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Digital and Non-Human Processes Rule at MAD

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If you think digital art is just 3-D printing and computer-driven technologies, visit *Out of Hand, Materializing the Postdigital* (through June 1, 2014 at MAD) or read its 300-page catalog loaded with 120 works by 85 artists from 20 countries.[i] Museum of Arts and Design Marcia Docter Curator Ronald T. Labaco has organized a talent pool of artists, designers, and architects. The featured art created since 2005 is conceptually structured around six themes:

- *Modeling Nature* uses biology and ecology as point of departure for art;
- *New Geometries* explores how math formulae may create 3-D forms;
- *Rebooting Revivals* is computer-assisted versions of historical works and styles;
- *Remixing the Figure* is digital manipulation of the body;
- *Pattern as Structure* combines data and sensory elements to immerse viewers in the space;
- *Processuality* documents the limitless possibilities and technologies of acts of making.

Before we plunge into the mechanics and materials in this wide-ranging exhibition, cautionary notes:

1. *Out of Hand* suggests both a cornucopia and a Pandora's box of possibilities. Users beware!
2. With a talent pool that includes Barry X Ball, Bespoke Innovations, Wim Delvoye, Richard Dupont, Zaha Hadid, Anish Kapoor, Joris Laarman, Daniel Libeskind, Maya Lin, Greg Lynn, Lucas Maassen, Jürgen Mayer-Hermann, Achim Menges, Marc Newson, Nike, Alan McCollum, Roxy Paine, Frank Stella, Hiroshi Sugimoto, and Unfold, this report can cover only a few examples of the techno-wizardry these and other artists incorporate.

3. Many art works use one or more of the following:
 1. 3D modeling or scanning: a digital process of making a new 3D object or copying an existing 3D object.
 2. CAD design: computer aided design is software especially created to produce 3D art.
 3. CNC milling, laser or lathe cutting: Computer numerical machining refers to machines and tools that operate following CAD programs.
 4. Digital weaving and knitting.
 5. The *Out of Hand* catalog glossary is a useful starting place for more technical terms.



<http://iscbookreviews.files.wordpress.com/2014/04/hyphae-pendant-lamps.gif>

Hyphae Pendant Lamps, 2013. Image dimensions: 1200px x 1600px Nervous System. Courtesy of Nervous System. Photo: Jessica Rosenkrantz

Modeling Nature:

The sixteen artists/ art groups in *Modeling Nature* mimic biomorphic structures “ranging from microscopic unicellular organisms to the macroscopic environment” using automated planning systems to create forms that simulate earth, water, the nervous system, and objects from cutlery to columns. Michael Hansmeyer’s *The Subdivided Column*, 2010 (106 5/16” tall) is an incredibly complex structure with graceful swirling and looping patterns. According to the artist, its algorithm “consists of rules that iteratively articulate and refine the structure” ...by... “recursively splitting and growing, much in analogy to morphologic genesis in nature” (p. 22). The form is composed of 2700 sheets of 1 mm. coated grey board and is processed with CNC (computer numerical control) laser cutting. In the catalog but not in the exhibition, Ordinary Ltd., a London-based design studio, has created *Dune*, an architectural speculation that aims to solidify sand dunes into buildings through the “microbial

lithification of sand dunes in the Sahara Desert” (p. 45). The idea is to use a bacteria to create a pan-African city. The Nervous System design group fabricates circular and other lighting elements whose surfaces mimic how veins form in leaves. Their *Hyphae Lamps* incorporate 3-D printing. Data mapping, symmetry or asymmetry, and tiling are also used in this and other categories.

New Geometries:

The *New Geometries* concepts include scientific terminology “such as fractal, space truss, hexagonal tiling, crystallography, and Voronoi diagram” (p. 73). Fourteen artists range from Shane Kohatsu’s *Nike Vapor Laser* Talon shoes made using the 3D printing process of SLS (selective laser sintering) to the *ICD/ITKE Research Pavilion*, 2011 at the University of Stuttgart by Achim Menges and Jan Knippers. Their bionic structure, built of thin sheets of plywood using CNC laser cutting, is modeled after the plate skeleton morphology of the sand dollar to create a lightweight shells with five to seven-sides that curve and fit together. Frank Stella’s *K 162*, 2011 is an epoxy resin structure (22 x 22 x 24”) with an array of interlocking forms; it is created by scanning a model, manipulating the scan, 3D printing, and painting. Marc Newson’s *Random Pak Chair*, 2006 is seamless fabricated nickel created by “growing” the metal on a 3D-printed surrogate form – “making an inorganic material behave organically” (p. 104). To produce one chair with a honeycomb structure, the algorithms to grow the desired objects are developed through a long digital process; then many machines work for over 1500 hours, followed by hand finishing. Hiroshi Sugimoto’s *Mathematical Model 009: Surface of revolution with constant negative curvature*, 2006 is an aluminum and glass sculpture rising point 76” high. Sugimoto based his idea for recreating a mathematical model on a broken 19th century plaster model made in Germany. His model’s vertically drawn-out rising peak, whose tip extends to infinity, measures 1mm. across its tip.

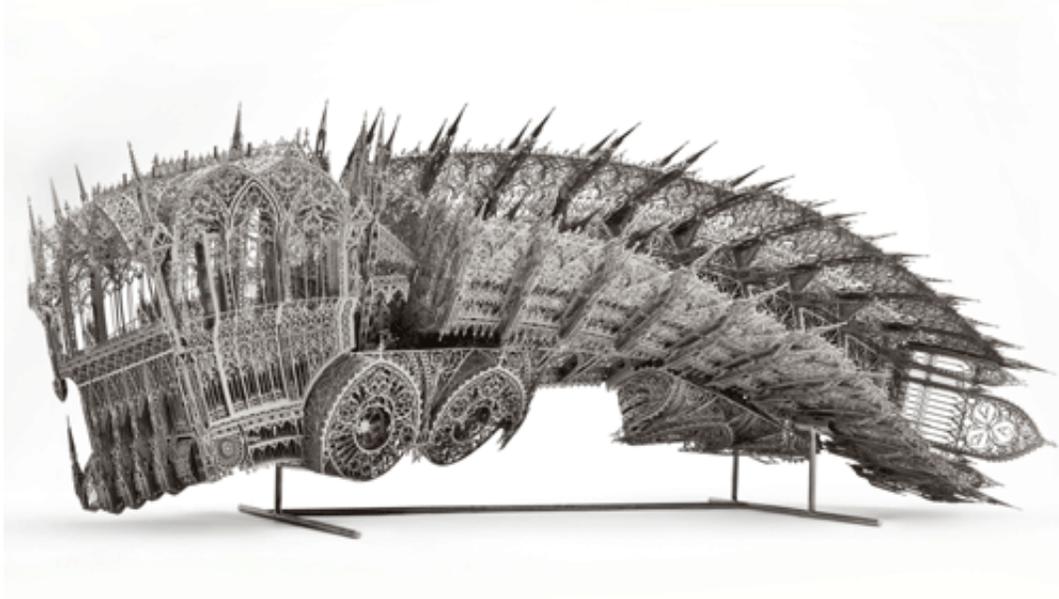


<http://iscbookreviews.files.wordpress.com/2014/04/nike-vapor.gif>

Nike Vapor Laser Talon, 2013. Image dimensions: 7831px x 5627px. Shane Kohatsu. Synthetic thermoplastic polyurethane textile upper, cubic dipped and painted nylon plate; laser sintering. Courtesy of Nike. Photo: Nike

Rebooting Revivals:

Revivals refers to scanning historic or decorative art from any period; artists often add contemporary modifications or alterations. Wim Delvoye's Gothic *Twisted Dump Truck*, 2011 (approx. 28 x 79 x 32") is laser-cut nickel-plated steel. The lace-like intricate Gothic architectural details somehow also form a twisting toy train on wheels.



<http://iscbookreviews.files.wordpress.com/2014/04/dump-truck.gif>

Twisted Dump Truck, (Counterclockwise, Scale model 1:5) (2011). Image dimensions: 4074px x 3056px Wim Delvoye Nickel-plated lasercut steel. Courtesy of Patricia Low Contemporary, Gstaad/St. Moritz. Photo: Studio Wim Delvoye

Julian Mayor's plywood *Clone Chair*, 2005, is a digital version of a CNC milled Queen Anne chair from the Metropolitan Museum. Rather than being hand-carved and refined, it looks like a digital product. Ron Arad's *Oh Void 1*, 2006 is an acrylic double loop limited edition chair. Making this glowing red and black form involved CNC, RP (rapid prototype), and CAD materials. Nendo's tiny Lacquered *Paper-Objects*, 2012 employ 3D-printed paper and *unrushu* lacquer; his perfect, beautiful boxes and containers seem to have a wood grain finish. Commencing with 3D digital scans of historical sculptures, Barry X Ball comprehensively re-imagines the works he appropriates. For his *Envy*, Ball has realized in translucent Golden Honeycomb Calcite the Baroque allegorical bust, *La Invidia*, by Giusto le Court. Employing digital modeling, CNC milling, and months of painstaking

hand work, he effects a complete transformation. With details more organic and sensuous than the Venetian original, Ball's sculptures are mysterious and new. Here is a link to a video of Barry X Ball talking about making his work for *Out of Hand*:



MAD's artists who use *Pattern as Structure* measure things including sound waves, light waves, and light reflections (see my "In the Studio" feature on Stephen Schaum), such as Lucas Maassen and Unfold, who have created *Brain Wave Sofa*, 2010 with Polyurethane foam, felt, wood, and CNC milling. Large scale digital knitting and robotic filament winding are other processes.



<http://iscbookreviews.files.wordpress.com/2014/04/lady-belhaven.gif>

Bust of Lady Belhaven (after Samuel Joseph), 2011. Image dimensions: 3071px x 3826px Stephen Jones, Epoxy resin, nylon; stereolithography, laser sintering. Made by .MGX by Materialise. Museum of Arts and Design purchase with funds provided by Alan and Marcia Docter. Photo: Kent Pell, Courtesy of Phillips de Pury and Company

Barry X Ball is also included in another category, *Remixing the Figure*. His 24-carat mirror-polished gold version of Boccioni's 1913 Futurist plaster work *Unique Forms of Continuity in Space* is a 21 x 16 3/8 x 7" work produced by digital scanning of the original, extensive alterations, and "flipping" the form so that the Ball version is a mirror image in terms of alignment with the original. The "resculpted, hyper-refined edges and surfaces" (p.221) give it its new title: *Perfect Forms*, 2010-2013. In this category, Stephen Jones's *Bust of Lady Belhaven (after Samuel Joseph)*, 2011 (Epoxy resin, nylon, stereolithography, laser sintering, 36 1/4 x 22 x 10 1/4") To a traditional 19th century bust, Jones has added symbols and images that float above Lady Belhaven's head to show her interests in design, music, and millinery. In the world of fashion, Michael Schmidt with Francis Bitonti has created a *Fully Articulated 3D Printed Dress* (worn by Dita von Teese), 2013. Using Maya and Rhino software, the designers created a design exclusively to fit von Teese's body, encoded and printed 17 pieces at Shapeways, a commercial technology business, then the pieces were handsewn and studded with Swarovski crystals.

Processuality, the final category in this exhibition, includes interactive media and audience participation. Dr. Behrokh Khoshnevis, at the University of Southern California, has created a robotic *Contour Crafting* machine to design and build housing for the poor. The idea is that robots can, layer by layer, build both outer structures and later add tiling, plumbing, electricity, windows, etc. Other works in this category include art made in response to the environment and machines that automatically produce unique art.

Outside the Museum, two large-scale sculptures — a fifteen-foot-high digitally scanned mask of artist Richard Dupont's face, and a towering abstraction of wrestling figures created through digital milling techniques by Michael Rees — introduce the exhibition. The Museum's second floor has 3D printers, modeling software, and computer monitors that visitors may experiment. Additionally, there are videos, works with interactive components, and designers-in-residence.

David McFadden, MAD's William and Mildred Lasdon Chief Curator, has noted, "The works in *Out of Hand* expand audience understanding of the ways artists and designers from around the world are utilizing these new technologies to extend their artistic practice, revealing how these innovations are also transforming practices in manufacturing, healthcare, and other fields not readily associated with the contemporary art world. By examining these trends through the lens of artistic expression, MAD is opening up a dialogue on the significance of digital technologies to our larger culture and global society."

By [Jan Garden Castro \(http://blog.sculpture.org/jan-garden-castro/\)](http://blog.sculpture.org/jan-garden-castro/)

[i] *Out of Hand Materializing the Postdigital*. Edited by Ronald T. Labaco (London, UK: Black Dog, 2013)