

# **Digital Fabrication In Architecture**

**Nick Dunn** 

#### **Digital Fabrication In Architecture:**

Digital Fabrication in Architecture, Engineering and Construction Luca Caneparo, 2013-10-02 Digital technologies are changing the relationship between design and construction with computer models CAD CAM and prototyping designers can gain direct control of building and construction processes. The ability to digitally model designs and thus to use those models directly in the context of production creates a synthesis between design and construction in keeping with the tradition of the close relationship between design and craftsmanship between the quality of the design and the rules of the craft The evolution of the culture of design and construction is the underlying theme of this book The aim is to discuss the direction that innovation is now taking with a particular focus on today s cutting edge architectures. The method addresses the ways in which different societies have dealt with the issues of their age regarding design and construction the different contributions provided by various techniques and with them the meanings expressed by the architecture As building design using digital tools requires specific skills in the fabrication processes and in the languages used by information technology the book also offers a practical guide to new methods and techniques of managing and controlling fabrication for AEC A systematic analysis of new skills used in the design process presents an overview of opportunities for architects and engineers By collecting information on significant projects and analyzing them the book explores the technical and artistic potential of digital technology. The cases studied are the outcomes of groundbreaking projects which were able to give form and significance to technological research They show that digital tools are not the exclusive prerogative of large firms but can also be adopted by teams working across small and medium sized firms firms which have been able to use informed research to link innovative design with the possibilities offered by digital fabrication in architecture Digital Fabrication Neil Leach, Achim Menges, 2018 Digital Fabrication offers an informed overview of the impact of digital technologies on architectural fabrication today providing a snapshot of the latest developments in the field drawing upon the leading experts in architectural practice and education from across the world Publication accompanies that of a companion volume Computational Design ISBN 9787560873336 How are new digital fabrication technologies changing the ways in which architects are constructing buildings today Digital Fabrication offers a range of informed opinions on the subject written by some of the leading authorities in the world It addresses new digital fabrication technologies such as 3D printing computer numerically controlled milling along with other robotically controlled manufacturing operations such as laser cutting bandsaw cutting stitching weaving forming bending folding and stacking The volume is divided into different sections comprising Manifestos Methodologies Interviews and Projects and also includes a helpful Introduction that offers a brief history of digital fabrication **Digital Fabrication in Architecture** Nick Dunn, 2012-09-07 With the increasing sophistication of CAD and other design software there is now a wide array of means for both designing and fabricating architecture and its components The proliferation of advanced modelling software and hardware has enabled architects and

students to conceive and create designs that would be very difficult to do using more traditional methods The use of CAD technologies in the production of physical models prototypes and individual elements is increasingly widespread through processes such as CAD CAM CNC milling and rapid prototyping This translation of computer generated data to physical artefact can also be reversed with devices such as a digitiser which traces the contours of physical objects directly into the computer This book focuses on the inspiring possibilities for architecture that can be explored with all the different technologies and techniques available for making complete designs or their components Fabricate Achim Menges, Bob Sheil, Ruairi Glynn, Marilena Skavara, 2017-04-03 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 Material Strategies in Digital Fabrication Christopher Beorkrem, 2017-07-28 In this second edition of Material Strategies in Digital Fabrication are new case studies improved wayfinding the inclusion of composites and plastics and references to similar strategies between different projects In 400 step by step diagrams dissecting 39 case studies in 10 countries on 3 continents the book shows you how material performance drives the digital fabrication process and determines technique. The book identifies the important characteristics of each material including connection types relative costs deformation color texture finish dimensional properties durability and weathering and waterproofing to link design outcomes to form The book is divided into five main chapters by material wood metal concrete masonry composites plastics and recycled pre cycled to help you reference construction techniques for the fabrication machines you have on hand Includes projects by SHoP Architects Gramazio Kohler Schindlersalmeron The Institute for Computational Design Achim Menges Patkau Architects Sebastien Wierinck Blue Dot Furniture Marble Fairbanks Studio Gang Architects Macdowell Tomova Thomas Heatherwick Studio Heather Roberge MX3D Matsys Asbjorn Sondergaard Block Research Group Phillipe Block Ball Nogues Studio Matter Design WORK Architecture Company and SoftLab **Fabrication Examining the Digital Practice of Architecture Philip** Beesley, Nancy Yen-Wen Cheng, R. Shane Williamson, 2004 **Fabricating Architecture** Robert Corser, 2012-03-20 In this increasingly digitized world any investigation of architecture inevitably leads to considerations of fabrication But despite its omnipresence in contemporary practice and theory digital design remains a fluid concept its development and current influence discussed in scattered articles **Digital Fabrications** Lisa Iwamoto, 2013-07-02 Digital Fabrications the second volume in our new Architecture Briefs series celebrates the design ingenuity made possible by digital fabrication techniques

Author Lisa Iwamoto explores the methods architects use to calibrate digital designs with physical forms The book is organized according to five types of digital fabrication techniques tessellating sectioning folding contouring and forming Projects are shown both in their finished forms and in working drawings templates and prototypes allowing the reader to watch the process of each fantastic construction unfold Digital Fabrications presents projects designed and built by emerging practices that pioneer techniques and experiment with fabrication processes on a small scale with a do it yourself attitude Featured architects include AEDS Ammar Eloueini Atelier Manferdini Brennan Buck MOS Office dA Florencia Pita MOD Mafoomby URBAN A O SYSTEMarchitects Andrew Kudless Matsys IwamotoScott Atelier Hitoshi Abe Chris Bosse Tom Wiscombe EMERGENT Thom Faulders Architecture Jeremy Ficca SPAN GNUFORM Heather Roberge PATTERNS Ruy Klein Homing the Machine in Architecture Galo Canizares, Zach Cohen, 2024-03-11 Homing the Machine in and servo Architecture is a series of conversations on the ways designers practitioners historians and theorists orient themselves within the world of architectural digital fabrication To home a digital fabrication machine is to send it back to its origin point a point that can be specified by the fabricator in advance of the fabrication process or by the defaults that are pre programmed into the machine The homing process is necessary and productive since it determines the physical point at which the machine and the maker begin making every time that architectural designers begin to digitally fabricate something new they first need to home the machine This book gathers first and second hand accounts of the origins of individual digi fab practices from the emergence of advanced prototyping tools to the contemporary moment It features interviews essays and case studies organized around three questions What are the possible histories of digital fabrication in architecture How do designers orient themselves in this emergent discipline What conceptual original points do architectural designers return to when they home their machines The discourse that emerges from this collection aims to reach practicing architects using digital fabrication as well as upper level students and academics of digital architecture architectural theory and architectural 1:1 Architecture and Digital Fabrication Fabio Gramazio, 2007 history **Constructing Change: The Impact of** Digital Fabrication on Sustainability Ena Lloret-Fritschi, Selen Ercan Jenny, David Jenny, 2024-09-23 Every year nearly 100 billion tonnes of raw material globally is extracted from the earth approximately half of it for construction purposes The construction industry is responsible for an estimated third of global waste while reuse of construction materials is not increasing fast enough The same sector accounts for at least 40 per cent of global carbon dioxide emissions There is thus an urgent need to showcase how novel approaches in digital fabrication might be able to enhance thesustainability of buildings and transform construction Featuring specialists from architecture engineering and materials science this AD presents innovative research and new construction systems approaches and trends to demonstrate how existing methods and unique concepts that utilise cutting edge technologies can in a short space of time help us advance towards a culture of sustainable construction It focuses on digital design and manufacturing including XR technologies and highlights unique ways to build

with earth or concrete Contributors Fabio Amicarelli Ana Anton and Benjamin Dillenburger Tobias Bonwetsch and Tobias Huber Mario Carpo Sasha Cisar Jelle Feringa Corentin Fivet Abel Gawel Fabio Gramazio and Matthias Kohler Norman Hack Silke Langenberg Sarah M Schlachetzki and Robin Rehm Daniela Mitterberger and Kathrin D rfler Romana Rust and In s Ariza and Timothy Wangler Yamini Patankar and Robert J Flatt Featured architects Terrestrial and Rematter AG Fabrication in Interior Design Jonathon Anderson, Lois Weinthal, 2021-11-04 Digital Fabrication in Interior Design Body Object Enclosure draws together emerging topics of making that span primary forms of craftsmanship to digital fabrication in order to theoretically and practically analyze the innovative and interdisciplinary relationship between digital fabrication technology and interior design The history of making in interior design is aligned with traditional crafts but a parallel discourse with digital fabrication has yet to be made evident This book repositions the praxis of experimental prototyping and integrated technology to show how the use of digital fabrication is inherent to the interior scales of body objects and enclosure These three scales act as a central theme to frame contributions that reinforce the interdisciplinary nature of interior design and reinterpret traditional crafts by integrating new methods of making into conventional workflows Featuring significant international practitioners and researchers the selected contributions represent the ever increasing interdisciplinary nature of design demonstrating a breadth of disciplines A foundational text for interiors students and practitioners Digital Fabrication in Interior Design expands the necessary dialogue about digital fabrication at the scale of interiors to inform design theory and practice (In)forming Mark Newell Cabrinha, 2010 This research focuses on the effect of technology on the culture of architectural education through the lens of digital fabrication cad cam As the computer was introduced into design education long before digital fabrication was accessible design culture has prioritized image over material experience Digital fabrication enables a material feedback loop into the digital design process which effects not only how architecture is produced but how architecture is conceived and the values shaped within design education As digital fabrication becomes standard practice in design education conventions of use are guickly becoming established which thwart the opportunities these tools were meant to engender Through the theory of affordances attention shifts from what the tools produce to what the tools afford the designer in the context of design practice Affordances combine the directionality of tools their material affordances along with the intentionality of the user their perceived affordances Developing a designer s engaged agency occurs at the intersection of these material and perceived affordances in the context of design practice This research develops through three research modes First through a series of tool driven research projects I developed a critical perspective on the place of digital fabrication to calibrate between material and geometry Second I conducted a series of micro experiments in digital fabrication at three architecture schools with distinct school cultures These studios are assessed through ethnographic methods to make visible the perceived affordances of digital fabrication from the students perspective Finally a critical reflection on the affordances of digital fabrication in design education is developed through over 30

interviews with recognized practitioner educators whose teaching and research engage digital fabrication Collectively this research situates the affordances of digital fabrication in the culture of architectural education to project an image of practice as an abstract workshop The dissertation citations contained here are published with the permission of ProQuest Ilc Further reproduction is prohibited without permission Copies of dissertations may be obtained by Telephone 800 1 800 521 0600 Web page http www proquest com en US products dissertations individuals shtml Robotic Fabrication in Architecture, Art and Design 2016 Dagmar Reinhardt, Rob Saunders, Jane Burry, 2016-02-03 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

Fabricate 2011 Ruairi Glynn, Bob Sheil, 2017-08-24 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 Robotic Fabrication in Architecture, Art and Design 2018 Jan Willmann, Philippe Block, Marco Hutter, Kendra Byrne, Tim Schork, 2018-08-25 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 Made by Robots Fabio Gramazio, Matthias Kohler, 2014-05-09 Although highly ambitious and sophisticated most attempts at using robotic processes in architecture remain the exception little more than prototypes or even failures at a larger scale This is because the general approach is either to automate existing manual processes or the

complete construction process However the real potential of robots remains unexploited if used merely for the execution of highly repetitive mass fabrication processes their capability for serial production of non standard elements as well as for varied construction processes is mostly wasted In order to scale up and advance the application of robotics for both prefabrication and on site construction there needs to be an understanding of the different capabilities and these should be considered right from the start of the design and planning process This issue of AD showcases the findings of the Architecture and Digital Fabrication research module at the ETH Zurich Future Cities Laboratory in Singapore directed by Fabio Gramazio and Matthias Kohler which explores the possibilities of robotic construction processes for architecture and their large scale application to the design and construction of high rise buildings Together with other contributors they also look at the far reaching transformations starting to occur within automated fabrication in terms of liberation of labour entrepreneurship the changing shape of building sites in situ fabrication and most significantly design Contributors Thomas Bock Jelle Feringa Philippe Morel Neri Oxman Antoine Picon and Fran ois Roche ETH Zurich contributors Michael Budig Norman Hack Willi Lauer and Jason Lim and Raffael Petrovic Future Cities Laboratory Volker Helm Silke Langenberg and Jan Willmann Featured entrepreneurs Greyshed Machineous Odico Formwork Robotics RoboFold and ROB Technologies

Fabricating a Future Architecture Kris L. Weeks, 2012 During the Renaissance era the builder was the master of both design and fabrication The Industrial Revolution split these two activities in the pursuit of higher efficiency Now the ascendance of digital fabrication could bring the two back together This study explores the current and future use of digital fabrication in architecture Digital fabrication is increasingly used to manufacture components for other industries but it is experiencing slower adoption in the building industry due to size and material limitations and a contract process that makes fabricators less willing to take risks on newer digital technology A design project was undertaken to establish a digital design to fabrication workflow that could work on actual building components for a large scale built environment The resulting workflow did offer the advantages of design freedom and the elimination of shop drawings but the absence of large scale 3D printing still makes it difficult to quickly fabricate and assemble mass customized non uniform 3D designs **Digital Vernacular** James Stevens, Ralph Nelson, 2015-06-26 Digital Vernacular addresses the why and how of digital fabrication in hundreds of step by step color images illuminating a set of working principles and techniques that join theory with practice Authors James Stevens and Ralph Nelson reconcile local traditions and innovations with globally accessible methods and digital toolsets By combining ethics with hardware the book will root you in the origins of making ensuring a lasting and relevant reference for your studio practice. The book opens with the origins and principles of the digital vernacular then outlines digital vernacular tools including computer numerically controlled CNC mills laser cutters and 3D printers You ll even learn to create your own digital fabrication tools out of inexpensive materials. The book concludes with the processes of the digital vernacular including techniques for removing joining forming and adding A companion website at make Lab org

hosts additional step by step processes and project outcomes **First RILEM International Conference on Concrete** and Digital Fabrication - Digital Concrete 2018 Timothy Wangler, Robert J. Flatt, 2018-08-29 Digital fabrication has been termed the third industrial revolution and is promising to revolutionize many disciplines including most recently the construction sector Both academia and industry see immense promise in cementitious materials which lend themselves well to additive manufacturing techniques for digital fabrication in construction With this recent trend and high interest in this new research field the 1st RILEM International Conference on Concrete and Digital Fabrication Digital Concrete 2018 was organized Since 2014 ETH Zurich has been host for the Swiss National Centre for Competence in Research NCCR for Digital Fabrication in Architecture which is highly interdisciplinary and unique worldwide In 2018 this NCCR opened the DFAB House which incorporates many digital fabrication principles for architecture It is also responsible for the 600 m2 Robotic Fabrication Lab and the first robotically built roof in the world Held in tandem with Rob Arch 2018 the leading conference for robotics in architecture RILEM deemed it the right time to combine forces at this new conference which will be the first large conference to feature the work of the recently created RILEM Technical Committee on Digital Fabrication with Cement based Materials among other leaders in this new field worldwide This conference proceedings brings together papers that take into account the findings in this new area Papers reflect the varying themes of the conference including Materials Processing Structure and Applications

The Enigmatic Realm of **Digital Fabrication In Architecture**: Unleashing the Language is Inner Magic

In a fast-paced digital era where connections and knowledge intertwine, the enigmatic realm of language reveals its inherent magic. Its capacity to stir emotions, ignite contemplation, and catalyze profound transformations is nothing in short supply of extraordinary. Within the captivating pages of **Digital Fabrication In Architecture** a literary masterpiece penned with a renowned author, readers attempt a transformative journey, unlocking the secrets and untapped potential embedded within each word. In this evaluation, we shall explore the book is core themes, assess its distinct writing style, and delve into its lasting impact on the hearts and minds of those that partake in its reading experience.

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