ROBOTIC WOODCRAFT

TOWARDS THE CRAFTSMANSHIP OF THE FUTURE

funded by

FWF Der Wissenschaftsfonds.

Research Partners

di:'ʌngewʌndtə

Association for Robots in Architecture

LUCY.D DESIGN

EXHIBITIONS

Rado Star Prize, 2015
Intuitive Software Design process,
Exhibited at the Rado Flagship Store Vienna, Austria

Randomized Identities, 2015
Randomized programming and customized fabrication
Installation at Vienna Design Week 2015,
University of Applied Arts Vienna, Austria

KUKA Innovation Award, 2016
Dynamic and sensitive robotic processes
Exhibition at the Messe Hannover 2016, Germany

Rob|Arch Conference, 2016
Robotic Mass Customization Workshop
University of Applied Arts Vienna, Austria

Kreative Robotik, 2017
Parametric Design objects
Ars Electronica Center Linz, Austria

Helix Deconstructor, 2017
Exhbited at MQ Art Box
Museumsquartier Wien, Austria

Making robots accessible to the creative industry is of significant relevance to European countries, as it serves as an important counterpoint to the ongoing trend of outsourcing fabrication to low-wage countries. Robotic fabrication allows creative users to return to taking full control of the fabrication and to provide local products, thus reducing emissions as well as “brain drain”, when important fabrication knowledge has to be handed over to external partners. Similarly, by offering customizable products, small and medium sized enterprises can differentiate themselves from larger, multinational companies who lack the flexibility to respond to the end-user’s individual requirements.
The process also responds to the current lack of skilled labor, with the robot enabling craftsmen to put their material knowledge into customized robotic processes, thus multiplying their output capacity. On the other hand, the use of robots and machines shows that craftsmanship is also relevant in a modern, technology-heavy society and will ideally encourage youths to work in these fields in larger numbers.

ROBOTIC WOODCRAFT

TOWARDS THE CRAFTSMANSHIP OF THE FUTURE

Can we imagine robots deciding by themselves? /// How might it change us, were robots act as human-like craftsman? /// How can we think of new ways to create surfaces to bring up a parametric aesthetic? /// How can we extend the aesthetic language of a parametric product? /// How can we implement robotic precision into human 3D thinking? /// Can we connect individuality with seriality and still stay efficient? /// Can we evolve a simple form to a new dynamic structure?

Robotic Woodcraft is an interdisciplinary research project funded through the program for arts-based research of the Austrian Science Fund that investigates the craftsmanship of the future. Today, robotic arms have become indispensable for many branches of industry and their falling prices; along with new, accessible software, robots are becoming increasingly relevant to the creative industry, especially craftsmen, architects, and designers.

The idea of the Robotic Woodcraft project is not to consider robots to be fabrication machines that make up the last part of a design to production workflow, but to treat them as integral design tools and multifunctional interfaces that allow us to move from a digital environment into physical space.
This requires a change in design thinking, as we do not create a digital model that is then fabricated, but instead design an entire customized robotic fabrication process.
Coupled with dynamic, parametric design software, having control over the entire process enables mass-customization, making it possible to offer customizable, individualized objects with the same efficiency as mass production. We believe that this intelligent, customizable, local production will be the key to the craftsmanship of the future. The choice does not have to be made between traditional woodworking and automation, instead the collaboration between robots and craftsmen will be crucial, building upon the individual strengths of each partner.

Achieving that goal requires a collaborative effort between different disciplines. The Robotic Woodcraft project involves master craftsmen, as well as mathematicians, architects, and designers, collaborating closely with the industrial designers of Lucy.D, as well as the roboticists of the Association for Robots in Architecture, thus bringing together a deep knowledge of the material, i.e. wood, with geometric understanding, expertise in robotics, as well as design skills.

ROBOTIC WOODCRAFT

TEAM

The Robotic Woodcraft team combines a wide variety of both applied and academic backgrounds. Its main partners are the **University for Applied Arts Vienna**, collaborating with the design studio Lucy.D and the **Association for Robots in Architecture**. Leading the project is **Georg Glaeser**, who Heads the Department of Geometry and Mathematics and, together with **Boris Odehnal**, investigates the mathematical issues that arise during fabrication, e.g. to ensure that surfaces are developable. **Reinhold Krobath** and his team of master carpenters is responsible for the Wood Technology Workshop at the university and manages access and use. While the workshop team has several decades of experience in working with wood, until recently CNC technologies were seldom used. Thus, there has been a particular interest in integrating new technologies with traditional workflows – merging manual and robotic labour. **Philipp Hornung** started working with the research project for his Master's thesis at the Zaha Hadid Studio and, following his graduation, is now working as a research associate at the university. His main interest as an architect, is large-scale structures and "intelligent" surfaces. The team is supported by graduate research assistants **Emmanuel Gollob**, **Georg Sampl** and **Sebastian Scholz** who are industrial designers and whose main interest is in the scale of furniture.

Lucy.D – Karin Santorso and Barbara Ambrosz – is an international award-winning design studio, working in a variety of scaling applications. As designers, they are interested in the practical implications of robotic fabrication to their work, especially towards customization and individualization. The Lucy.D studio is cutting edge in implementing new technologies and applying unusual material to their design developments. Cross-thinking and profound skills of the development processes are among their main interests.

The Association for Robots in Architecture has been pioneering the use of robots for the creative industry, developing the software interface KUKA|prc (parametric robot control) to enable the efficient connected 3D drawing software with robotic arm use. Their main responsibility in the project is to share knowledge on how to work with robots, as well as to further customize software to the particular requirements of the creative industry. The main researchers are **Sigrid Brell-Cokcan** and **Johannes Braumann** as roboticists and software specialists, with **Baris Cokcan**, an architect specialized in timber construction.

The Association was founded in 2010 with the aim of making industrial robots accessible to the creative industry. To this end, the Association is currently developing innovative software tools and has initialized the Rob|Arch conference series on robotic fabrication in architecture, art and design which, following Vienna in 2012, Ann Arbor in 2014, and Sydney in 2016, will be held in Zurich in 2018. Robots in Architecture is a KUKA System Partner and has been validated as a research institution by national and international research agencies such as the European Union's FP7 program. Recently, Sigrid founded the new chair for Individualized Construction at RWTH Aachen University. Johannes is professor for creative robotics at UfG Linz and leads the development of KUKA|prc.

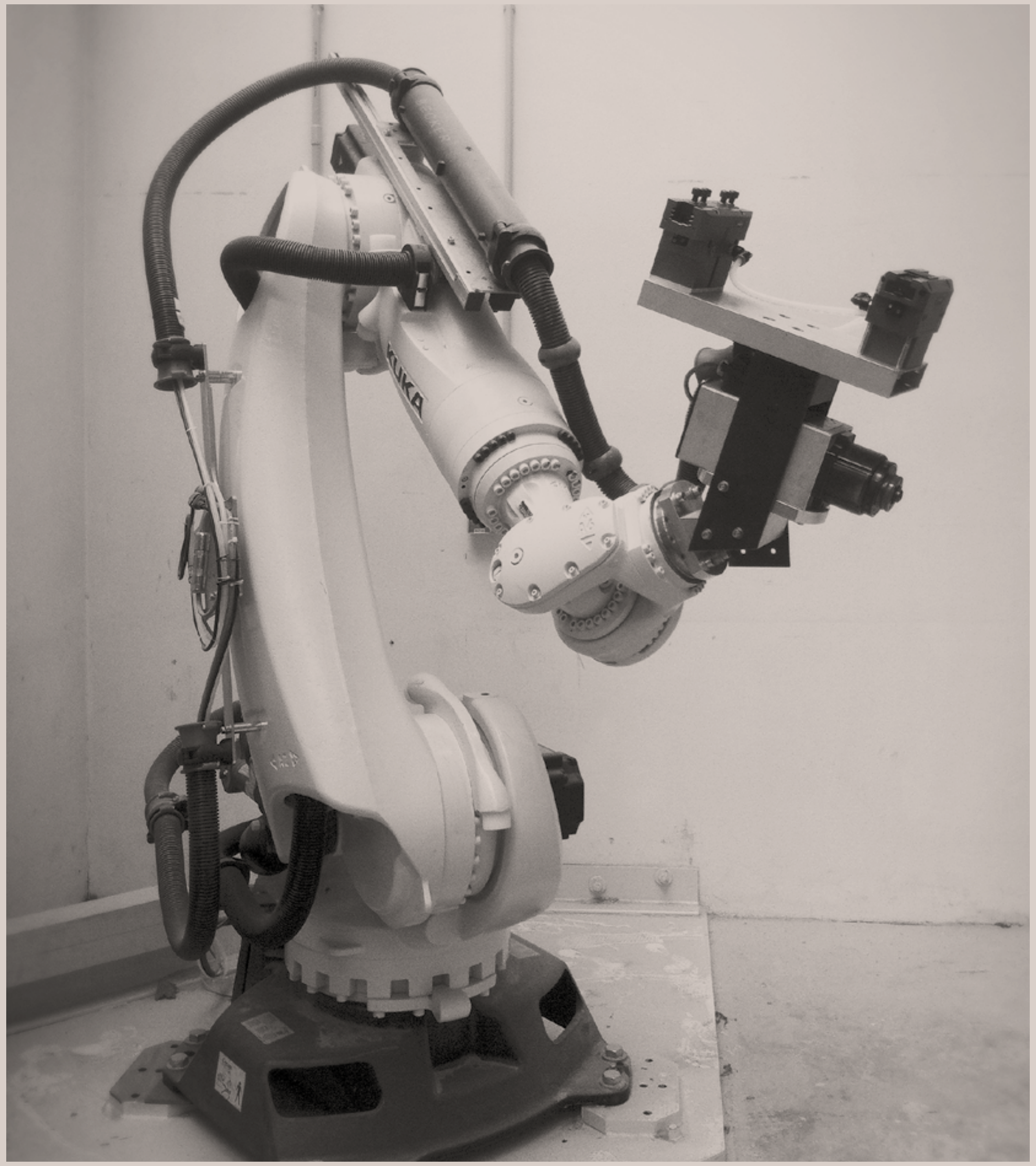
University of Applied Arts Vienna

Institute of Geometry:
Georg Glaeser, Univ.-Prof. Mag.rer.nat. Dr., Head of Research
Boris Odehnal, Univ.-Ass. Mag.rer.nat. Dr.,
Philipp Hornung, Univ.-Ass. Mag.arch.
Georg Sampl, Research Assistant
Sebastian Scholz, Research Assistant

Wood Technology:
Reinhold Krobath, Prof., Head of Wood Technology
Gerhard Brandstötter, Sen. Art.
Emanuel Gollob, Research Assistant

Association for Robots in Architecture
Johannes Braumann, Univ.-Prof. D.I.
Sigrid Brell-Cockan, Univ.-Prof. Dr.

Lucy.D Designstudio
Barbara Ambrosz, Univ.-Ass. Mag.art.
Karin Santorso, Wiss.Mit. Mag.art.

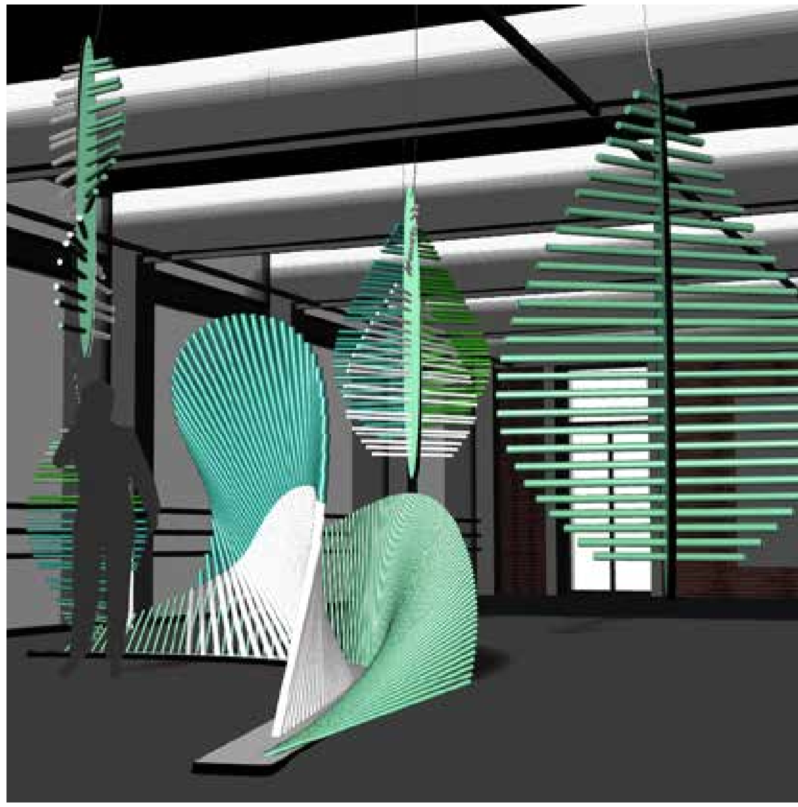


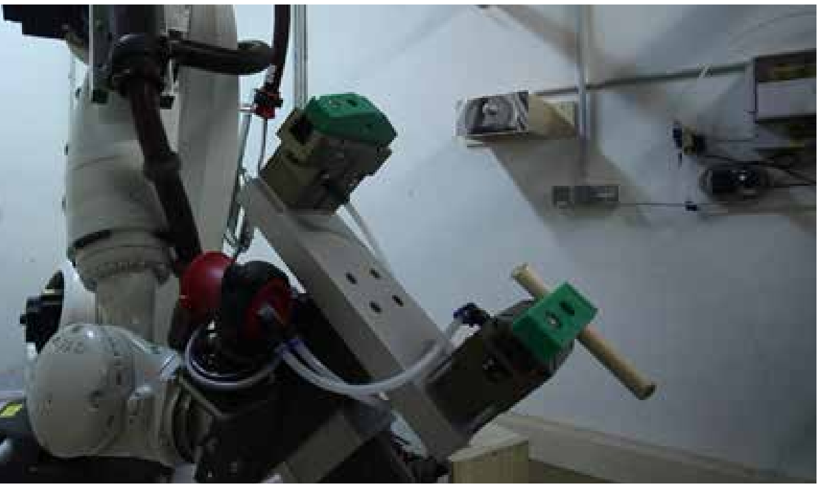
CAN WE
IMAGINE ROBOTS
DECIDING BY
THEMSELVES?

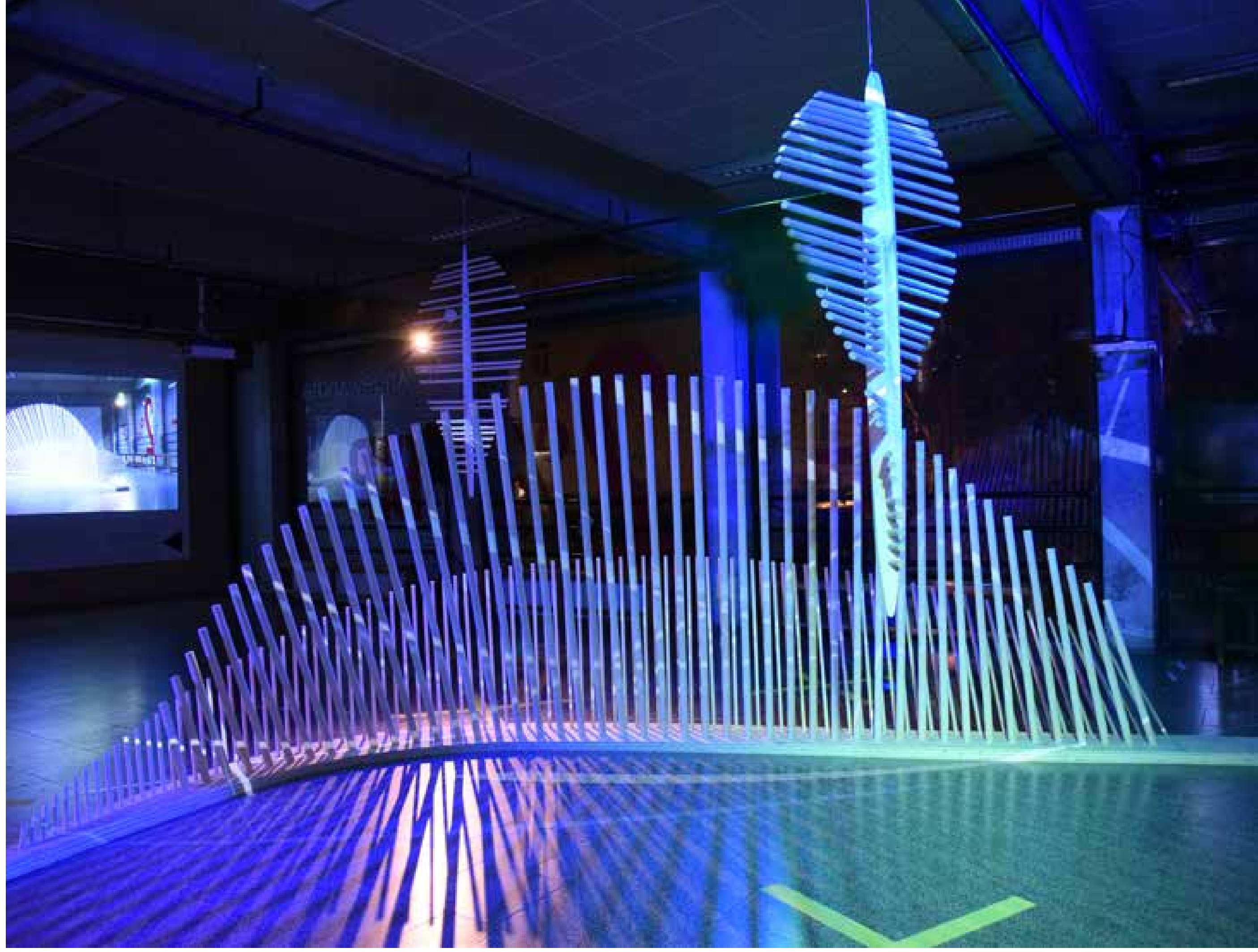
RANDOMIZED IDENTITIES

RANDOMIZED IDENTITIES focuses on the idea of individualization within a production process, rather than a replication of the original prototype. The designers from Lucy.D developed a digital, generative process that generates an infinite range of surfaces. Taking into account the specifications of parameters, such as height, diameter, amount and spacing, these digitally generated patterns and the associated process information orchestrate and actuate computer controlled woodworking tools, at the same time seamlessly creating and materializing 3D surfaces. The flexibility of present-day robotic machinery allows for a continuous implementation of modifications. Instead of using industrial robots with the purpose of replacing human labor, we create a digital ecosystem that introduces random factors into machines that are otherwise accurate to tenths of a millimetre. We show industrial robots as the strong and intuitive tools that they are and open up new areas of wood geometry and human/machine-cooperation beyond industrial file-to-factory concepts. The 'RANDOMIZED IDENTITIES' peculiarity lies not only in their aesthetic qualities but in their inherent capabilities to reflect contemporary production facilities and conditions. In this sense, they stand for a new form of integrated product and process development and for a new way of thinking design.

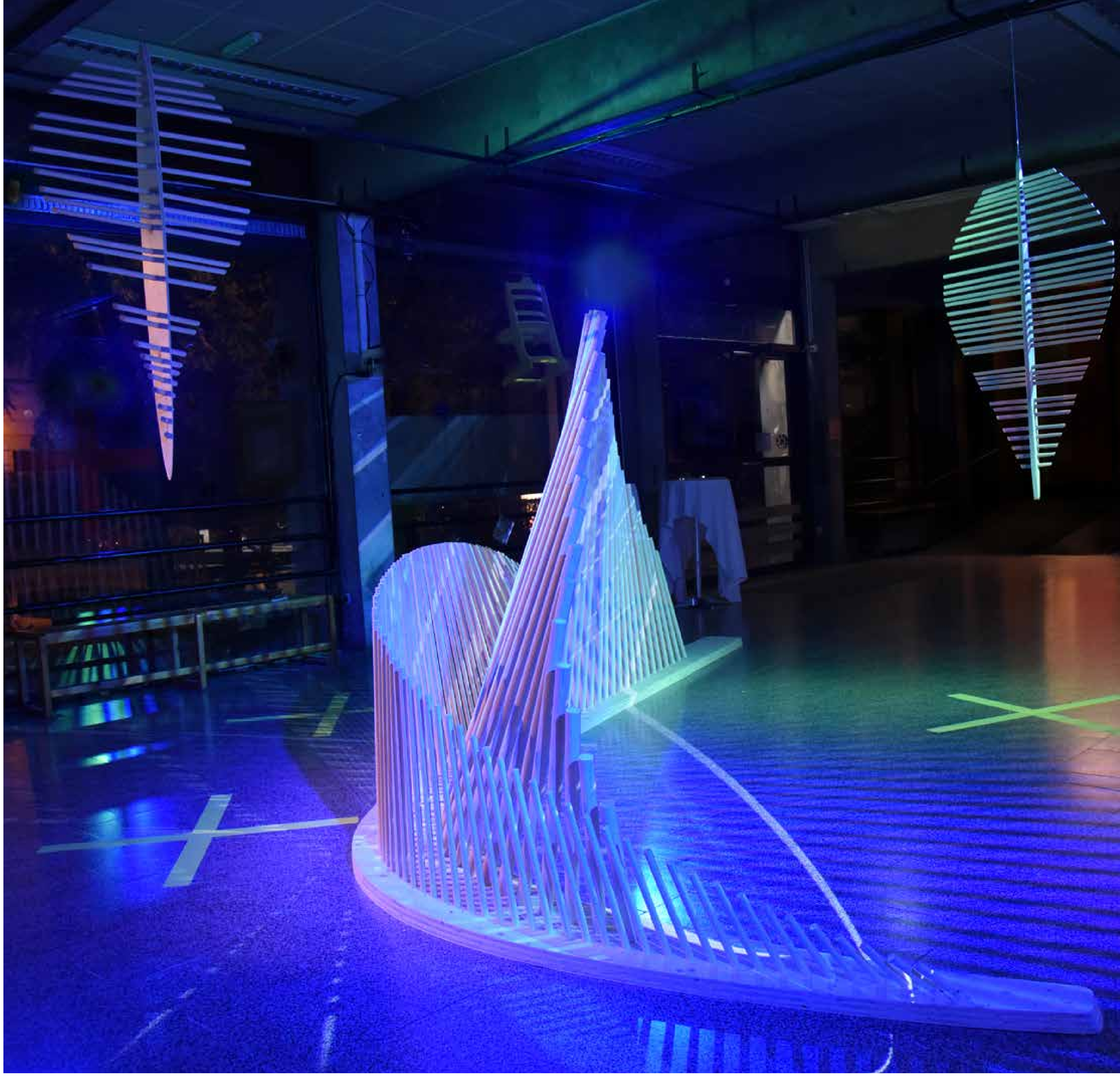
Credits: Lucy.D, Robots in Architecture
Robotics: Georg Sampl, Sebastian Scholz, Philipp Hornung
Collaboration Partners: University of Applied Arts Vienna, Bildwerk
Exhibited during the Vienna Design Week 2015, University of Applied Arts Vienna, Austria
Project year: 2015







FOCUS ON
THE IDEA OF
INDIVIDUALIZATION
WITHIN A
PRODUCTION
PROCESS



Vienna Design Week 2015
Presentation and Live Robotic Performance at the University of Applied Arts Vienna, Live-Visuals by Bildwerk

HOW MIGHT IT
CHANGE US,
**WERE ROBOTS
TO ACT
AS HUMAN-LIKE
CRAFTSMEN?**

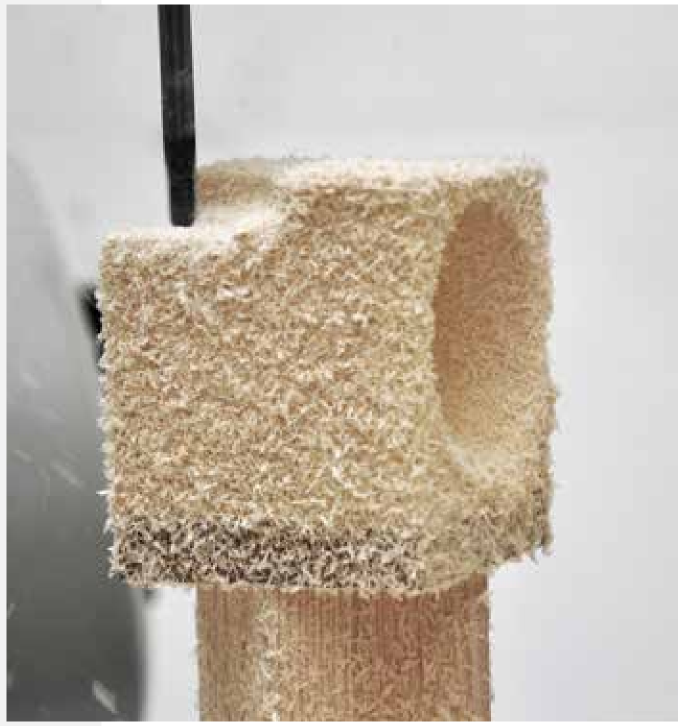
VARIOUS ROBOTIC **EXPERIMENTS**

Bust CNC Replica
translating handcrafted arts via state-of-the-art technology
into different materials
–
Carved Out Cube
physical, geometrical operations on primitives
–
Circular Chainsaw Blade Turning The Corner
exploring the limitations of directional non-standard tools
–
CNC Ornament
creating instant portraits through robotic ornament
–
Doublesided Milling At Once
using the third space, while limiting to the second
–
Woodcarver ABC Ornament
simple mathematical operations transformed into rich wooden ornaments
–
Wooden Vectorfield
freezing dynamic motions into static wood

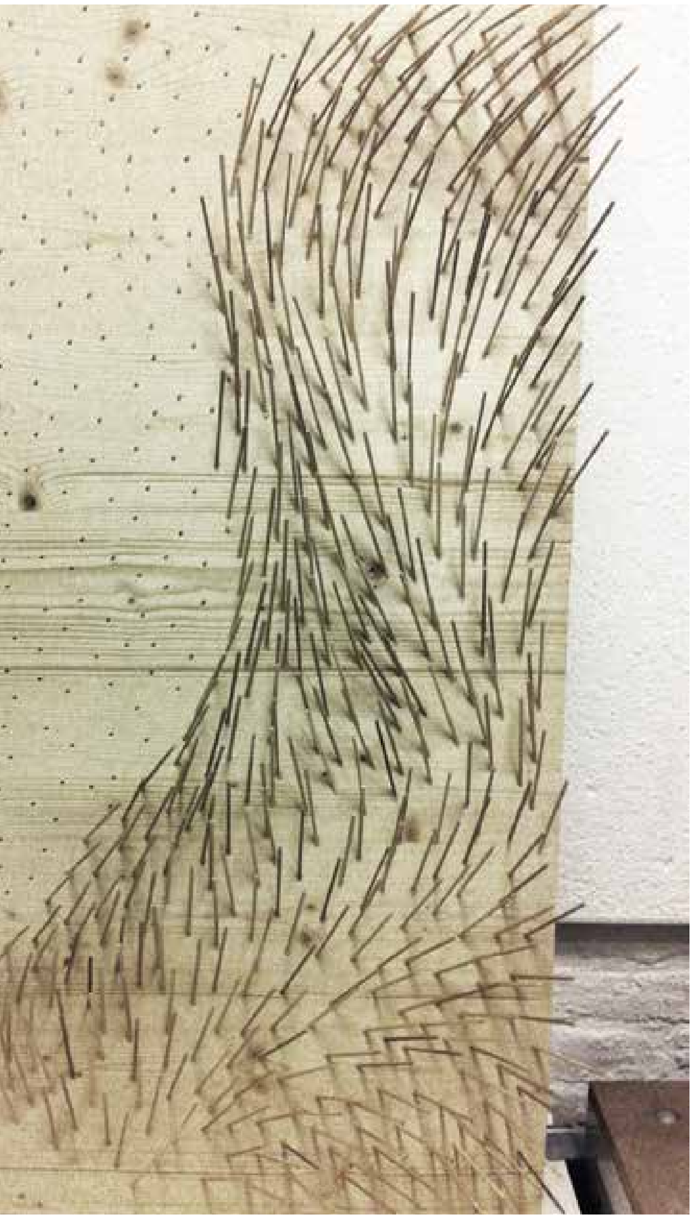
Project year: 2015 – 2017

BUST CNC REPLICA

CIRCULAR SAW BLADE



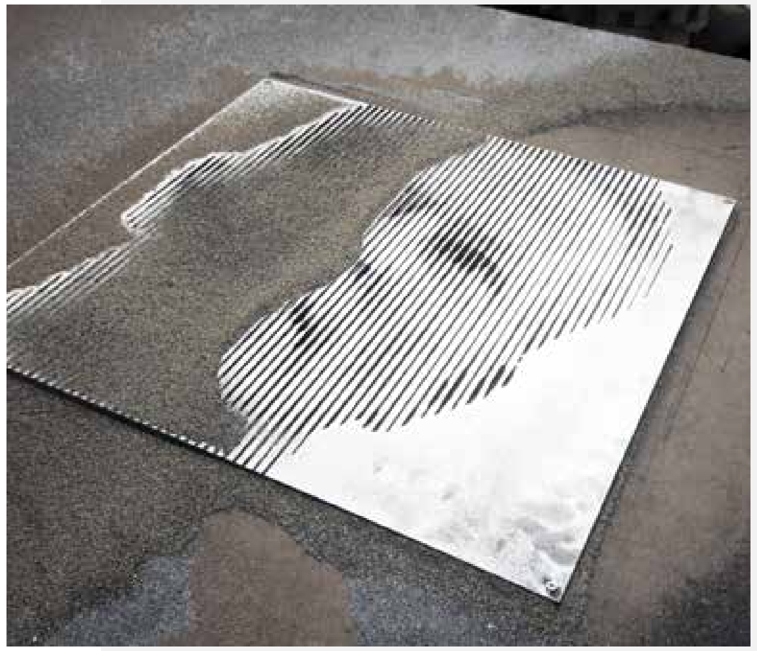
CARVED OUT CUBE



WOODEN
VECTORFIELD

DOUBLESIDED
MILLING
AT ONCE

CNC
ORNAMENT



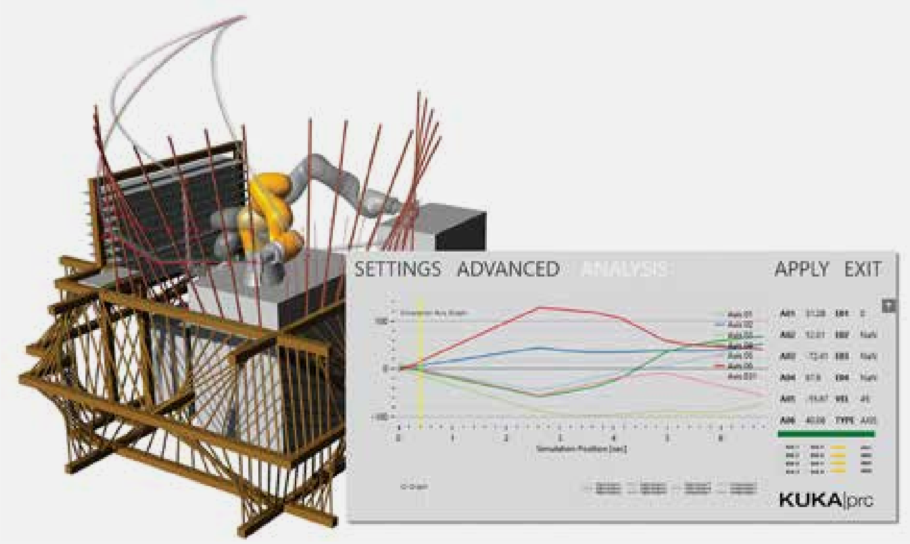
WOOD
CARVER

DIANA
SENSITIVE ASSEMBLY

DIANA, the dynamic interactive assistant for novel applications, is a robot installation developed by teams from RWTH Aachen University (Chair for Individualized Building Construction and the Cybernetic-Cluster IMA/ZLW & IfU) and Robots in Architecture as part of the KUKA Innovation Award for the Hannover Fair 2016 that showcases the challenges of using robots in the construction industry, demonstrating concepts such as mass customization and strategies towards dealing with environments with high tolerances.

It builds upon the topological structures based on ruled surfaces, that have been developed as part of the Robotic Woodcraft project. While a robot can cut very accurately, it has problems dealing with materials with high tolerances, such as wooden rods. Previously, the assembly was always done by hand, but for DIANA, for the purposes of special sensitivity, a KUKA LBR iiwa robot was employed to perform the completely new assembly processes.

Collaboration Partners: KUKA Roboter GmbH, RWTH Aachen
Credits: Robots in Architecture
Individualized Construction and Cybernetic Cluster
Exhibited at Hannover Fair 2016
Project year: 2016



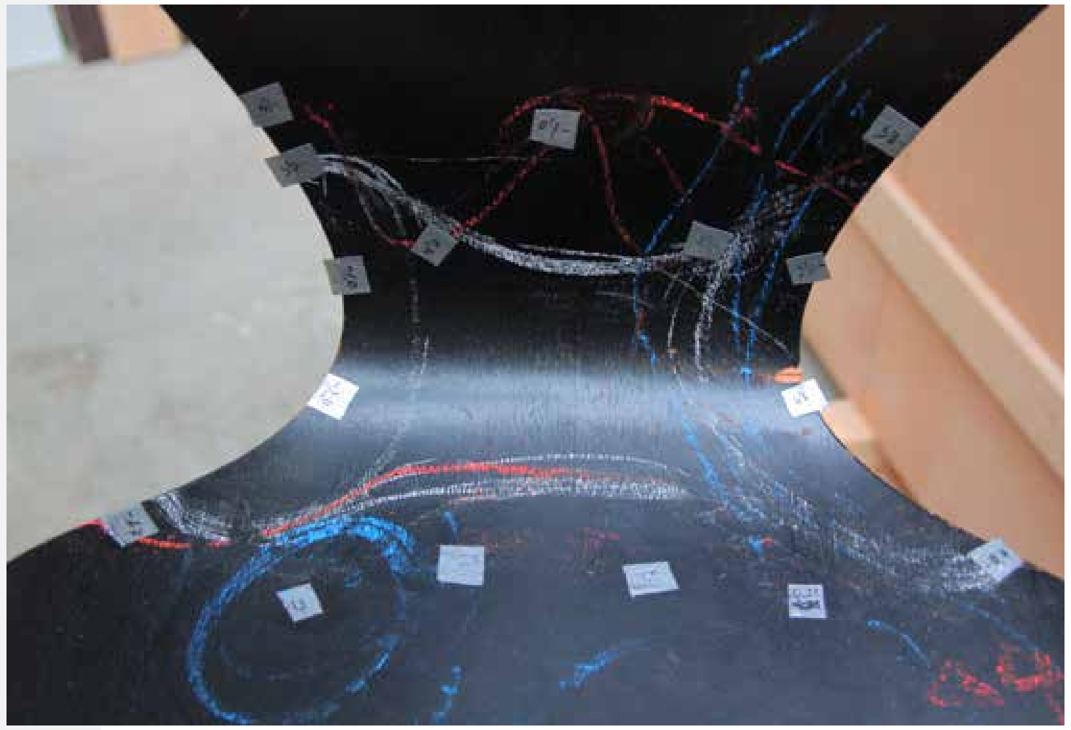
CREATING
NEW ASSEMBLY PROCESSES

Hannover Fair 2016
Dynamic and sensitive robotic processes

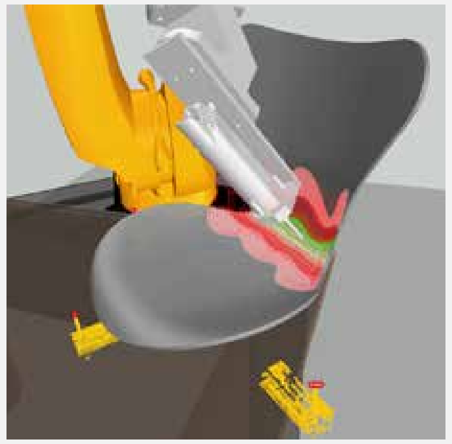
REPAIR MY SERIES 7

The ‘Series 7’ Chair by Arne Jacobsen is a modern chair design classic, but its iconicnarrow neck has a structural weakness which has led to many chairs breaking at this point. Rüdiger Suppin is an architect working at the department of industrial construction (Prof. Achammer) at Vienna UT who has developed a process for robotically repairing these chairs. This would involve first 3D-scanning the actual form followed by running a structural analysis to inform the design of an GRP-implant and the programming of the robot to then iteratively remove material with a milling tool. With sufficient material removed, the created space is filled with a carbon-fibre inlay, thus stiffening the chair and making it usable.

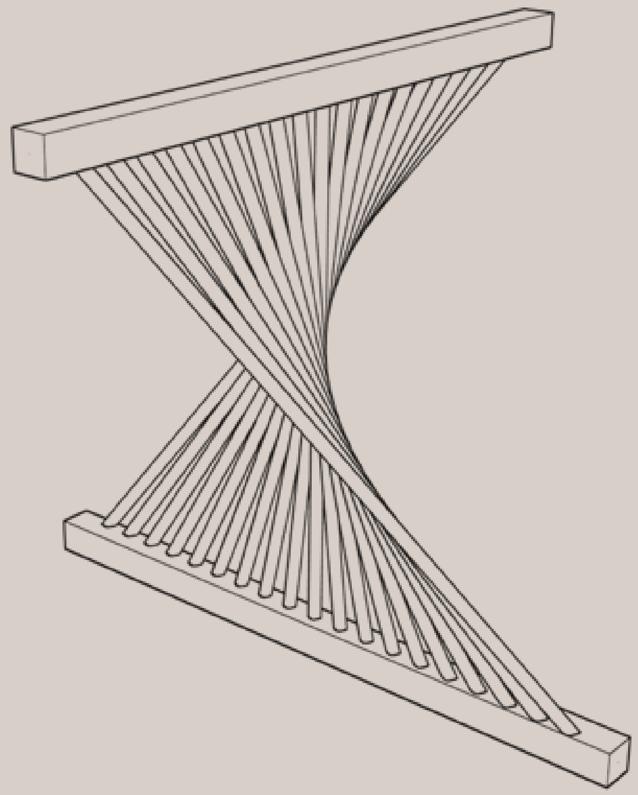
Credits: Rüdiger Suppin (Vienna UT)
Robotics: Philipp Hornung
Supporting Partner: Institute KUNST2 at UT Vienna, Rüdiger Suppin,
Department of Industrial Construction, UT Vienna, structural engineer DI Peter Bauer,
Werkraum Wien Ingenieure zt gmbh
Project year: 2015



FINDING WEAK SPOTS OF THE CHAIR‘S STRUCTURE

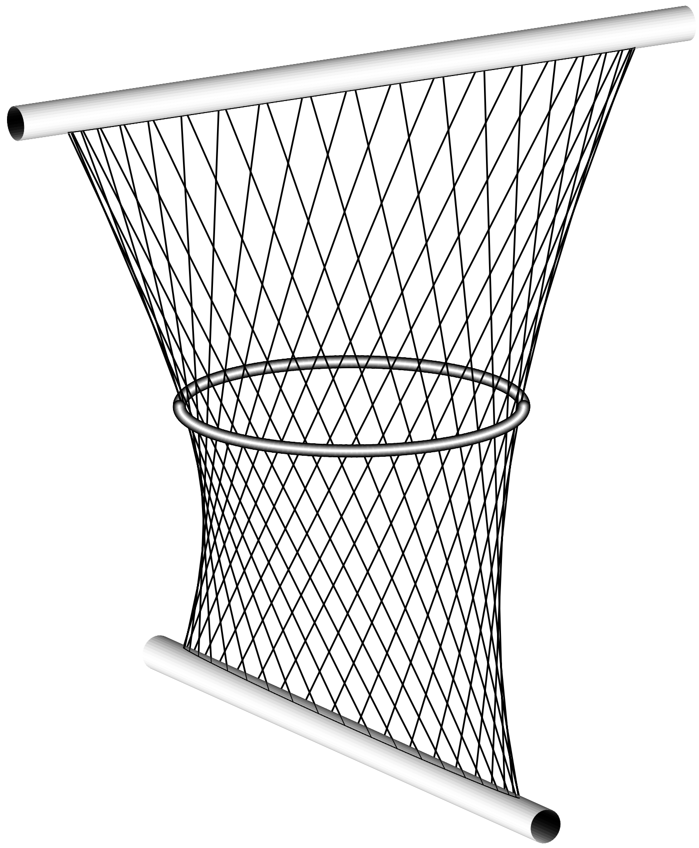


ROBOTICALLY REPAIRED CHAIR



HOW CAN WE THINK
OF NEW WAYS TO
**CREATE SURFACES
TO BRING UP
A PARAMETRIC
AESTHETIC?**

QF1



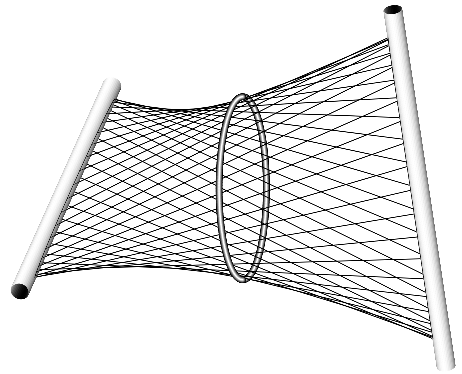
Credits: Boris Odehnal
Robotics: Georg Sampl, Sebastian Scholz
Project year: 2015

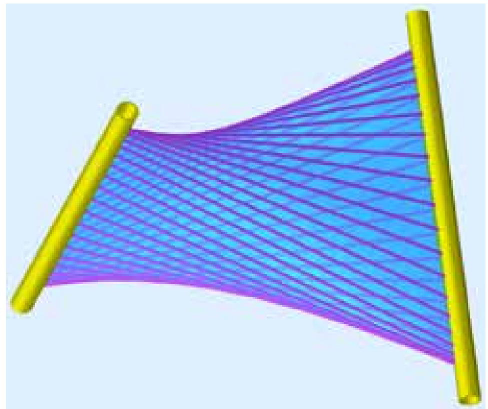
Model of a Ruled Surface

The depicted quartic ruled surface is formed by all straight lines that meet a pair of skew but orthogonal straight lines (the directrices) and a circle. Mathematically speaking, there is an equation guiding the shape of the smooth ruled surface

$$4(x^2+y^2)(z^2+1600)-(z^2-1600)^2+320(x^2-y^2)z=0.$$

Mathematical software allows the preparation of plots and 3D prints directly from the equation.





Mathematical models can be created in many different ways with various materials. In former times, models made of clay and wire were quite common.
Wooden sticks are a good choice if the generators (lines) on a ruled surface should be materialized. This results in a so-called *discrete model*, *i.e.*, only a finite number of the infinitely many lines on the surface are shown.

In practice, neither ideal geometric object can be perfectly modeled: Lines and circles have no thickness, a fact that should be taken into account when creating a model. Once the decision about material and thickness is made, the holes to be drilled can be computed and the data (coordinates of the holes with respect to the pole representing the directrix) and . . .

. . . the directions of the axis of the drill can be given directly to the robot.
The assembly of the sticks in order to obtain the model shows some difficulties that can only be resolved by the experienced artisan.

HP MODUL

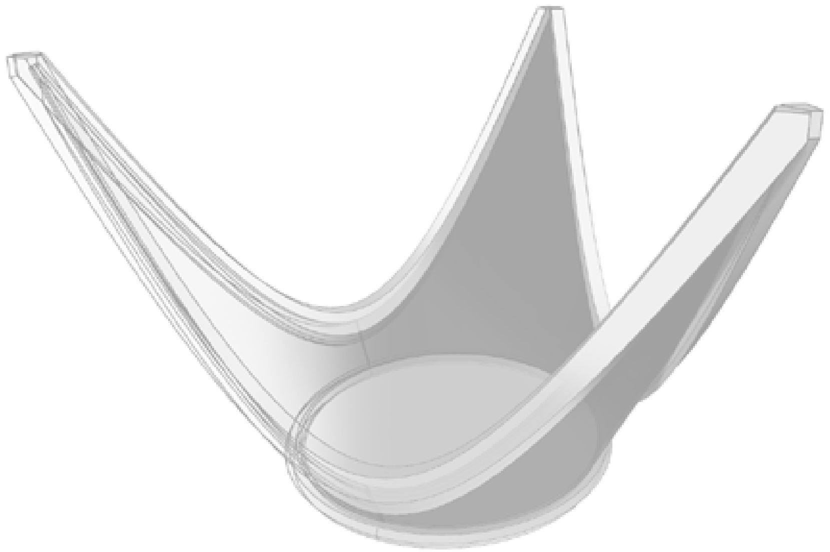
The HP-Module is the result of a collaboration with the geometers, investigating ruled surfaces with the aim of creating large-scale 3D-structures with a minimum of material. This programmed hyperbolic paraboloid surface module can be scaled to the equally distributed distances of directrixes or material thicknesses which can be altered via parametric input. Duplicating, shifting and mirroring the modules in a 3D space generates varying geometrical and static patterns. The outcome can be described as a physical sketch deriving from the amalgamation of a virtual shaping process and a physical raw material.

Credits: Georg Sampl, Sebastian Scholz
Institute for Geometry, University of Applied Arts Vienna, Austria
Project year: 2015

AZW KIT STOOL

The design incorporates know-how from architects, designers and craftsmen, and is primarily based on three differentiated elements: the frames, the hull and the deck. The hull is the bridging element between the vertical frames and the horizontal deck, consisting of active bending parts forming the geometrical shape of a cone. This spatial, inter-connective element is facilitating the force-flow from the deck a horizontal seating element all the way down through the frames into the ground. Vice versa, the frames and the deck are stiffening and supporting the otherwise open-edges of the hull. The result is a spatial, stool with a high structural efficiency (weight to structural capability). All elements were machined from different wooden composite materials using customized and optimized robotic fabrication strategies.

Credits: Philipp Hornung
Exhibited at „Kreative Robotik", Ars Electronica Center Linz
Project year: 2016/17



A GEOMETRICAL SHAPE FORMED USING ACTIVELY BENT PARTS

HOW FAR CAN WE
EXTEND THE AESTHETIC LANGUAGE
OF PARAMETRIC PRODUCTS?

TRIO

Trio is a stool that was inspired by contemporary, architectural structures. It consists of three identical pieces, whose fabrication is optimized to balance manual and mechanical labor. As the code is fully parametric, every chair can be individualized very efficiently. As an experimental workpiece, the stool aims to evaluate and demonstrate considerations of materials, dimensions, proportions and tectonics. The result is this beautiful piece of furniture, the efficient fabrication of which was only possible through the use of a robotic arm.

Credits: Lucy.D
Robotics: Philipp Hornung
Exhibited at „Kreative Robotik“, Ars Electronica Center Linz
Project year: 2017

THE NUMBER OF POLES USED REFLECT A NEED FOR STABILITY

POLES FITTED TO PRE-DRILLED ARC SUPPORTING STRUCTURE

STEP 1
PRODUCTION OF SEAT

STEP 2
PRODUCTION OF LEGS

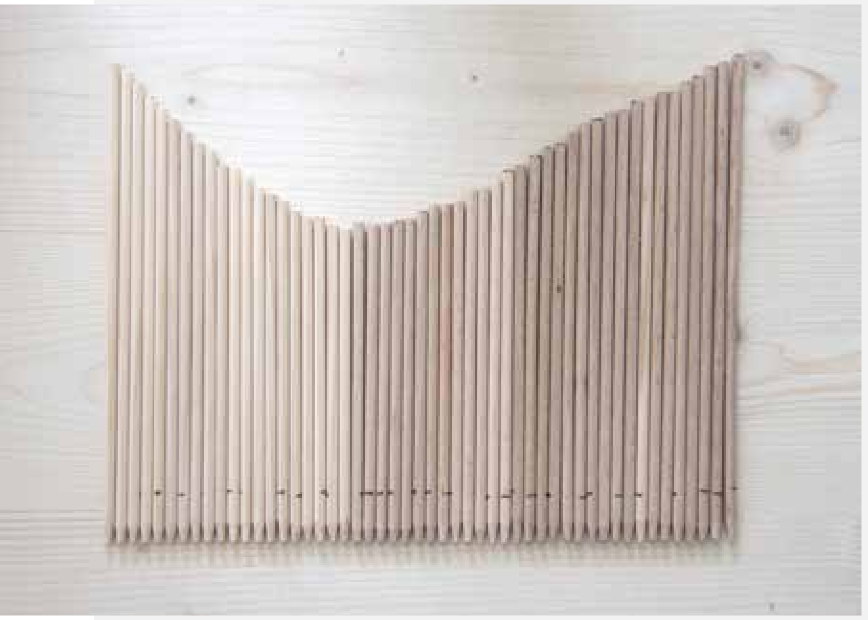
STEP 3
ASSEMBLY

FINAL STEP
TEST

PIUME

Piume is a further development of the idea of using parametric design in robotics to develop individualized furniture. Piumes are objects of light which, in their essential form, try to combine the lifeless technoid with human individuality. They address the dichotomy, which is continually making relevant the debate of the differences between man and machine.

Credits: Lucy.D
Status: in development
Project year: 2017

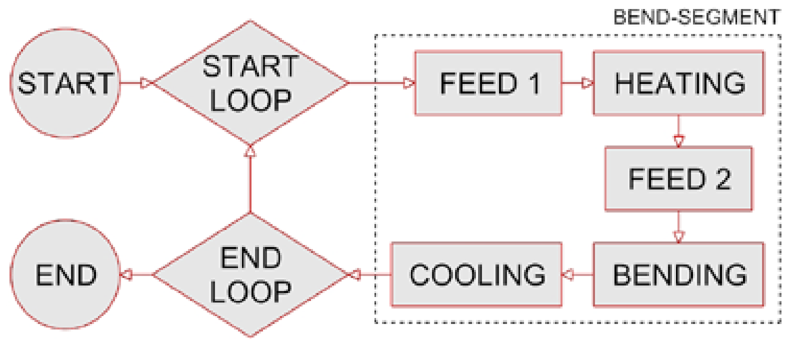


COFFEE TABLE
AAC 16 EXTENDED

Building upon a robotic production process that was initially set up for the 'Angewandte Architecture Challenge 2016' summer-school, conducted at the University of Applied Arts in Vienna, a side table with a unique table frame was developed. This object showcases a new way for fabrication that goes beyond both, current industrial, as well as manual processes. the ‚coffee table - AAC16 extended' takes plastic rods - an affordable, common industrial good - and uses the strength of a robotic arm to bend them into new shapes, without requiring a custom negative formwork. The design of the table frame is based on a continuous, 3D curved plastic spline, which describes a spatial, intertwined load-bearing knot. The free-form plastic spline was fabricated out of straight polyethylene rods utilizing a special robot-setup, based on a 6-axis KUKA robotic arm, a series of customized gripping end-effectors and an infrared heating device. The robotic plastic forming (based on a process conceptualized by 'clever contour') was fully automated and included incremental gripping, heating, free-form-bending as well as cooling of the digitally pre-described elements. The bent elements were then trimmed and detailed by robotic milling, subsequently assembled by hand and connected to a table top. The result is the 'coffee table – AAC16 extended', a table with an extraordinary appearance.

Credits: Philipp Hornung
Exhibited at „Kreative Robotik", Ars Electronica Center Linz
Project year: 2016

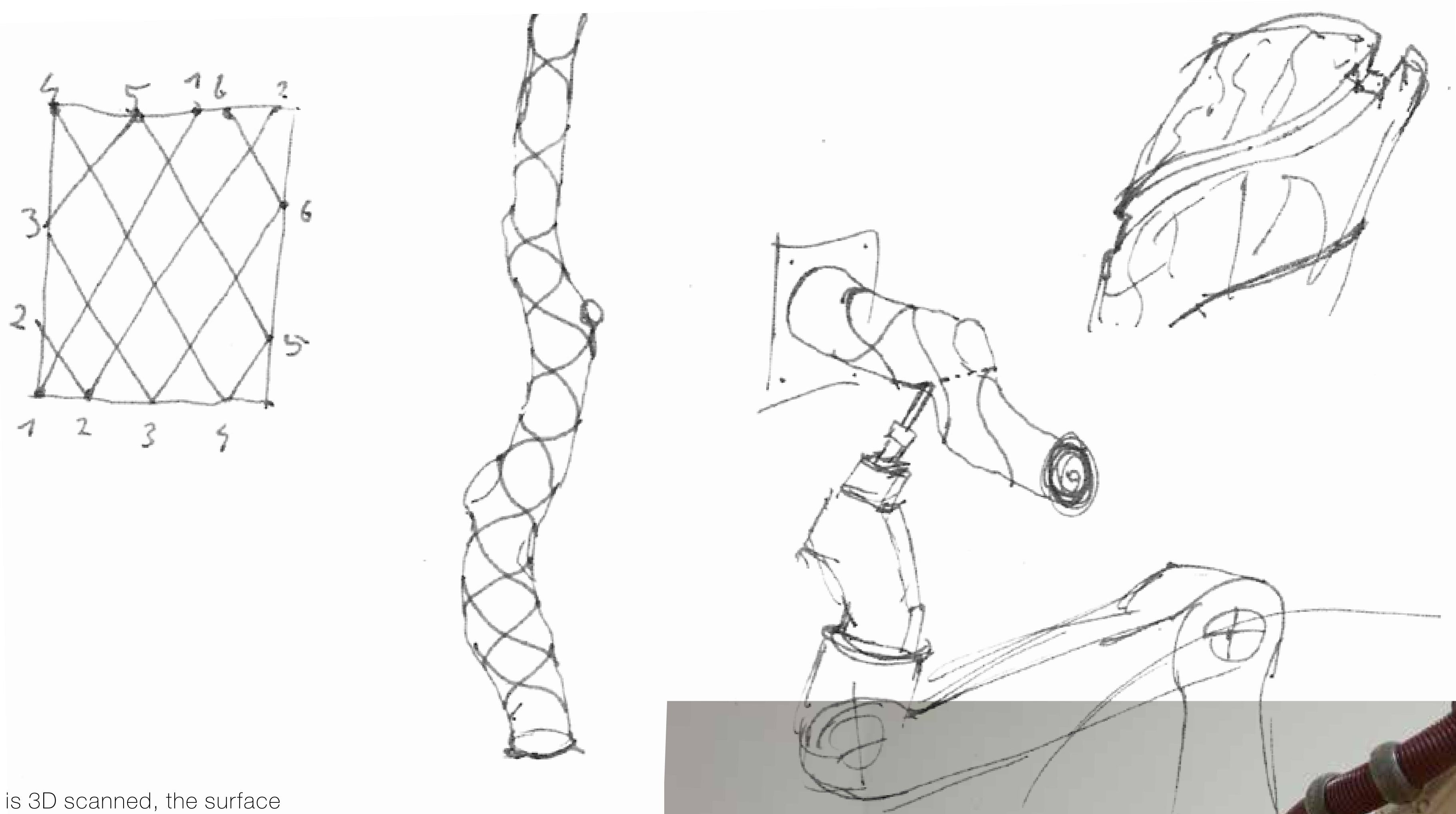
INCREMENTAL
FREE-FORM
BENDING



INCLUDED
INCREMENTAL
GRIPPING
HEATING
FREE-FORM-BENDING
& COOLING


RWC
AAC16
extended

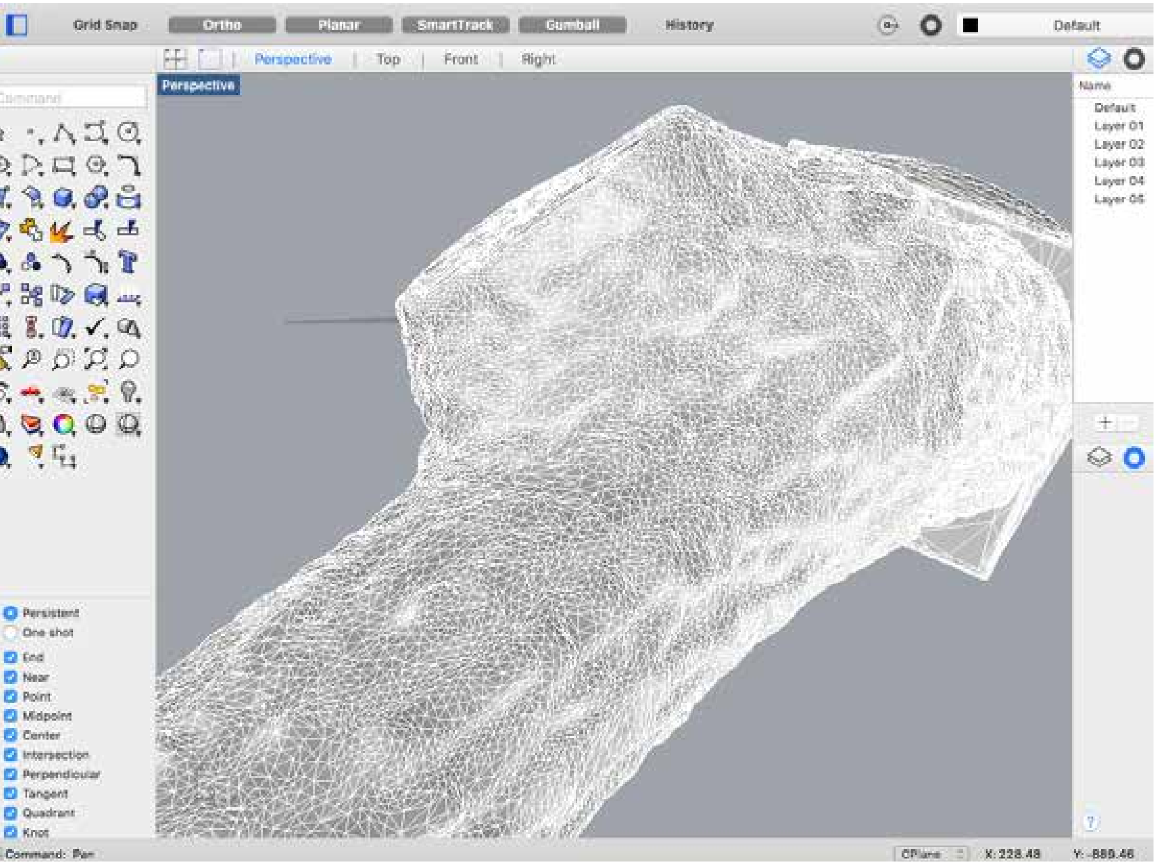
HOW CAN WE IMPLEMENT **ROBOTIC PRECISION INTO HUMAN 3D THINKING?**



BRANCH

'An apple tree always wanted to become a maypole.' The branch is 3D scanned, the surface covered with a parametric carving pattern and milled by a 6-axis robotic arm. Will future maypoles be carved using robotic arms? Will their shape, if 3D scanning makes it possible, escape the cylindrical urge upwards and evolve in all directions?
In a trans-disciplinary process, the branch was 3D scanned with the infrared scanner from the Geometry department of the University of Applied Arts. Together with experts from the Digital Art department, the 3D scan was produced retrospectively before our grasshopper coding on its surface could start. With a traditional maypole carving as inspiration, the parametric patterns were programmed. Applying the craft skills of the wood technicians in our team, we were able to mill the first branches. More will follow.

Credits: Emanuel Gollob
Project year: 2017


Grid Snap
Ortho
Planar
SmartTrack
Gumball
History
Default
Perspective
Top
Front
Right
Perspective
Name
Default
Layer 01
Layer 02
Layer 03
Layer 04
Layer 05
Persistent
One shot
End
Near
Point
Midpoint
Center
Intersection
Perpendicular
Tangent
Quadrant
Knot
Command: Pan
CPlane
X: 228.48
Y: -889.46

ROBOTIC MASS CUSTOMIZATION

Becker Brakel is a manufacturer of moulded wood and has worked with the department of wood technology for several years. In this project, the idea was to turn an industrially mass-produced material into a customized object using a KUKA robotic arm. Thus, Becker provided us with a range of raw moulded wood forms, which are usually turned into chairs. Using a 3D scanner, we digitized the form and loaded it into our 3D drawing environment, where we programmed the robot to cut and engrave the wooden forms. This was done as part of a two-day workshop with students from several disciplines at the University of Applied Arts.

Collaboration Partner: Becker Brakel GmbH
Credits: Department of Wood Technology , Robots in Architecture, Philipp Hornung
Robotic Mass Customization Workshop 2016, University of Applied Arts Vienna, Austria
Project year: 2016

CUT & ENGRAVE
3D SCANNED WOODEN FORMS

CAN WE CONNECT **INDIVIDUALITY** WITH **SERIALITY** YET **REMAIN EFFICIENT?**

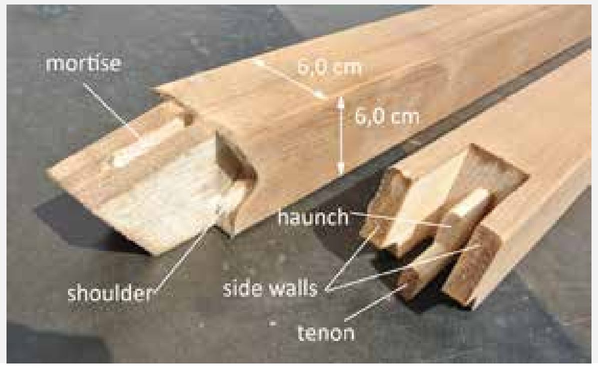
ADDITION OF **INDIVIDUALISED WOOD JOINTS**

The aim was to design a pavilion from wood for the exhibition “Think Global, Build Social” at the AzW “Architekturzentrum Wien”. Similar to the nearby “Enzis”, the pavilion was to simultaneously act as a multifunctional furniture piece and a sculptural element.

The dynamic appearance and multi functionality of the object stems from just four, differently shaped frames (referred to as frame, table, bench and lounger), which are strung together in a single row. The frames were shaped out of individual beams, which were assembled on-site. Thus, the concept allows for many variations through a recombination of the differently shaped frames, so that the final geometry of the pavilion can be changed even as late as during its assembly. The pavilion was designed with this new concept of modularity, manufactured automatically with a 6-axis robotic arm. New CAD/CAM interfaces, linking design directly with fabrication, enabled the serial production of 450 individual slab joints with 14 different connection angles.

As was initially intended, glue was not used in the joining of the beams. The precise manufacturing and unique shape of the joint ensured the required moment resistance of the frames. The pavilion was exhibited in the Courtyard of MQ from June-September 2014 during the exhibition “Think Global, Build Social”.

Design: Evelyn Hochegger
Project Management & Implementation: Barış Çokcan and Prof. Wolfgang Winter
Project Partner: University of Technology - Department of Architectural Sciences Structural Design and Timber Engineering, Robots in Architecture and AzW (Architekturzentrum Wien)
Robotic: Robotics in Architecture
Project year: 2014



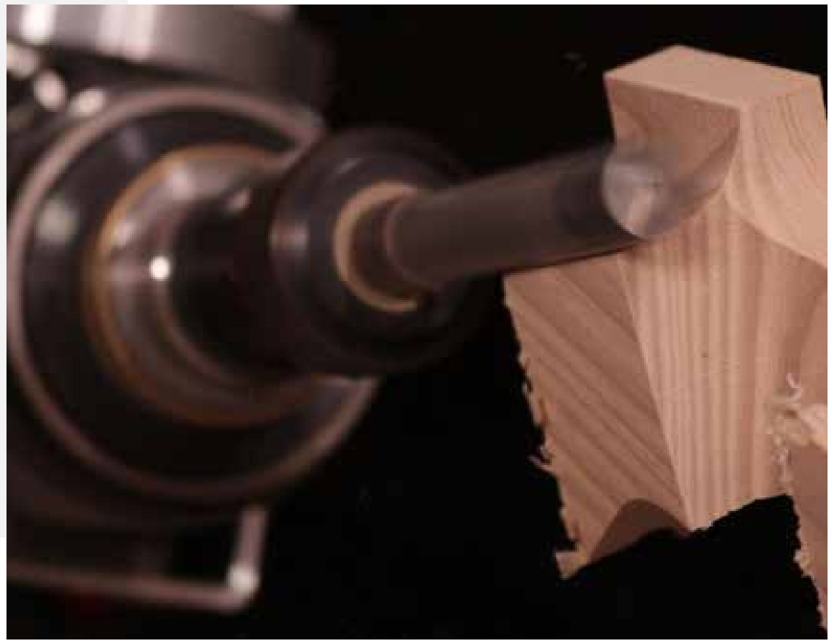
LOUNGE CHAIR FRAME **TRANS**

This project evolved concurrently with the work on an essay describing Eileen Gray's architecture. The typology is oriented on the specific term "style camping" coined by Gray in 1927, when she built her first house E 1027 including the functional furniture in Roquebrune-Cap-Martin. The joints and parts of this furniture frame were milled multilateral with a "KUKA KR 90 270 R2500" robot, and glued together manually.

Credits: Georg Sampl
Exhibited at „Kreative Robotik", Ars Electronica Center Linz
Project year: 2017

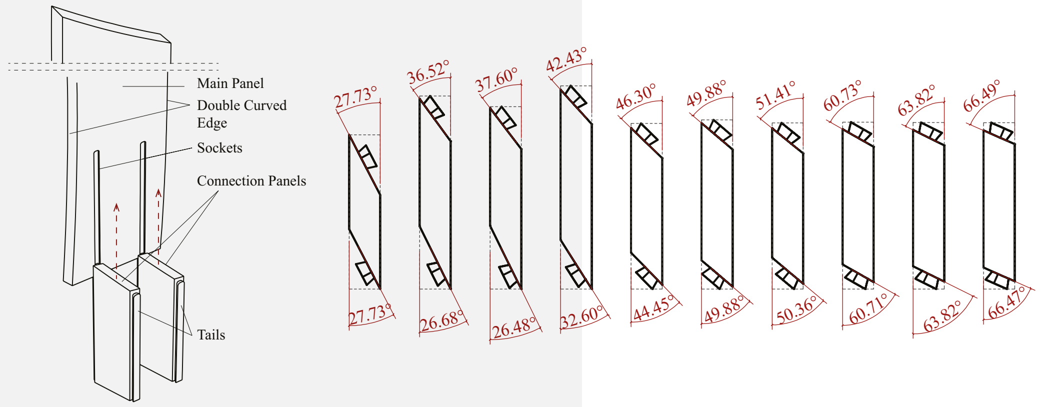
THE SOLID WOODEN PARTS WERE JOINED TOGETHER TO FORM A FLUENT INTERSECTION

THE INDIVIDUAL PARTS ARE JOINED USING GLUE



Kreative Robotik", Ars Electronica Center, Linz 2016

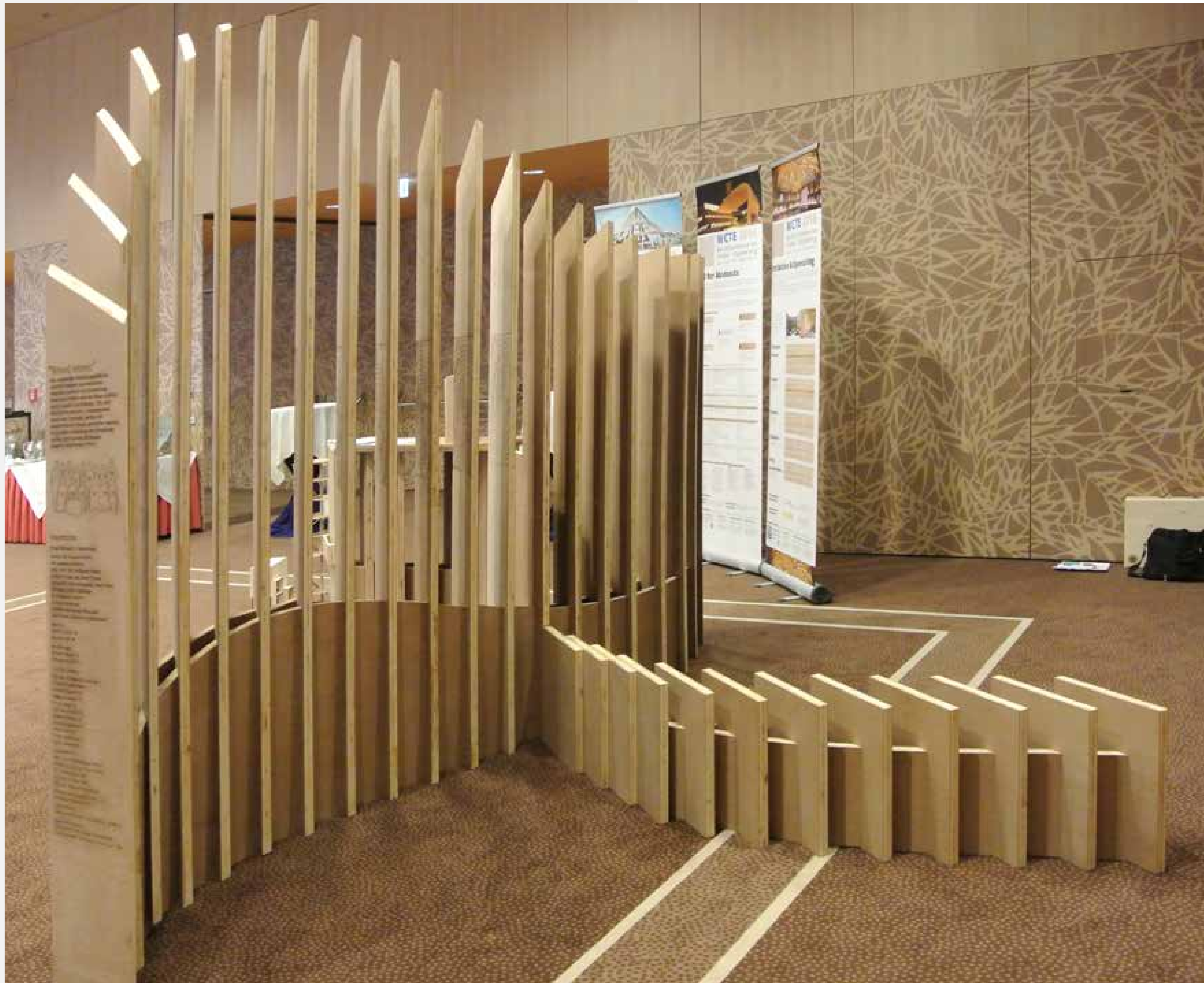
WOODWAVES
INFO-POINT FOR WCTE



The aim was to design an Info-Point for the World Conference on Timber Engineering, which, while acting as a recognizable landmark, was also to provide information to attendees. The design of the object should emphasize the innovation and high performance of wood-based constructions, while the temporary nature of the event required quick assembly and disassembly, the reusability of elements and versatile usage of space.

The project “WoodWaves” was designed with this new concept of modularity. The process utilizes a robotically operated milling cutter which from a spruce blockboard sheet constructs a multifunctional information point. The structure of the entire object is held together only with sliding dovetail joints. Parametric design methods were developed to automatically adjust each joint to fit the individual conditions. New CAD/CAM interfaces, linking design directly with fabrication, enabled the serial production of 108 different shaped elements with a 6-axis robotic arm.

Design: Ana Jugovic & Meliha Honic
Project Management & Implementation: Barış Çokcan and Prof. Wolfgang Winter
Project Partner: University of Technology - Department of Architectural Sciences Structural Design and Timber Engineering, Robots in Architecture and Department for Wood Technology, University of Applied Arts, Vienna
Robotic: Robotics in Architecture, Philipp Hornung
Project year: 2016



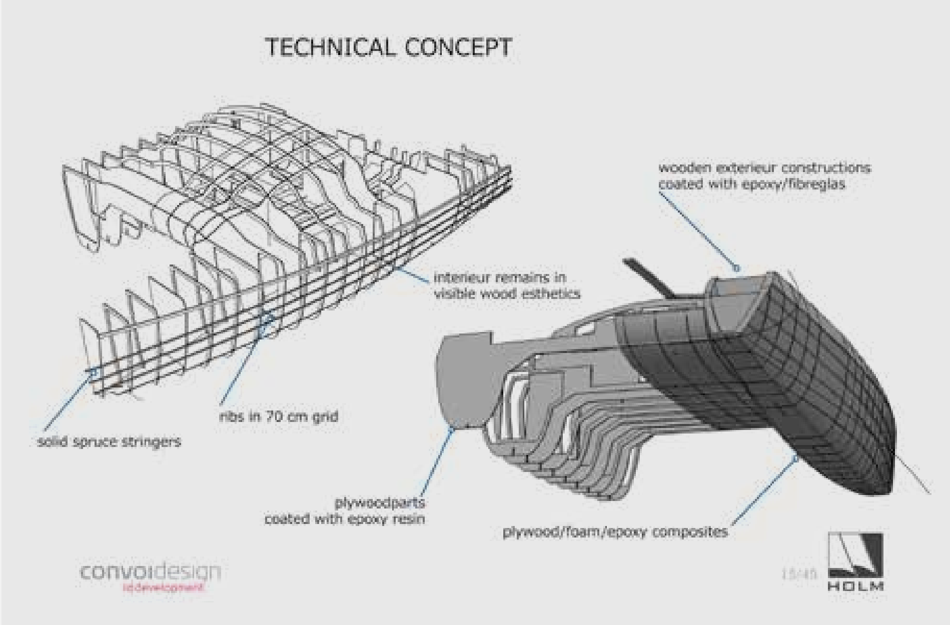
KATAMARAN
HOLM

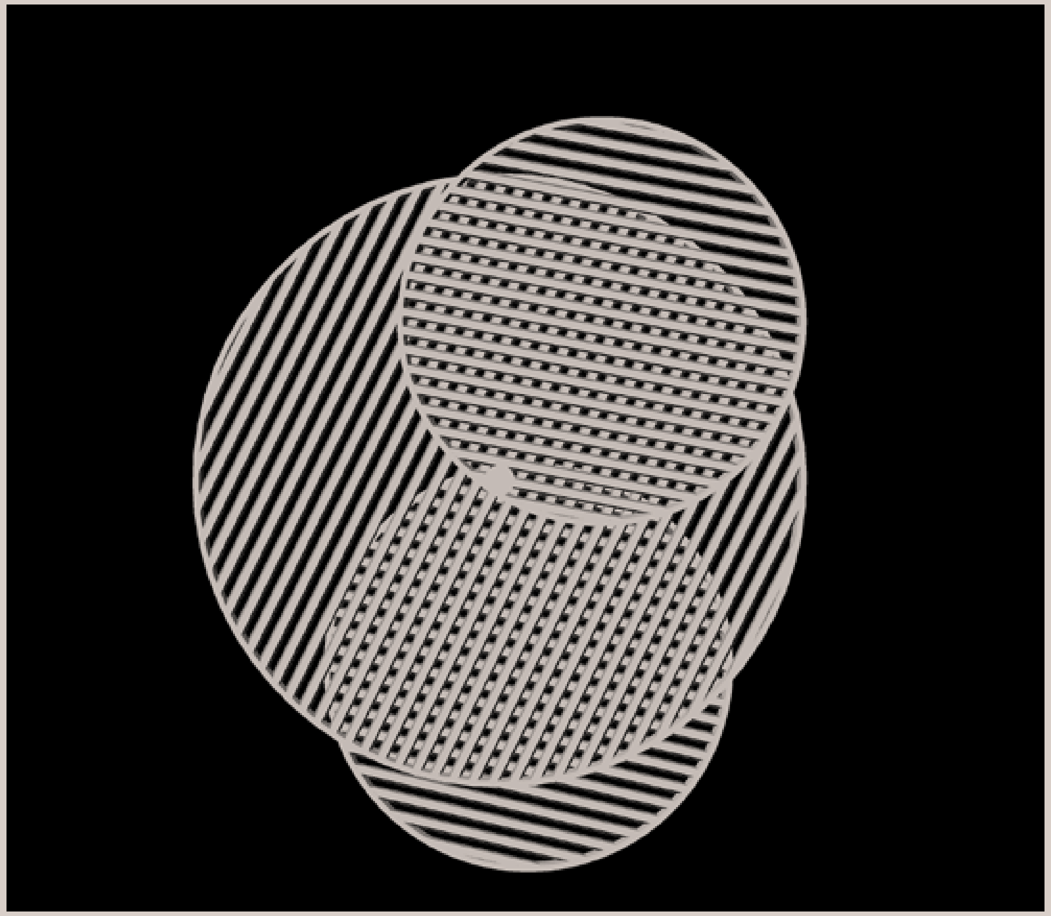
HOLM – the Scandinavian cruising catamaran is a ship design and construction principle developed by the Vienna based designer Peter Spitaler. The primary structure of the yacht is based on wooden frames and stringers machined by 5-axis subtractive milling. Team members of Project Robotic Woodcraft were asked to collaborate. Research strategies for a digital interface between the designers' planning software and the robotic fabrication process were constructed. As a case study, a small full scale section of the yacht was created, by applying custom developed digital tools, and was fabricated using the robotic arm.

Credits: Convoi Design, Peter Spitaler
Robotics: Philipp Hornung
Project year: 2016

5-AXIS
MILLING IN THE RWC-LAB

OVERVIEW OF HOLM‘S CONSTRUCTION PRINCIPLE



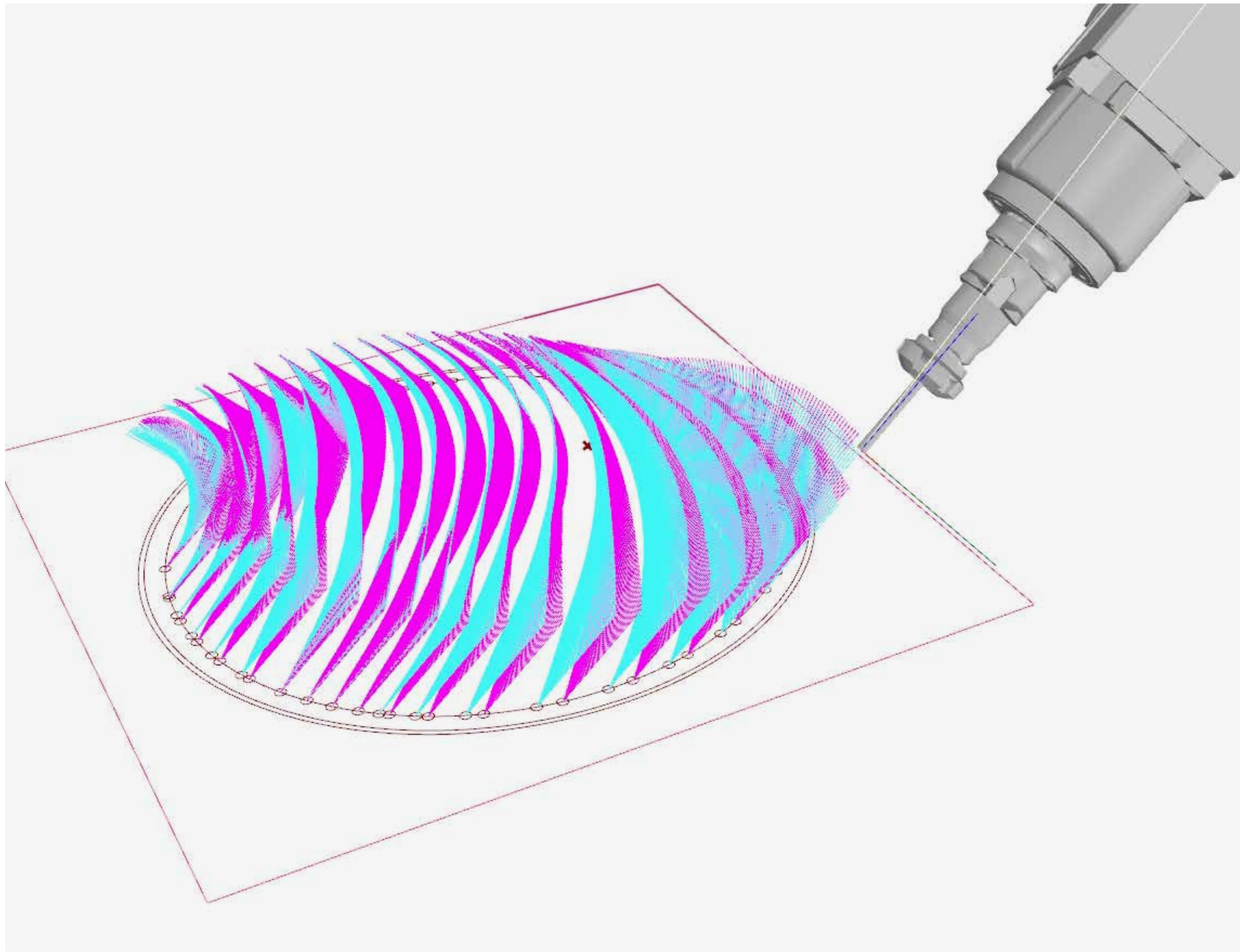


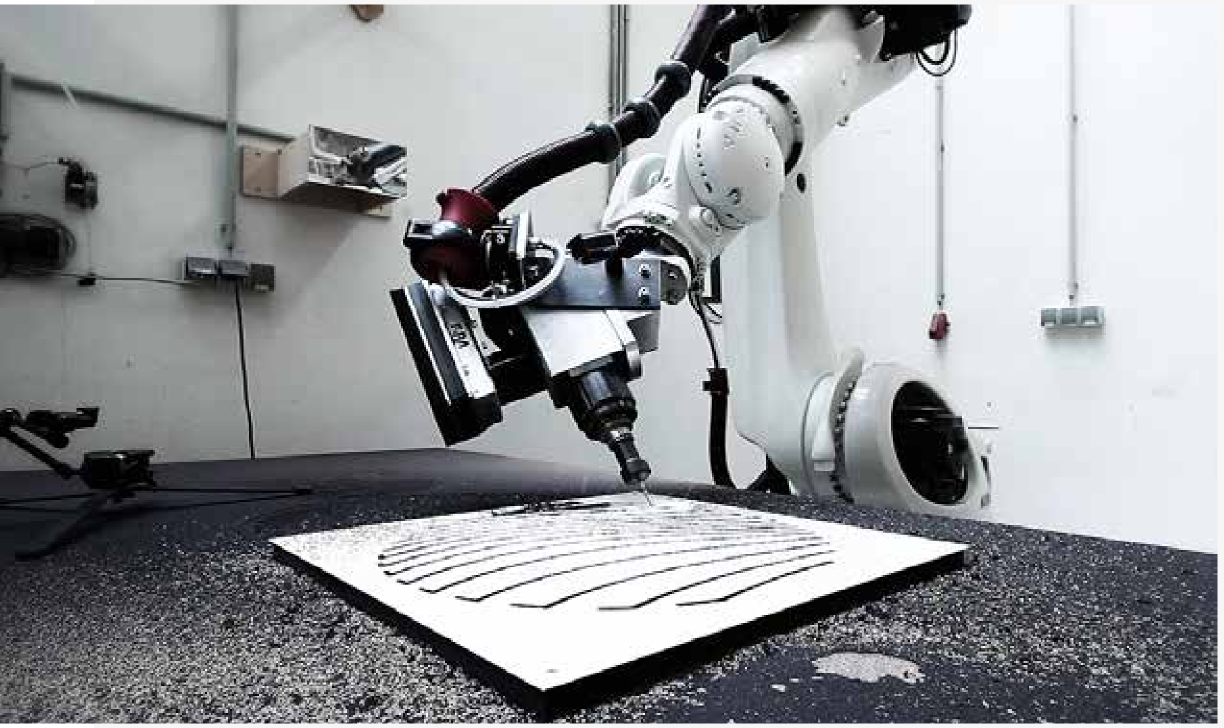
CAN WE EVOLVE A
**SIMPLE FORM TO
A NEW DYNAMIC
STRUCTURE?**

RADO STAR PRIZE INSTALLATION **MY TIME**

We addressed the question whether it was possible for a subjective sense of time to manifest within an object. “My time” consists of a wave-like, structured wooden disk, rotating around its own axis while mounted on a delicate structure, a bit like a grandfather clock. The disk model was milled by a six axled industrial robot and crafted in the course of a research project on Robotic Woodcraft at the University of Applied Arts, Vienna.

Credits: Lucy.D
Robotics: Philipp Hornung
Rado Star Prize 2015, exhibited at Rado Flagship Store, Kärnter Strasse 18, 1010 Wien
Project year: 2015





STRETCHING AND COMPRESSING

PERSONAL TIME PERCEPTION

MAZZOCCHIO EXTENDED

Roman Pfeffer, a Vienna based artist manipulates forms, to change their internal order and to set aside related viewing habits to question those forms. For MAZZOCCHIO EXTENDED, he deconstructed a 17.5 metre long Olympic sports rowing boat by segmenting it into 16 individual parts and re-configuring it into a spatial spiralling sculpture. For a solo exhibition, we teamed up with the artist to explore the creative possibilities of robotics within the context of his work. Robotic Woodcraft realized a series of small scale prototypes in M1:20 and M1:10, a piece of art in the shape of a wooden boat, which he later manipulated and finished manually.

Credits: Roman Pfeffer
Robotics: Philipp Hornung
Exhibited: MQ Art Box, Museumsquartier Vienna
Project year: 2015

Modell-Scale: 1:20 / 1:10

DECONSTRUCTION

17,5 METRE LONG
OLYMPIC SPORTS
ROWING BOAT

CREDITS / IMPRINT

In addition to all those who contributed their professional skills, we also want to send a warm „thank you" to our friends and families for their love and support.

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The core team consists of the University for Applied Arts Vienna, in particular the Department of Geometry and Mathematics and the Department of Wood Technology, the design studio Lucy.D and the Association for Robots in Architecture.

Academic partners:

Industry Partners:

Artists & Researchers:

Roman Pfeffer / Rüdiger Suppin / Peter Spitaler

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