

Advances In Architectural Geometry 2014

Even more than authorship, ownership is challenged by the rise of digital and computational methods of design and production. These challenges are simultaneously legal, ethical and economic. How are new methods of fabrication and manufacture going to irreversibly change not only ways of working, but also designers' ethics and their stance on ownership? In his 2013 second-term State of the Union address, President Obama stated that 3D printing 'has the potential to revolutionize the way we make almost everything'. Nowhere will the impact of 3D printing be felt greater than in the architectural and design communities. When anyone can print out an object or structure from a digital file, will designers still exert the same creative rights or will they need to develop new practice and payment models? As architecture becomes more collaborative with open-source processes, will the emphasis on signature as the basis of ownership remain relevant? How will wider teams working globally be accredited and compensated? This issue of AD explores this subject; it features the work of designers who are developing wholly new approaches to practice by exploring means of commercialising process-based products rather than objects. Contributors: Phil Bernstein, Mark Garcia, Antoine Picon, Carlo Ratti and David Ruy Featured architects: Francis Bitonti, Marjan Colletti, Wendy W Fok, Panagiotis Michalatos, Jose Sanchez, Thibault Schwartz, Aaron Sprecher, Feng Xu and Philip Yuan

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.

This book connects the different topics and professions involved in information technology approaches to architectural design, ranging from computer-aided design, building information modeling and programming to simulation, digital representation, augmented and virtual reality, digital fabrication and physical computation. The contributions include experts' academic and practical experiences and findings in research and advanced applications, covering the fields of architecture, engineering, design and mathematics. What are the conditions, constraints and opportunities of this digital revolution for architecture? How do processes change and influence the result? What does it mean for the collaboration and roles of the partners involved. And last but not least: how does academia reflect and shape this development and what does the future hold? Following the sequence of architectural production - from design to fabrication and construction up to the operation of buildings - the book discusses the impact of computational methods and technologies and its consequences for the education of future architects and designers. It offers detailed insights into the processes involved and considers them in the context of our technical, historical, social and cultural environment. Intended mainly for academic researchers, the book is also of interest to master's level students.

As architectural designs continue to push boundaries, there is more exploration into the bound shape of architecture within the limits of spaces made for human usability and interaction. The Handbook of Research on Form and Morphogenesis in Modern Architectural Contexts provides emerging research on the process of architectural form-finding as an effort to balance perceptive efficiency with functionality. While highlighting topics such as architectural geometry, reverse modeling, and digital fabrication, this book details the geometric process that forms the shape of a building. This publication is a vital resource for scholars, IT professionals, engineers, architects, and business managers seeking current research on the development and creation of architectural design.

The book connects the ICT and the architectural worlds, analyzing modeling, materialization and data-driven visions for design issues at different scales. Furthermore, using sample modeling and materialization tools, it explores the links between performance-driven design approaches and the application of new digital technologies. Intended for architects and urbanists, it provides a theoretical framework to address the implications of the digital revolution in building design and operation. Furthermore, combining insights from IT and ICT with architectural and urban design know-how, it offers engineering professionals a technology-driven interpretation of the building design field.

Nature has provided opportunities for scientists to observe patterns in biomaterials which can be imitated when designing construction materials. Materials designed with natural elements can be robust and environment friendly at the same time. Advances in our understanding of biology and materials science coupled with the extensive observation of nature have stimulated the search for better accommodation/compression of materials and the higher organization/reduction of mechanical stress in man-made structures. Bio-Inspired Materials is a collection of topics that explore frontiers in 3 sections of bio-inspired design: (i) bionics design, (ii) bio-inspired construction, and (iii) bio-materials. Chapters in each section address the most recent advances in our knowledge about the desired and expected relationship between humans and nature and its use in bio-inspired buildings. Readers will also be introduced to new concepts relevant to bionics, biomimicry, and biomimetics. Section (i) presents research concepts based on information gained from the direct observation of nature and its applications for human living. Section (ii) is devoted to 'artificial construction' of the Earth. This section addresses issues on geopolymers, materials that resemble the structure of soils and natural rocks; procedures that reduce damage caused by earthquakes in natural construction, the development of products from vegetable resins and construction principles using bamboo. The last section takes a look into the future towards the improvement of human living conditions. Bio-Inspired Materials offers readers - having a background in architecture, civil engineering and systems biology - a new perspective about sustainable building which is a key part of addressing the environmental concerns of current times.

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This book presents the outcomes of the 12th International Workshop on the Algorithmic Foundations of Robotics (WAFR 2016). WAFR is a prestigious, single-track, biennial international meeting devoted to recent advances in algorithmic problems in robotics. Robot algorithms are an important building block of robotic systems and are used to process inputs from users and sensors, perceive and build models of the environment, plan low-level motions and high-level tasks, control robotic actuators, and coordinate actions across multiple systems. However, developing and analyzing these algorithms raises complex challenges, both theoretical and practical. Advances in the algorithmic foundations of robotics have applications to manufacturing, medicine, distributed robotics, human–robot interaction, intelligent prosthetics, computer animation, computational biology, and many other areas. The 2016 edition of WAFR went back to its roots and was held in San Francisco, California – the city where the very first WAFR was held in 1994. Organized by Pieter Abbeel, Kostas Bekris, Ken Goldberg, and Lauren Miller, WAFR 2016 featured keynote talks by John Canny on “A Guided Tour of Computer Vision, Robotics, Algebra, and HCI,” Erik Demaine on “Replicators, Transformers, and Robot Swarms: Science Fiction through Geometric Algorithms,” Dan Halperin on “From Piano Movers to Piano Printers: Computing and Using Minkowski Sums,” and by Lydia Kavraki on “20 Years of Sampling Robot Motion.” Furthermore, it included an Open Problems Session organized by Ron Alterovitz, Florian Pokorny, and Jur van den Berg. There were 58 paper presentations during the three-day event. The organizers would like to thank the authors for their work and contributions, the reviewers for ensuring the high quality of the meeting, the WAFR Steering Committee led by Nancy Amato as well as WAFR’s fiscal sponsor, the International Federation of Robotics Research (IFRR), led by Oussama Khatib and Henrik Christensen. WAFR 2016 was an enjoyable and memorable event.

The book presents research from Rob|Arch 2018, the fourth international conference on robotic fabrication in architecture, art, and design. In capturing the myriad of scientific advances in robotics fabrication that are currently underway – such as collaborative design tools, computerised materials, adaptive sensing and actuation, advanced construction, on-site and cooperative robotics, machine-learning, human-machine interaction, large-scale fabrication and networked workflows, to name but a few – this compendium reveals how robotic fabrication is becoming a driver of scientific innovation, cross-disciplinary fertilization and creative capacity of an unprecedented kind.

This two-volume set LNCS 11581 and 11582 constitutes the thoroughly refereed proceedings of the 10th International Conference on Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management, DHM 2019, which was held as part of the 21st HCI International Conference, HCII 2019, in Orlando, FL, USA, in July 2019. The total of 1275 papers and 209 posters included in the 35 HCII 2019 proceedings volumes were carefully reviewed and selected from 5029 submissions. DHM 2019 includes a total of 77 papers; they were organized in topical sections named: Part I, Human Body and Motion: Anthropometry and computer aided ergonomics; motion prediction and motion capture; work modelling and industrial applications; risk assessment and safety. Part II, Healthcare Applications: Models in healthcare; quality of life technologies; health dialogues; health games and social communities.

Bringing together pioneers in design and making within architecture, construction, engineering, manufacturing, materials technology and computation, Fabricate is a triennial international conference, now in its third year (ICD, University of Stuttgart, April 2017). The 2017 edition features 32 illustrated articles on built projects and works in progress from academia and practice, including contributions from leading practices such as Foster + Partners, Zaha Hadid Architects, Arup, and Ron Arad, and from world-renowned institutions including ICD Stuttgart, Harvard, Yale, MIT, Princeton University, The Bartlett School of Architecture (UCL) and the Architectural Association. Each year it produces a supporting publication, to date the only one of its kind specialising in Digital Fabrication.

This book presents a selection of papers from the International Conference Geometrias’17, which was hosted by the Department of Architecture at the University of Coimbra from 16 to 18 June 2017. The Geometrias conferences, organized by Aproged (the Portuguese Geometry and Drawing Teachers’ Association), foster debate and exchange on practical and theoretical research in mathematics, architecture, the arts, engineering, and related fields. Geometrias’17, with the leitmotif “Thinking, Drawing, Modelling”, brought together a group of recognized experts to discuss the importance of geometric literacy and the science of representation for the development of scientific and technological research and professional practices. The 12 peer-reviewed papers gathered here show how geometry, drawing, stereotomy, and the science of representation are still at the core of every act leading to the conception and materialization of form, and highlight their continuing relevance for scholars and professionals in the fields of architecture, engineering, and applied mathematics.

The “2019 DigitalFUTURES — The 1st International Conference on Computational Design and Robotic Fabrication (CDRF 2019)” provides an international platform for advanced scientific research papers on the digital technology of architectural design and construction. The themes of the papers include, but are not limited to, architectural theories, tools, methods and procedures in material intelligence, data intelligence; computational intelligence, and robotic intelligence.

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.

Based on a discussion of conflicts in the urbanization process, this book provides theoretical and practical solutions for the preservation and development of urban localities. On the basis of informative case studies, it reveals the similarities and unique aspects of urbanization in Germany and China. The process of urban growth and the future trend of locality and urbanization are also examined. The book gathers contributions from architects, landscape designers, environmental engineers, urban planners and geographers, who analyze urban issues from their individual perspectives and provide methods for preserving and developing urban localities. As such, it expresses responses to urban development trends against the backdrop of sustainability in the 21st century.

This is the Proceedings of the International Congress of Graphic Design in Architecture, EGA 2018, held in Alicante, Spain, May 30-June 1, 2018. About 200 professionals and researchers from 18 different countries attended the Congress. This book will be of interest to researchers in the field of architecture and Engineering. Topics discussed are Innovations in Architecture, graphic design and architecture, history and heritage among others.

Workflows are being rethought and remodelled across the architecture, engineering and construction (AEC) spectrum. The synthesis of building information modelling (BIM) platforms with digital simulation techniques and increasing access to data, charting building performance, is allowing architects to engage in the generation of new workflows across multidisciplinary teams.

By merging digital design operations with construction activities, project delivery and post-occupation scenarios, architects are becoming instrumental in the shaping of buildings as well as the design process. Workflows expand the territory of architectural practice by extending designers' remit beyond the confines of the design stage. The implications for the AEC industry and architecture as a profession could not be greater. These new collaborative models are becoming as important as the novel buildings they allow us to produce. Contributors include: Shajay Bhooshan, John Cays, Randy Deutsch, Sean Gallagher, Ian Keough, Peter Kis, Jonathan Mallie, Adam Modesitt, Rhett Russo, Dale Sinclair, and Stacie Wong. Featured architects: Arup, Diller Scofidio + Renfro, GLUCK+, GRO Architects, PLANT, Populous, Young & Ayata, and Zaha Hadid Architects.

This book deals with a group of architected materials. These are hybrid materials in which the constituents (even strongly dissimilar ones) are combined in a given topology and geometry to provide otherwise conflicting properties. The hybridization presented in the book occurs at various levels - from the molecular to the macroscopic (say, sub-centimeter) ones. This monograph represents a collection of programmatic chapters, defining archimats and summarizing the results obtained by using the geometry-inspired materials design. The area of architected or geometry-inspired materials has reached a certain level of maturity and visibility for a comprehensive presentation in book form. It is written by a group of authors who are active researchers working on various aspects of architected materials. Through its 14 chapters, the book provides definitions and descriptions of the archetypes of architected materials and addresses the various techniques in which they can be designed, optimized, and manufactured. It covers a broad realm of archimats, from the ones occurring in nature to those that have been engineered, and discusses a range of their possible applications. The book provides inspiring and scientifically profound, yet entertaining, reading for the materials science community and beyond.

Material Synthesis: Fusing the Physical and the Computational Guest-edited by Achim Menges A new understanding of the material in architecture is fast emerging. Designers are no longer conceiving of the digital realm as separate from the physical world. Instead computation is being regarded as the key interface for material exploration and vice versa. This represents a significant perceptual shift in which the materiality of architecture is no longer seen to be a fixed property and passive receptor of form, but is transformed into an active generator of design and an adaptive agent of architectural performance. In stark contrast to previous linear and mechanistic modes of fabrication and construction, materialisation is now beginning to coexist with design as explorative robotic processes. This represents a radical departure from both the trite modernist emphasis on 'truth to materials' and the dismissal of materials by the previous generation of digital architects. The issue features designers, researchers and thinkers that are at the forefront of exploring new modes of material enquiry and its deep interrelationship with technology, biology and culture. Through their work, which unfolds from multifaceted alliances between the fields of design, engineering and natural sciences, it seeks to trace the emergence of a novel material culture in architecture. Architectural and engineering contributors include: Sean Ahlquist, Martin Bechthold, Philippe Block, Karola Dierichs, Jan Knippers, Achim Menges, Neri Oxman, Steffen Reichert and Tobias Schwinn. Scientific and philosophical perspectives provided by: Mario Carpo, Manuel De Landa, Neil Gershenfeld and Thomas Speck. Features the design research of: Harvard's Material Processes and Systems Group, MIT's Mediated Matter Group and Stuttgart University's Institute for Computational Design.

This open access book offers a summary of the development of Digital Earth over the past twenty years. By reviewing the initial vision of Digital Earth, the evolution of that vision, the relevant key technologies, and the role of Digital Earth in helping people respond to global challenges, this publication reveals how and why Digital Earth is becoming vital for acquiring, processing, analysing and mining the rapidly growing volume of global data sets about the Earth. The main aspects of Digital Earth covered here include: Digital Earth platforms, remote sensing and navigation satellites, processing and visualizing geospatial information, geospatial information infrastructures, big data and cloud computing, transformation and zooming, artificial intelligence, Internet of Things, and social media. Moreover, the book covers in detail the multi-layered/multi-faceted roles of Digital Earth in response to sustainable development goals, climate changes, and mitigating disasters, the applications of Digital Earth (such as digital city and digital heritage), the citizen science in support of Digital Earth, the economic value of Digital Earth, and so on. This book also reviews the regional and national development of Digital Earth around the world, and discusses the role and effect of education and ethics. Lastly, it concludes with a summary of the challenges and forecasts the future trends of Digital Earth. By sharing case studies and a broad range of general and scientific insights into the science and technology of Digital Earth, this book offers an essential introduction for an ever-growing international audience.

In light of environmental challenges architecture is facing, wood is no longer regarded as outmoded, nostalgic, and rooted in the past, but increasingly recognized as one of the most promising building materials for the future. Recent years have seen unprecedented innovation of new technologies for advancing wood architecture. **Advancing Wood Architecture** offers a comprehensive overview of the new architectural possibilities that are enabled by cutting-edge computational technologies in wood construction. It provides both an overarching architectural understanding and in-depth technological information through built projects and the works of four leading design research groups in Europe. The projects presented include large scale, permanent buildings such as the ETH Arch-Tec Lab Building in Zurich, the Landesgartenschau Exhibition Hall near Stuttgart and the Boiler House in Hooke Park, UK, as well as, built research prototypes investigating additive robotic fabrication, folded plate structures and meteorosensitive building skins. Illustrated in full colour, the book showcases the latest technological developments in design computation, simulation and digital fabrication together with an architectural, engineering and manufacturing perspective, offering an outlook towards novel spatial and constructional opportunities of a material with unrivalled ecological virtues.

Through expanded intelligence, the use of robotics has fundamentally transformed a variety of fields, including manufacturing, aerospace, medicine, social services, and agriculture. Continued research on robotic design is critical to solving various dynamic obstacles individuals, enterprises, and humanity at large face on a daily basis. **Robotic Systems: Concepts, Methodologies, Tools, and Applications** is a vital reference source that delves into the current issues, methodologies, and trends relating to advanced robotic technology in the modern world. Highlighting a range of topics such as mechatronics, cybernetics, and human-computer interaction, this multi-volume book is ideally designed for robotics engineers, mechanical engineers, robotics technicians, operators, software engineers, designers, programmers, industry professionals, researchers, students, academicians, and computer practitioners seeking current research on developing innovative ideas for intelligent and autonomous robotics systems.

This book presents a collection of state of the art research on GPU Computing and Application. The major part of this book is selected from the work presented at the 2013 Symposium on

GPU Computing and Applications held in Nanyang Technological University, Singapore (Oct 9, 2013). Three major domains of GPU application are covered in the book including (1) Engineering design and simulation; (2) Biomedical Sciences; and (3) Interactive & Digital Media. The book also addresses the fundamental issues in GPU computing with a focus on big data processing. Researchers and developers in GPU Computing and Applications will benefit from this book. Training professionals and educators can also benefit from this book to learn the possible application of GPU technology in various areas.

This book constitutes the thoroughly refereed proceedings of the 20th IAPR International Conference on Discrete Geometry for Computer Imagery, DGCI 2017, held in Vienna, Austria, in September 2017. The 28 revised full papers presented together with 3 invited talks were carefully selected from 36 submissions. The papers are organized in topical sections on geometric transforms; discrete tomography; discrete modeling and visualization; morphological analysis; discrete shape representation, recognition and analysis; discrete and combinatorial topology; discrete models and tools; models for discrete geometry.

High Value Manufacturing is the result of the 6th International Conference on Advanced Research in Virtual and Rapid Prototyping, held in Leiria, Portugal, October 2013. It contains current contributions to the field of virtual and rapid prototyping (V&RP) and is also focused on promoting better links between industry and academia. This volume comprises a collection of more than 110 reviewed papers which cover a wide range of topics, such as Additive and Nano Manufacturing Technologies, Biomanufacturing, Materials, Rapid Tooling and Manufacturing, CAD and 3D Data Acquisition Technologies, Simulation and Virtual Environments, and novel applications. High Value Manufacturing is intended for engineers, designers and manufacturers who are active in the fields of mechanical, industrial and biomedical engineering.

Landscape Architecture and Digital Technologies explores how digital technologies are reshaping design and making in landscape architecture. While the potentials of digital technologies are well documented within landscape planning and visualisation, their application within design practice is far less understood. This book highlights the role of the digital model in encouraging a new design logic that moves from the privileging of the visual to a focus on processes of formation, bridging the interface of the conceptual and material, the virtual and the physical. Drawing on interviews and projects from a range of international designers -including , Snøhetta, Arup, Gustafson Porter, ASPECT Studios, Grant Associates, Catherine Mosbach, Philippe Rahm, PARKKIM, LAAC and PEG office of landscape + architecture among others, the authors explore the influence of parametric modelling, scripting, real-time data, simulation, prototyping, fabrication, and Building Information Modelling on the design and construction of contemporary landscapes. This engagement with practice is expanded through critical reflection from academics involved in landscape architecture programs around the world that are reshaping their research and pedagogy to reflect an expanded digital realm. Crossing critical theory, technology and contemporary design, the book constructs a picture of an emerging twenty-first century practice of landscape architecture practice premised on complexity and performance. It also highlights the disciplinary demands and challenges in engaging with a rapidly evolving digital context within practice and education. The book is of immense value to professionals and researchers, and is a key publication for digital landscape courses at all levels.

FABRICATE is an international peer reviewed conference that takes place every three years with a supporting publication on the theme of Digital Fabrication. Discussing the progressive integration of digital design with manufacturing processes, and its impact on design and making in the 21st century, FABRICATE brings together pioneers in design and making within architecture, construction, engineering, manufacturing, materials technology and computation. Discussion on key themes includes: how digital fabrication technologies are enabling new creative and construction opportunities from component to building scales, the difficult gap that exists between digital modelling and its realisation, material performance and manipulation, off-site and on-site construction, interdisciplinary education, economic and sustainable contexts. FABRICATE features cutting-edge built work from both academia and practice, making it a unique event that attracts delegates from all over the world. FABRICATE 2011, 2014 and 2017 are now all available to download free from UCL Press.

Visual computing and descriptive geometry are multidisciplinary fields addressing the handling of images, 3D models, and other computer graphics. These ideas are experiencing a revival due to emergent technologies and applications available to developers. Based in traditional forms of design and architecture, these fields are currently experiencing a bounty of new research based on old principles. The Handbook of Research on Visual Computing and Emerging Geometrical Design Tools seeks to add to this knowledge base by considering these technologies from a designer's perspective rather than reiterating the principles of computer science. It combines aspects of geometry and representation with emerging tools for CAD, generation, and visualization while addressing the digital heritage of such fields. This book is an invaluable resource for developers, students of both graphic and computer-generated design, researchers, and designers.

Sustainable development within urban and rural areas, transportation systems, logistics, supply chain management, urban health, social services, and architectural design are taken into consideration in the cohesive network models provided in this book. The ideas, methods, and models presented consider city landscapes and quality of life conditions based on mathematical network models and optimization. Interdisciplinary Works from prominent researchers in mathematical modeling, optimization, architecture, engineering, and physics are featured in this volume to promote health and well-being through design. Specific topics include: - Current technology that form the basis of future living in smart cities - Interdisciplinary design and networking of large-scale urban systems - Network communication and route traffic optimization - Carbon dioxide emission reduction - Closed-loop logistics chain management and operation - Modeling the effect urban environments on aging - Health care infrastructure - Urban water system management - Architectural design optimization Graduate students and researchers actively involved in architecture, engineering, building physics, logistics, supply chain management, and mathematical optimization will find the interdisciplinary work presented both informative and inspiring for further research.

This book discusses a new method for the design and engineering of complex façades. Based on the file-to-factory concept, the method combines parametric design approaches and additive manufacturing. Parametric design and additive manufacturing are both growing trends that open up new possibilities. Parametric design approaches change how planners / designers perceive building details. Further, new engineering concepts are needed to cope with the increasing complexity of architectural geometries due to the rapid developments in areas such as façade

systems, modeling software and digital manufacturing techniques.

This book explores various digital representation strategies that could change the future of wooden architectures by blending tradition and innovation. Composed of 61 chapters, written by 153 authors hailing from 5 continents, 24 countries and 69 research centers, it addresses advanced digital modeling, with a particular focus on solutions involving generative models and dynamic value, inherent to the relation between knowing how to draw and how to build. Thanks to the potential of computing, areas like parametric design and digital manufacturing are opening exciting new avenues for the future of construction. The book's chapters are divided into five sections that connect digital wood design to integrated approaches and generative design; to model synthesis and morphological comprehension; to lessons learned from nature and material explorations; to constructive wisdom and implementation-related challenges; and to parametric transfigurations and morphological optimizations.

This book is an exciting collection of research articles that offer a unique view into the fast developing field of metal additive manufacturing, providing insights into this advanced manufacturing technology. The articles span recent advances in metal AM technologies, and their application to a wide range of metals, exploring how the processing parameters offer unique material properties. This book encapsulates the state of the art in this rapidly evolving field of technology and will be a valuable resource for researchers in the field, from Ph.D. students to professors, and through to industrial end users.

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.

This book provides an overview of the environmental problems that arise from construction activity, focusing on refurbishment as an alternative to the current crisis in the construction sector, as well as on measures designed to minimize the effects on the environment. Furthermore, it offers professionals insights into alternative eco-efficient solutions using new materials to minimize environmental impacts and offers solutions that they can incorporate into their own designs and buildings. It also demonstrates best practices in the cooperation between various universities in Andalusia in Spain and Latin America and many public and private companies and organizations. This book serves as a valuable reference resource for professionals and researchers and provides an overview on the status of investigations to find solutions to improve sustainable development in terms of materials, systems, facilities, neighborhoods, buildings, and awareness of the society involved.

The first book on active matter, an emerging field focused on programming physical materials to assemble themselves, transform autonomously, and react to information. The past few decades brought a revolution in computer software and hardware; today we are on the cusp of a materials revolution. If yesterday we programmed computers and other machines, today we program matter itself. This has created new capabilities in design, computing, and fabrication, which allow us to program proteins and bacteria, to generate self-transforming wood products and architectural details, and to create clothing from "intelligent textiles" that grow themselves. This book offers essays and sample projects from the front lines of the emerging field of active matter. Active matter and programmable materials are at the intersection of science, art, design, and engineering, with applications in fields from biology and computer science to architecture and fashion. These essays contextualize current work and explore recent research. Sample projects, generously illustrated in color, show the range of possibilities envisioned by their makers. Contributors explore the design of active material at scales from nano to micro, kilo, and even planetary. They investigate processes of self-assembly at a microscopic level; test new materials that can sense and actuate themselves; and examine the potential of active matter in the built environment and in living and artificial systems. Active Matter is an essential guide to a field that could shape the future of design.

This book highlights the concept of informed architecture as an alternative to performance-based approaches. Starting with an analysis of the state of art, the book defines an operative methodology in which performative parameters lead to the generation of the shape becoming the design's input, rather than being mere quantitative parameters. It then uses case studies to investigate the methodology. Lastly, the book discusses a novel way of conceiving and using the manufacturing tool, which is the basis for the definition of informed architectures in relation to data usage and the optimization process.

The book presents the proceedings of Rob/Arch 2016, the third international conference on robotic fabrication in architecture, art, and design. The work contains a wide range of contemporary topics, from methodologies for incorporating dynamic material feedback into existing fabrication processes, to novel interfaces for robotic programming, to new processes for large-scale automated construction. The latent argument behind this research is that the term 'file-to-factory' must not be a reductive celebration of expediency but instead a perpetual challenge to increase the quality of feedback between design, matter, and making.

Die Konstruktion im Dienst der Architektur – diesem Thema widmet sich das mehrbändige Werk des Architekten José Luis Moro. Der 2. Band behandelt wesentliche Fragen der geometrischen Gestaltung und des Zusammenfügens von Bauteilen sowie die dafür zu lösenden Detailfragen der Stoß- und Fugenausbildung. Auch Varianten von Tragwerken und etablierter Bauweisen werden dargestellt und hinsichtlich ihrer strukturellen Logik erläutert. Den letzten Abschnitt bilden zahlreiche, detailliert dokumentierte Konstruktionsbeispiele zu den gewählten Prinzipvarianten.

Wood is usually perceived as a "traditional" material. However, the properties of this material have now for some time made it possible to design free shapes and highly complex structures. Today, the wood laboratory of the EPF Lausanne, which was originally founded by Julius Natterer, is testing the production of origami structures, ribbed shells, fabric structures and curved panels under the guidance of Professor Weinand using digital calculation and computer-aided processing methods. The research results are tested in prototypes, which demonstrate the potential applications in large-scale timber buildings. By exploring the hitherto unused potential of wood as a construction material, this book provides an exciting and inspiring outlook on a new generation of timber buildings.

The sixteen-volume set comprising the LNCS volumes 11205-11220 constitutes the refereed proceedings of the 15th European Conference on Computer Vision, ECCV 2018, held in Munich, Germany, in September 2018. The 776 revised papers presented were carefully reviewed and selected from 2439 submissions. The papers are organized in topical sections on learning for vision; computational photography; human analysis; human sensing; stereo and reconstruction; optimization; matching and recognition; video attention; and poster sessions.

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