

Introduction

SIGRID BRELL-ÇOKCAN, JOHANNES BRAUMANN 8

Keynotes

DIGITAL BY MATERIAL 12

Envisioning an extended performative materiality
in the digital age of architecture

Jan Willmann, Fabio Gramazio, Matthias Kohler, Silke Langenberg

MORPHOSPACES OF ROBOTIC FABRICATION 28

From theoretical morphology to design computation
and digital fabrication in architecture

Achim Menges

Workshops

ROBOTICALLY FABRICATED WOOD PLATE MORPHOLOGIES 48

Robotic prefabrication of a biomimetic, geometrically differentiated,
lightweight, finger joint timber plate structure

Tobias Schwinn, Oliver David Krieg, Achim Menges

PROCESSES FOR AN ARCHITECTURE OF VOLUME: ROBOTIC WIRE CUTTING 62

Robotic wire cutting

Wes McGee, Jelle Feringa, Asbjørn Søndergaard

AUGMENTED FABRICATIONS 72

A new control model for synchronous robotics

Brandon Kruysman, Jonathan Proto

INTERLACING 82

An experimental approach to integrating digital and physical design
methods

Kathrin Dörfler, Florian Rist, Romana Rust

HAL 92

Extension of a visual programming language to support teaching
and research on robotics applied to construction

Thibault Schwartz

BRICKDESIGN 102

A software for planning robotically controlled
non-standard brick assemblies

Tobias Bonwetsch, Ralph Bärtschi, Matthias Helmreich

MILL TO FIT	110
The Robarch	
<i>Andreas Trummer, Felix Amtsberg, Stefan Peters</i>	
DESIGN ROBOTICS	118
Towards strategic design experiments	
<i>Martin Bechthold, Nathan King</i>	
Projects	
FABRICATING THE STEEL BULL OF SPIELBERG	130
<i>Clemens Neugebauer, Martin Kölldorfer</i>	
MORPHFAUX	138
Recovering architectural plaster by developing custom robotic tools	
<i>Joshua Bard, Steven Mankouche, Matthew Schulte</i>	
PROTOCOLS, PATHWAYS, AND PRODUCTION	142
<i>David Pigram, Iain Maxwell, Wes McGee, Ben Hagenhofer-Daniell, Lauren Vasey</i>	
FROM DIGITAL DESIGN TO AUTOMATED PRODUCTION	148
Complex-shaped concrete sub-constructions with steel reinforcement	
<i>Jens Cortsen, Silvan Oesterle, Dorte Sølvason, Hanno Stehling</i>	
ROBOT ASSISTED ASYMMETRIC INCREMENTAL SHEET FORMING	154
Surface quality and path planning	
<i>Jan Brüninghaus, Carsten Krewet, Bernd Kuhlenkötter</i>	
CNSILK	160
Spider-silk inspired robotic fabrication of woven habitats	
<i>Elizabeth Tsai, Michal Firstenberg, Jared Laucks, Yoav Stermann, Benjamin Lehnert, Neri Oxman</i>	
RHINO2KRL	166
A simple CAD to robot interface for fast process prototyping	
<i>Tom Pawlofsky</i>	
ROBOTIC FABRICATION FOR DÜZCE TEKNOPARK	172
Streamlining fabrication through versatile machines	
<i>Baris Çokcan</i>	
FREE MOLDING TECHNOLOGY	174
<i>Yaron Elyasi</i>	

OUTSIDE ITSELF	180
Interactive installation assembled by robotic machines untouched by human hands <i>Federico Díaz</i>	
Research	
GEOMETRY OPTIMIZATION	184
Realization of fluid-form structure composed of spherical components, fabricated by means of computer software and robotic arms <i>Lukáš Kurilla, Ladislav Svoboda</i>	
ROBOTIC POURING OF AGGREGATE STRUCTURES	196
Responsive motion planning strategies for online robot control of granular pouring processes with synthetic macro-scale particles <i>Karola Dierichs, Tobias Schwinn, Achim Menges</i>	
MAGNETIC ARCHITECTURE	206
Generative design through sensoric robots <i>Alexandre Dubor, Gabriel-Bello Díaz</i>	
AUTOMATING ECLIPSIS	214
Automated robotic fabrication of custom optimized metal façade systems <i>Nathan King, Jonathan Grinham</i>	
IRREGULAR SUBSTRATE TILING	222
The robotic poché <i>Ryan Luke Johns, Nicholas Foley</i>	
ROBOSCULPT	230
Unique molds for design with minimal waste <i>Mathew Schwartz, Jason Prasad</i>	
THE FRAMED PAVILION	238
Modeling and producing complex systems in architectural education <i>Richard Dank, Christian Freissling</i>	
AUGMENTED REALITY AND THE FABRICATION OF GESTURAL FORM	248
<i>Ryan Luke Johns</i>	
ROBOTIC IMMATERIAL FABRICATION	256
<i>Steven Keating, Neri Oxman</i>	

Industry

KUKA: INNOVATIONS IN INDUSTRIAL ROBOTICS <i>Alois Buchstab</i>	266
SPLINETEX Architectural composite materials <i>Valentine Troi</i>	274
INDUSTRIAL ROBOTS IN ARCHITECTURE Trends and innovations from ABB <i>David Kittl, Martin Kohlmaier</i>	278
REVOLUTION IN STEEL BEAM FABRICATION <i>Andreas Hofer</i>	282
21ST CENTURY ART: THE MARRIAGE OF INSPIRATION AND INNOVATION Robots evolve to become the artist's high-performance tool <i>Manfred Hübschmann, David Arceneaux</i>	286
MODULAR ROBOTICS From individual modules to complex robotic structures <i>Christian Binder</i>	292
NEW PERSPECTIVES FOR ARCHITECTURE AND DESIGN Fabrication using robotic machining centers <i>Alfred Kaser</i>	296
PARAMETRIC ROBOT CONTROL WITHOUT CAD/CAM Dynamically generated parametric robot commands for the fabrication of pneumatic cylinders <i>Eric Dokulil</i>	300
A CUSTOM ROBOTIC TRIMMER FOR MODERN TIMBER CONSTRUCTIONS <i>Michael Bauer</i>	304
RAPID ON-SITE FABRICATION OF CUSTOMIZED FREEFORM METAL CLADDING PANELS Robotic devices in shipping containers shifting from research to state-of-the-art <i>Peter Mehrtens</i>	308
List of Contributors	316

Rob|Arch 2012

Robotic Fabrication in Architecture, Art and Design

Brell-Cokcan, S.; Braumann, J. (Eds.)

2013, VII, 313 p., Hardcover

ISBN: 978-3-7091-1464-3