architecture and engineering. Several professors have begun using graphic statics in the classroom and studio environment. But until now, there had been no guidebook that rapidly brings students up to speed on the fundamentals of how to create graphical solutions to statics problems. Graphic Statics introduces all of the traditional graphic statics techniques in a parametric drawing format, using the free program GeoGebra. Then, advanced topics such as indeterminate beams and three dimensional curved surfaces are covered. Along the way, links to wider design ideas are introduced in a succinct summary of the steps needed to create elegant solutions to many static equilibrium problems. Meant for students in civil and architectural engineering, architecture, and construction, this practical introduction will also be useful to professionals looking to add the power of graphic statics to their work.*

A Companion to Greek Architecture

[John Wiley & Sons](#) *A Companion to Greek Architecture provides an expansive overview of the topic, including design, engineering, and construction as well as theory, reception, and lasting impact. Covers both sacred and secular structures and complexes, with particular attention to architectural decoration, such as sculpture, interior design, floor mosaics, and wall painting. Makes use of new research from computer-driven technologies, the study of inscriptions and archaeological evidence, and recently excavated buildings. Brings together original scholarship from an esteemed group of archaeologists and art historians. Presents the most up-to-date English language coverage of Greek architecture in several decades while also sketching out important areas and structures in need of further research.*

The Geometry of Environment

An Introduction to Spatial Organization in Design

Routledge Originally published in 1971 *The Geometry of Environment* is a fusion of art and mathematics introducing stimulating ideas from modern geometry, using illustrations from architecture and design. The revolution in the teaching of mathematics and the advent of the computer in design challenge traditional ways of appreciating the space about us, and expand the 'structural' understanding of our surroundings through such concepts as transformations, symmetry groups, sets and graphs. This book aims to show the relevance of 'new maths' and encourages exploration of the widening intellectual horizons of environmental design and architecture.

Advances in Architectural Geometry

Analysing Architecture

the universal language of place-making

Routledge Now in its fifth edition, *Analysing Architecture* has become internationally established as the best introduction to architecture. Aimed primarily at those studying architecture, it offers a clear and accessible insight into the workings of this rich and fascinating subject. With copious illustrations from his own notebooks, the author dissects examples from around the world and all periods of history to explain the underlying strategies in architectural design and show how drawing may be used as a medium for analysis. In this new edition *Analysing Architecture* has been revised and expanded. Notably, the chapter on 'How Analysis Can Help Design' has been redeveloped to clearly explain this crucially important aspect of study to a beginner readership. Four new chapters have been added to the section dealing with Themes in Spatial Organisation, on 'Axis', 'Grid', 'Datum Place' and 'Hidden'. Material from the 'Case Studies' in previous editions has been redistributed amongst earlier chapters. The 'Introduction' has been completely rewritten; and the format of the whole book has been adjusted to allow for the inclusion of more and better illustrative examples. Works of architecture are instruments for managing, orchestrating, modifying our relationship with the world around us. They frame just about everything we do. Architecture is complex, subtle, frustrating... but ultimately extremely rewarding. It can be a difficult discipline to get to grips with; nothing in school quite prepares anyone for the particular demands of an architecture course. But this book will help.

Geometry of the Unconscious

An Uncertain Truth in Architecture

The experience of seeing space in its relationship with matter is inherent in the gap between the visible and invisible in architecture. This book examines architecture where the complexities of chance, atmosphere, situation and circumstance are amalgama

Practical Geometry for Builders and Architects

Geometry Through History

Euclidean, Hyperbolic, and Projective Geometries

Springer Presented as an engaging discourse, this textbook invites readers to delve into the historical origins and uses of geometry. The narrative traces the influence of Euclid's system of geometry, as developed in his classic text *The Elements*, through the Arabic period, the modern era in the West, and up to twentieth century mathematics. Axioms and proof methods used by mathematicians from those periods are explored alongside the problems in Euclidean geometry that lead to their work. Students cultivate skills applicable to much of modern mathematics through sections that integrate concepts like projective and hyperbolic geometry with representative proof-based exercises. For its sophisticated account of ancient to modern geometries, this text assumes only a year of college mathematics as it builds towards its conclusion with algebraic curves and quaternions. Euclid's work has affected geometry for thousands of years, so this text has something to offer to anyone who wants to broaden their appreciation for the field.