



THE SIXTH ELEMENT



UNVEILING THE NATURAL BEAUTY
OF 3D PRINTING

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OF 3D PRINTING



Objet1000™

Objet1000 – the world's largest multi-material 3D printer – capable of 3D printing 1:1 scale parts combining rigid and soft materials, all in a single build.



Objet500 Connex3™

Objet500 Connex3 color, multi-material 3D production system produces complex parts with virtually unlimited combinations of rigid, flexible, transparent and color materials – all in a single print run, requiring no assembly.



**THE SIXTH ELEMENT:
UNVEILING THE NATURAL BEAUTY
OF 3D PRINTING**

November 2014

Materials and techniques

Digital Materials, using triple-jetting

technology by Stratasys® Ltd.

Objet®500 Connex3™ color, multi-material

3D Production System and Objet1000™

multi-material 3D Production System.

Core team:

Nick Ervinck

Eyal Gever

Neri Oxman, Architect, Associate Professor of Media,

Arts and Science, Mediated Matter Group Director,

MIT Media Lab. In collaboration with Christoph Bader;

Dominik Kolb (Deskriptiv) and Joe Hicklin

(The Mathworks)

Graphic Design:

Studio Razgroup



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INTRODUCTION

THE SIXTH ELEMENT

UNVEILING
THE NATURAL BEAUTY
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“All matter originates and exists only by virtue of a force which brings the particle of an atom to vibration and holds this most minute solar system of the atom together. We must assume behind this force the existence of a conscious and intelligent mind. This mind is the matrix of all matter.”

- Max Planck: Das Wesen der Materie [The Nature of Matter], speech at Florence, Italy (1944) (from Archiv zur Geschichte der Max-Planck-Gesellschaft, Abt. Va, Rep. 11 Planck, Nr. 1797)

PUSHING THE BOUNDARIES OF MATTER

We live in a world with an abundant array of diversity, evident in the natural environment and in life. “The Sixth Element: Unveiling the Natural Beauty of 3D Printing” by Stratasys engages both the imagination and the senses in its expression of nature and interpretation of organic creation and force.

Through the sense-provoking work of three renowned artists - Nick Ervinck, Eyal Gever and Prof. Neri Oxman - “The Sixth Element” explores the tension between the physical and the metaphysical. This is expressed through extraordinary sculptures that examine the relationship between form, dynamics, movement and performance and that reflect the design nuances made possible with a combination of multi-color, multi-material, rubber, rigid, opaque and transparent 3D printing in all scales.

THE ELEMENTS

“Nature that framed us of four elements, Warring within our breasts for regiment, Doth teach us all to have aspiring minds: Our souls, whose faculties can comprehend The wondrous architecture of the world, And measure every wandering planet’s course, Still climbing after knowledge infinite, And always moving as the restless spheres, Wills us to wear ourselves, and never rest, Until we reach the ripest fruit of all, That perfect bliss and sole felicity, The sweet fruition of an earthly crown.”

- Christopher Marlowe: 1587 Tamburlaine the Great (published 1590), pt.1, act 2, sc.7.

The 3D printed sculptures created in this collection were generated out of spirit, from “ex nihilo,” a Latin phrase meaning something “out of nothing.” The series includes 3D printed art inspired by the classical elements of nature, believed by many philosophies to reflect the simplest, essential parts and principles of which anything can consist and upon which the fundamental powers of everything are based. Each sculpture is designed to incorporate a specific element or a combination of elements necessary for sustaining nature.

The five elements in classical thought are Earth, Water, Air, Fire and Life. The sixth element in this series is 3D Printing, used to transform the patterns and forms of the natural elements into sculptures.

3D Printing is the synthesis. It binds the classical elements together and has the ability to transcend traditional ideas, rules and patterns to create meaningful new ideas and interpretations. It is also the key to understanding the nature of creative thought, through the convergence between art, nature and new digital opportunities.

 **ELEMENT: EARTH**
Earth is above all things grounded and stable, trusting to roots and creating a sense of stability in our lives. It is associated with the force from the ground, a source through which we gain our strength, power and roots.

 **ELEMENT: WATER**
Water is associated with emotion, flow, transference, fluidity and birth. It creates polarity, health and sexuality and represents the fluid nature of the body. Our entire existence is based on water, it is critical for the existence of all living matter and organisms.

 **ELEMENT: AIR/WIND**
Air and Wind are about all the things that we cannot see but can feel. Air is balance and equilibrium associated with creativity, the spark of inspiration, transcendence, cognition, spirit and movement. It is also communication and sound, wisdom and knowledge, light and clear seeing.

 **ELEMENT: FIRE**
Fire implies power, strength, passion and heat. It is also vitality, spontaneity, strength of will, purpose and esteem. It is also associated with destruction, violence, explosion and decay.

 **ELEMENT: LIFE**
Life is about nature, movement, time, growth and love. It also reflects energy, binding and flowing through matter creating what we know as a force of life, sometimes creative and sometimes destructive. Life is also about spiritual growth and the conscious sides of life.

 **ELEMENT: 3D PRINTING**
3D Printing is an additive manufacturing technology. It is the Axis Mundi, the world center, connecting between the physical and the metaphysical. It signifies the “synthesis” that binds the classical elements together, transforms the organic, unifies particles and has the ability to transcend traditional ideas, rules and patterns to create new meanings and interpretations.

3D Printing has been described as the most influential new medium for creative and innovative professionals. What makes it so unique is its resemblance to the way organisms grow in nature. It harnesses the intelligence and wisdom of nature and defies boundaries to produce a physical shape, expressing originality and imagination.

3D Printing is also the key to understanding the nature of creative thought, through the convergence of art, nature and new digital opportunities that exist for artists and designers – enabling them to produce new forms and shapes that would otherwise be impossible to realize.

EXPRESSING THE RATIONAL AND IRRATIONAL ELEMENTS OF NATURE

3D Printing’s additive process is both highly versatile and uniquely simple, removing the constraints of traditional manufacturing and

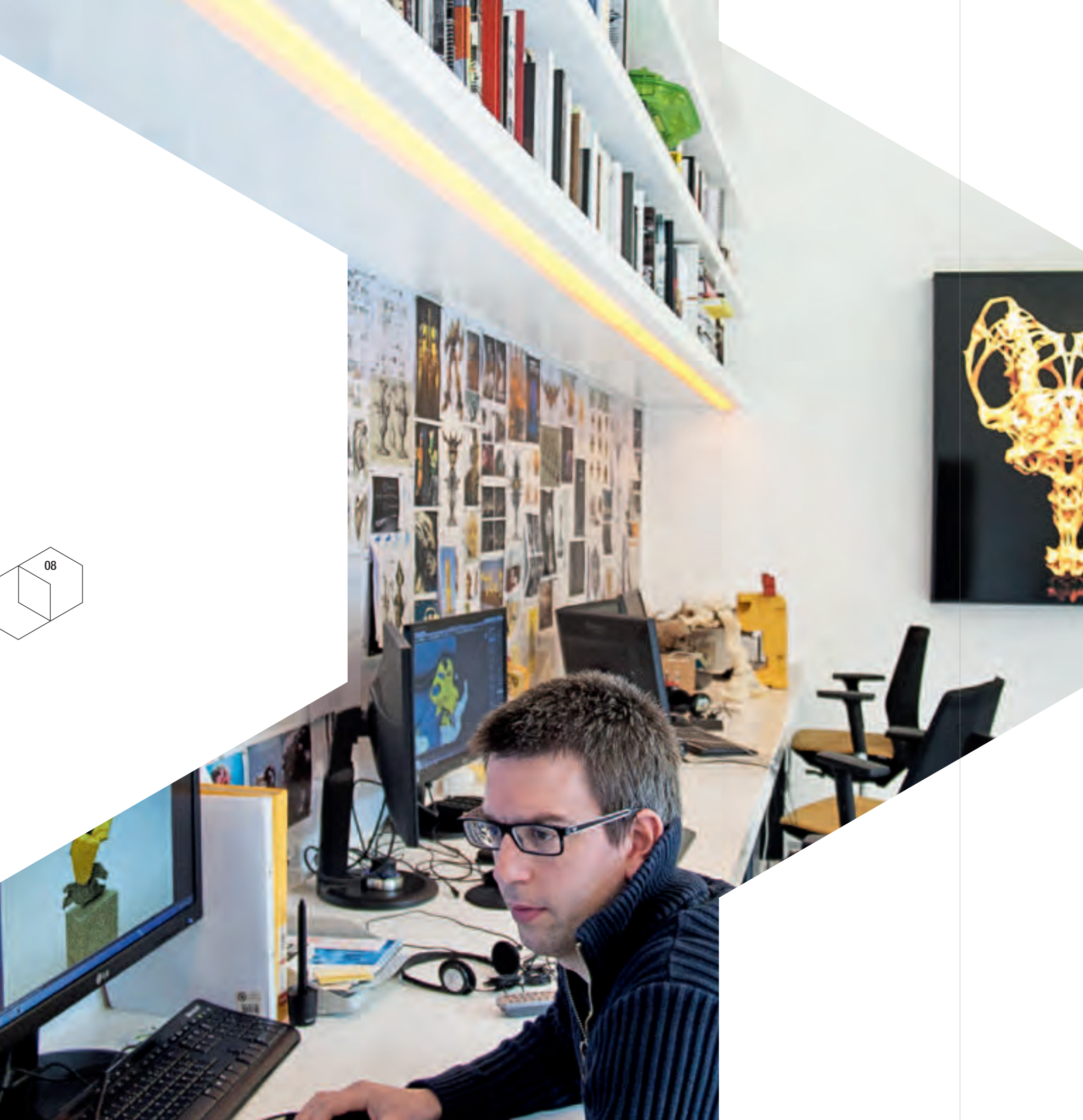
enabling almost all forms of physical expression. It enables artists, designers and engineers to rapidly create whole assemblies, unique artistic geometries and functional prototypes and final parts straight from a 3D design.

The “The Sixth Element” sculptures were created using the Objet500 Connex3 color, multi-material 3D Production System as well as the world’s largest multi-material 3D printer, the Objet1000. Using triple-jetting technology, these 3D printers offer unprecedented control over material properties such as rigidity, opacity and color. The artists were able to control and vary material properties at length scales of only several microns and produce highly complex parts. In some cases, this inspired the artists to think of 3D Printing not only as a fabrication output but as a design tool where the resolution of layers, the use of materials and the coloring strategies can also be hard coded.

The result is a beautiful collection of sculptures reflecting the dynamics and flow that we see in Earth, Water, Air, Fire and Life. “The Sixth Element” demonstrates unprecedented levels of artistic expression, ranging from extremely large in scale standing sculptures to highly precise artworks that feature interesting textures, patterns that deploy density and depth, minute details and complex surfaces and geometries that reflect the rational and irrational elements of nature.

We are proud to be associated with the extraordinary work of Nick Ervinck, Eyal Gever and Prof. Neri Oxman who have created the inspiring artistic pieces you see in this collection.

Enjoy



LIGHT, WIND, WATER, MOVEMENT

DESIGNED BY NICK ERVINCK

Fostering a cross-pollination between the digital and the physical, Belgian artist Nick Ervinck explores the boundaries between various media and explores the aesthetic potential of sculpture, 3D prints, animation, installation, architecture and design. Through his sculptural objects, he examines spatial positioning and points to the phenomenological experience and embodiment of space. These works oscillate between the static and the dynamic and reinvigorate the capacity of the ornament and the void in order to prospect new virtual or utopian territories transformed into reality through the use of 3D printing.

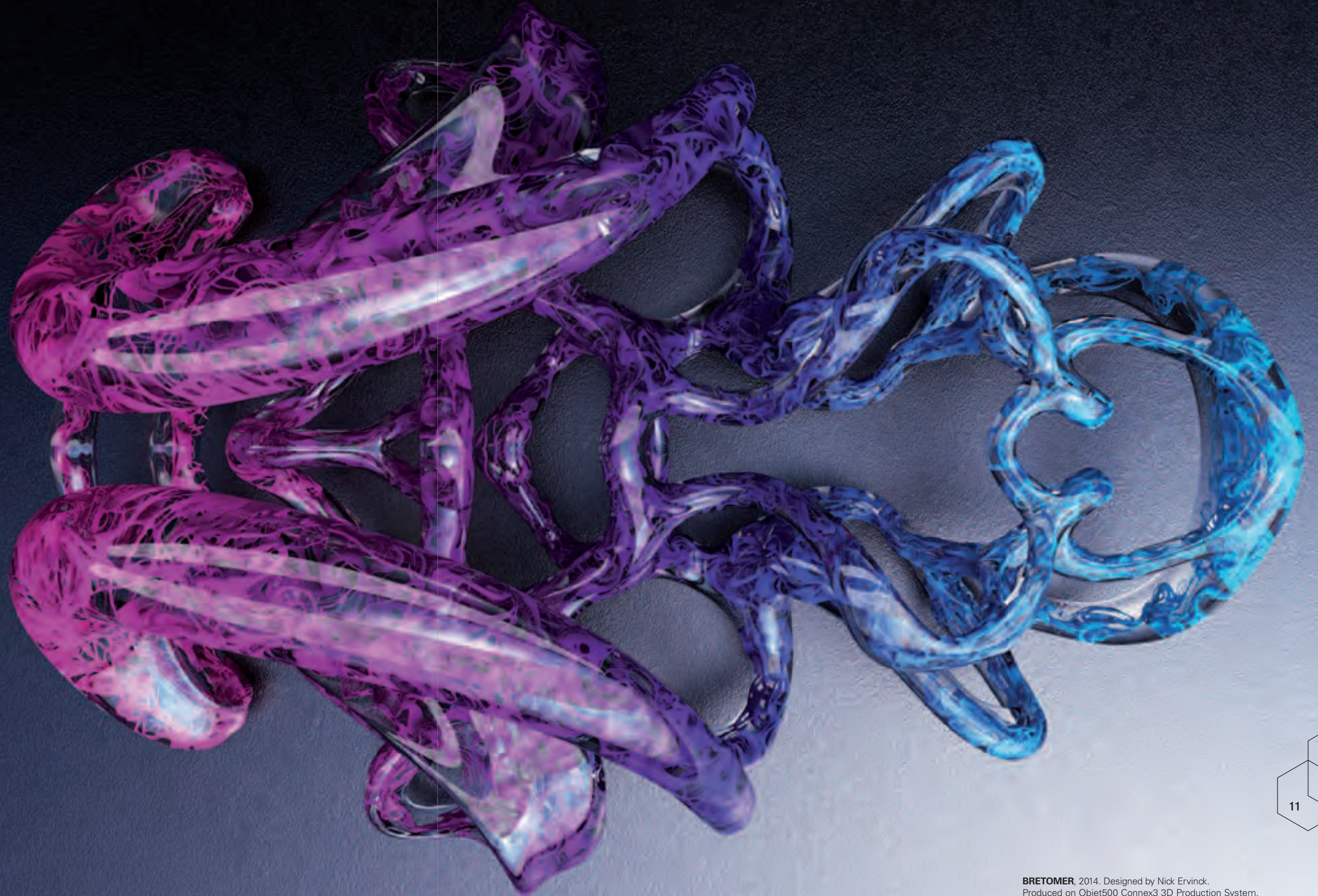
Ervinck's work has been included in numerous group shows, nationally as well as internationally. In 2005, he received the Godecharle prize for sculpture, followed by the Mais prize of the City of Brussels and the Prize for Visual Art of West-Flanders in 2006. In 2008, Ervinck was a laureate of the Rodenbach Fonds Award, and he won the audience award for new media at Foundation Liedts-Meesen. In 2013 he won the CoD+A Award in the liturgical category. Recently, he showed work at MOCA Shanghai, Chamber New York, MARTa Herford, Kunstverein Ahlen, Koraalberg Antwerp, Zebrastraat Ghent, HISK Ghent, Vrijstaat O./Freestate Ostend, Superstories Hasselt, De Brakke Grond Amsterdam, MAMA Rotterdam, Hermitage Amsterdam, Ron Mandos Amsterdam, The Baker Museum Naples Florida, Creativity World Biennale Rio De Janeiro and Oklahoma, Highlight Gallery San Francisco and Telic Arts Exchange Los Angeles/Berlin.

DESIGN IDEOLOGY

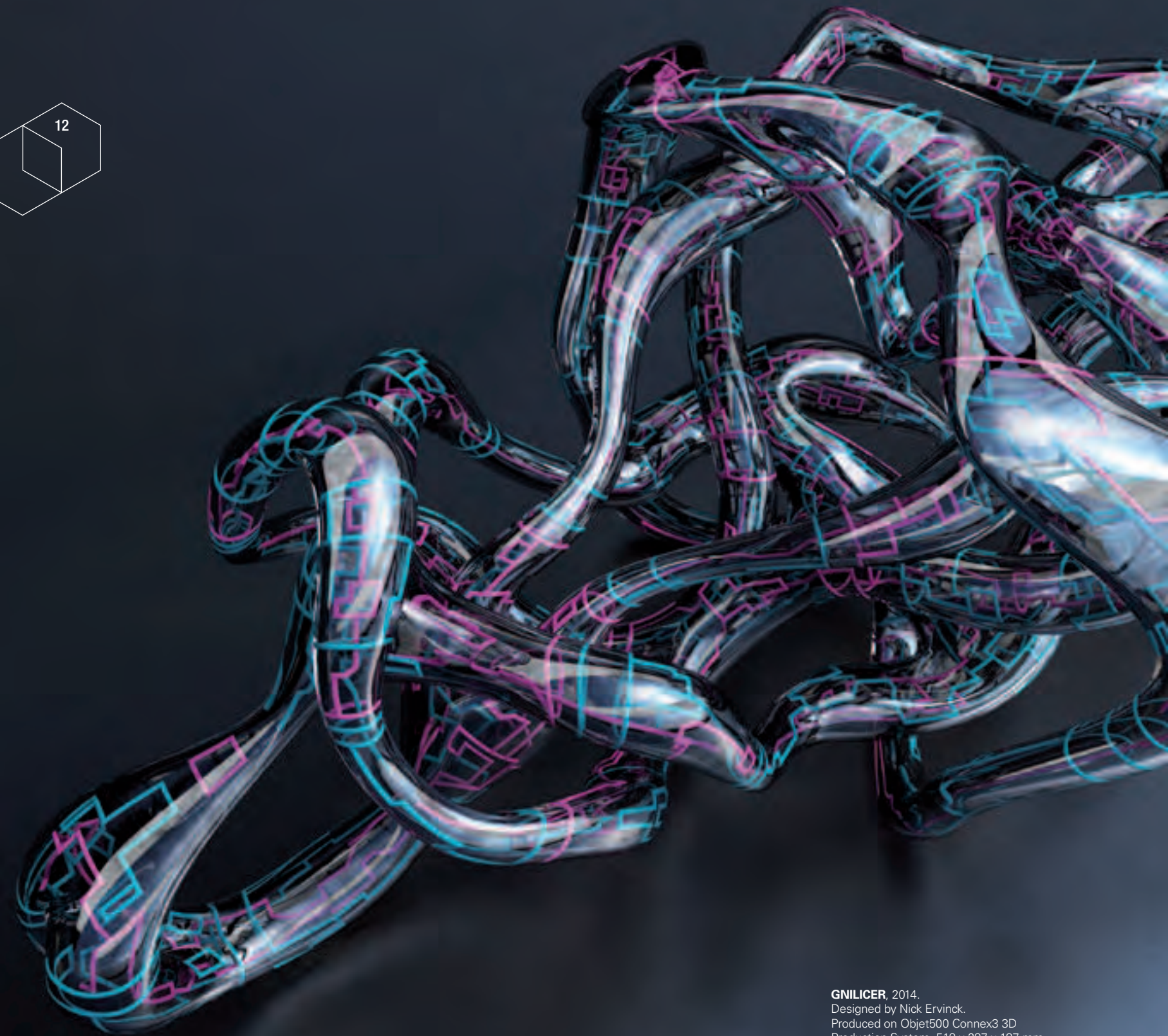
Ervinck's occupation with how art has developed due to new materials and techniques has led him to turn toward architecture, applied sciences and new media, to create forms and designs previously unthinkable. His work seeks to explore the realm of the impossible by constantly pushing the limits of what we call "realistic." Moreover, his designs balance on the edge of functionality, spatial interventions, digital aesthetics and object-oriented eclecticism.

Taking a vanguard position in the field of digital technology, Ervinck applies 3D printing to produce almost any type of intricate geometry or ornament. He uses copy-paste techniques in a 3D software environment, to derive images, shapes and textures from different sources. Ervinck focuses on how the computer can be used in the realization of new, organic and experimental (negative) spaces and sculptures within sculptures, and how the tension between blobs and boxes are articulated during the digital designing process. Organic, geometric, fluid and massive, Ervinck's artworks thus demonstrate the sculpture as a crossover, as a visual hybrid floating between high tech and low tech and referring to both the classic sculpture and the language of futurism, science and high technology.

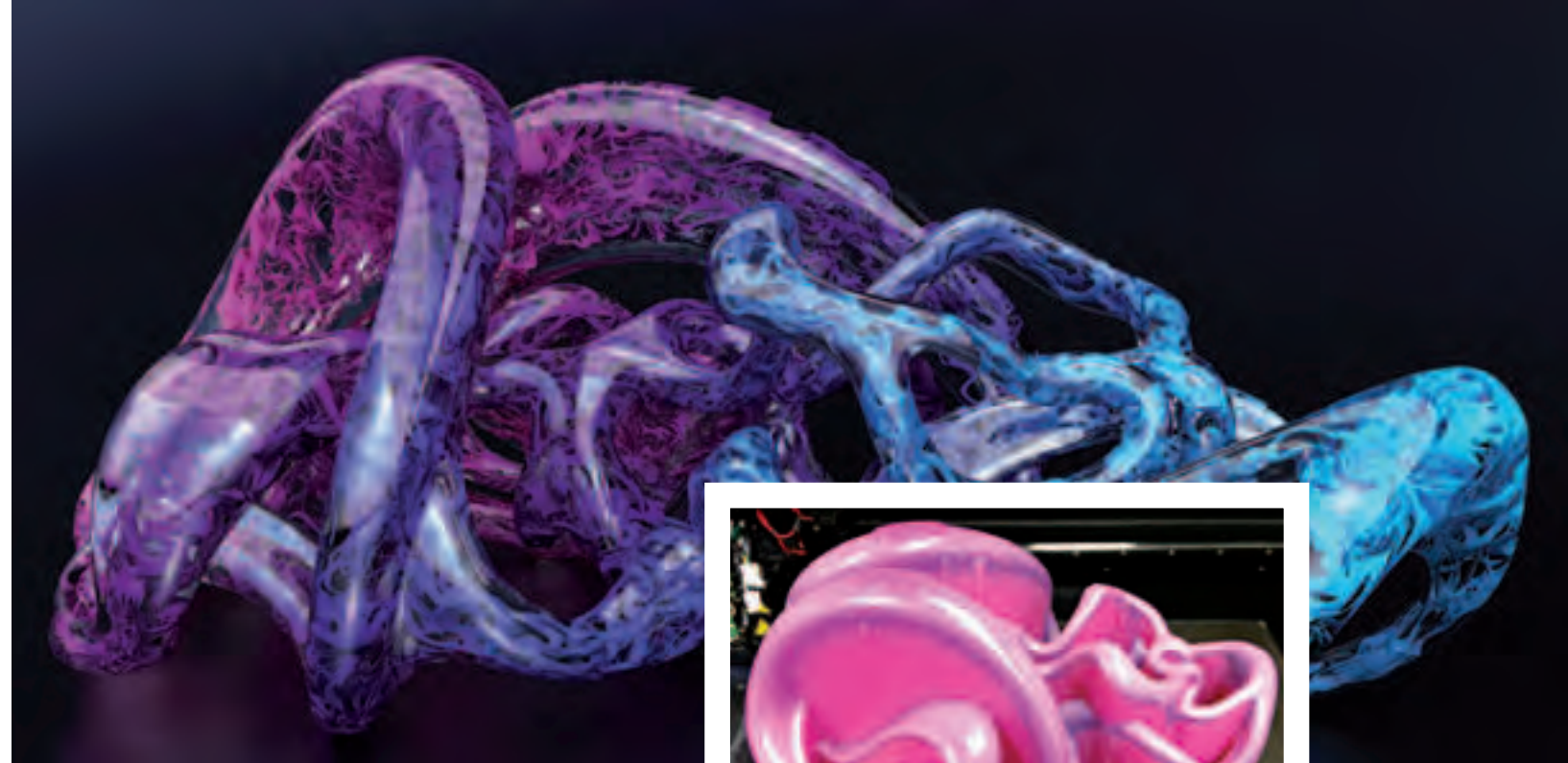
In his sculptures, the incorporation of motion into a stationary sculpture takes precedence and in his recent works with *Stratasys*, Ervinck focuses on reflection, color and movement to create sculptures that seem to escape the virtual world, yet don't seem to be born from it.



BRETomER, 2014. Designed by Nick Ervinck.
Produced on Objet500 Connex3 3D Production System.
200 x 353 x 495 mm



GNILICER, 2014.
Designed by Nick Ervinck.
Produced on Objet500 Connex3 3D
Production System. 518 x 287 x 187 mm



BRETOMER, 2014. Designed by Nick Ervinck.
Produced on Objet500 Connex3 3D Production System.
200 x 353 x 495 mm

LIGHT AND WIND: GNILICER AND BRETOMER

“The destruction of the mass” GNILICER and BRETOMER are the continuation of an experiment that Jean Arp, Henry Moore and Georges Vantongerloo started all those years ago when they began their well-intended attack on our perception and definition of mass.

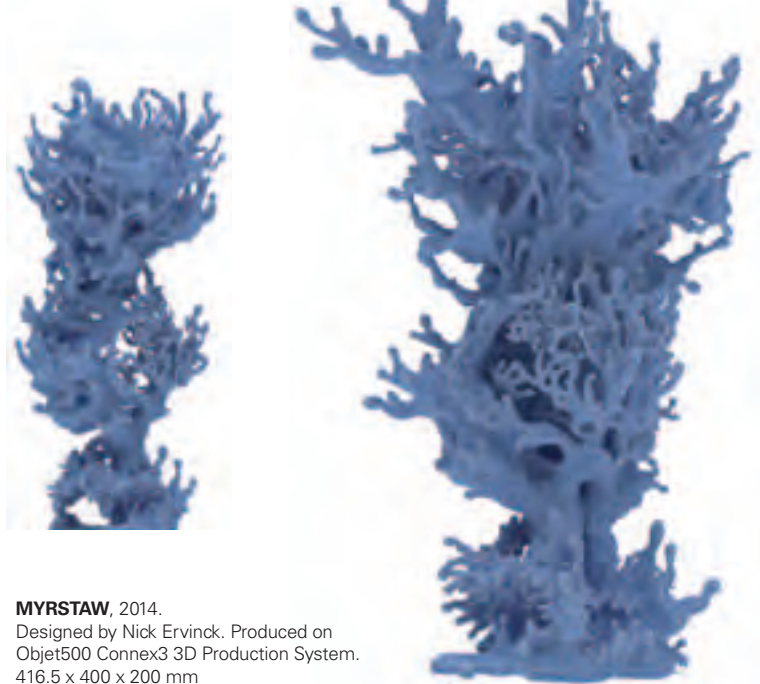
Giving meaning to the negative and giving depth to the hole, Ervinck continues this noble search, tearing down what we know and perceive. He does this by replacing the rigid foundation of blocks and hard materials usually associated with sculpting, with the incertitude of transparency and the seemingly infinite and elusive line. Paradoxically, it is within this incertitude that a new definition grows.

The shape we perceive seems to be very elusive, gives the impression of being unstable, susceptible to change, a visually contingent object. Our mind tries to complete the image we see by suggesting virtual shapes, which seem to correspond with the “outlines” (if there are any). Some of us would recognize older works, like Moore’s “Reclining Figure,” caught within the essence of these sculptures. Sometimes you could recognize a somewhat threatening alien creature. For some of us, the shapes just keep changing and surprising us. Because of this, the viewer is given a chance at interpretation, which gives us a chance to feel at one with the universe, to come into contact with that elusive universal truth that hides behind this veil we call reality.

GNILICER and BRETOMER are the result of the successful merging of two rather different worlds. This merger of two worlds, made possible by the Objet500 Connex3 color, multi-material 3D Production System. With this 3D printer, Ervinck was able to 3D print GNILICER and BRETOMER the way he envisioned them, an organic, biomorphic shape combined with a very unexpected play of lines. The fluid, organic outer shapes seem to rest upon the detailed and structured inner lines, which function as a floating skeleton propping up the entire sculpture. The colors seem to be caught within, a subtle reference to the noble search alchemists have been conducting for so long - namely trying to capture the essence of colors.

In GNILICER the colored lines remind us of the **light cycles** in the science fiction movie TRON (1982) or of the complex structure computer grids have these days. With BRETOMER we recognize a much more irregular and irrational play of lines, as if not only color, but also the very essence of **smoke** or **wind** is held captive in a foreign body. A power reaching, bending, contorting, trying to find its way through this abstract shape which sometimes has the likes of a strange being, a creature of alien origin.

SPLASHING WATER: MYRSTAW



MYRSTAW, 2014.
Designed by Nick Ervinck. Produced on
Objet500 Connex3 3D Production System.
416.5 x 400 x 200 mm

MYRSTAW has something monstrous, a hybrid shape in which one can recognize various elements. In its symmetry it almost has the likeness of an alien creature or even an idol ready to be worshipped. The work isn't clearly defined but points in different directions. The imagery used is clearly inspired by macro photographic images of splashing water, and thus sculpturally interprets the encounter between nature and technology.

Ervinck tries to catch this sublime violence lurking behind a serene surface. How natural erosion processes generate irregular, complex structures (e.g. the erosion of rocks by seawater) has always fascinated the artist, and it was the inspiration for previous works such as NIEBLOY (2010) and IKRAUSIM (2009).

Though inspired by natural dynamics, this sculpture is generated by the power of the virtual. Not liberated from the material by a process of depletion and carving, the virtual form itself rather becomes a generative principle. Although MYRSTAW is designed fully digitally, it is nevertheless tangible because of its manual execution. After all, Ervinck is very interested in how new technologies can revitalize traditional sculpture and explore the limits of the possible.



Study for
NOITENA, 2014
Designed by Nick Ervinck

MOVEMENT: NOITENA AND NOITULS

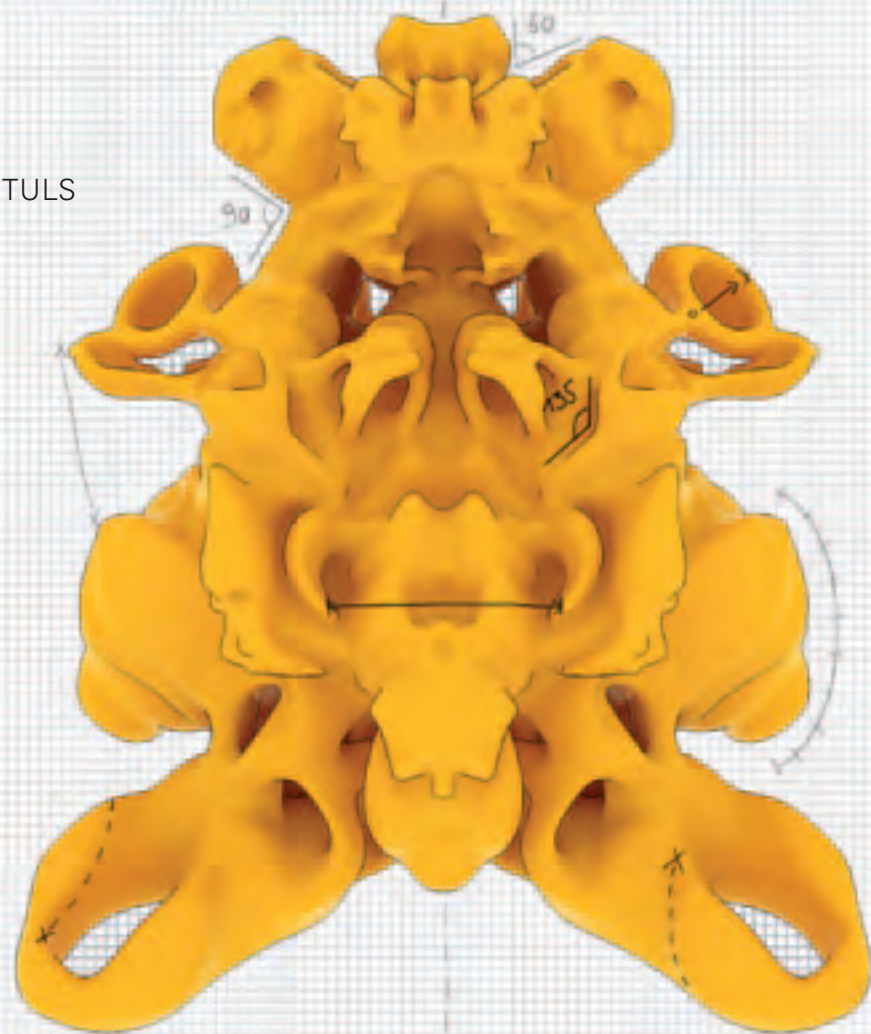
Just like a Rorschach drawing, NOITENA AND NOITULS can be read in different ways and at different angles. They feel spiritual, religious and alien to the touch. Ervinck created with these sculptures, mysterious and poetic works, sculptures that aren't easily fitted into specific categories.

As shadows of the past, these creatures seem to float in an infinite and undefined space. In this way they achieve the status of "nachbilder," or afterimages, optical illusions we see for the short moment after we look directly into the sun. It captures those little illusions we don't understand and therefore seem to forget very easily. That's why we are so haunted by these strange forms, captured in time. With NOITENA and NOITULS Ervinck manages to capture motion on a tangible medium. These sculptures were intertwined through various renderings, each focused on **reflection**, **color** and **movement**. In this way, he created sculptures that seem to escape from the virtual world, but appear not to be born from it. These sculptures are an homage to Eadweard James Muybridge (1830-1904), one of the first photographers who used his zoopraxiscope to visualize motion in an animation. Inspired by this groundbreaking achievement, many 20th century artists (Duchamp, Boccioni, Bala, etc.) aimed to capture motion, emotion and time in their own artistic medium. Here Ervinck tries to do the same. It is not just an interpretation though: With the help of 3D software, he has renewed the art historical tradition. Just like photographers experimented with new techniques in the beginning of 20th century, Ervinck attempts to push the boundaries with 3D printing in the 21st century.

NOITENA, 2013.
Designed by Nick Ervinck.
Lightbox. 1540 x 1540 x 170 mm



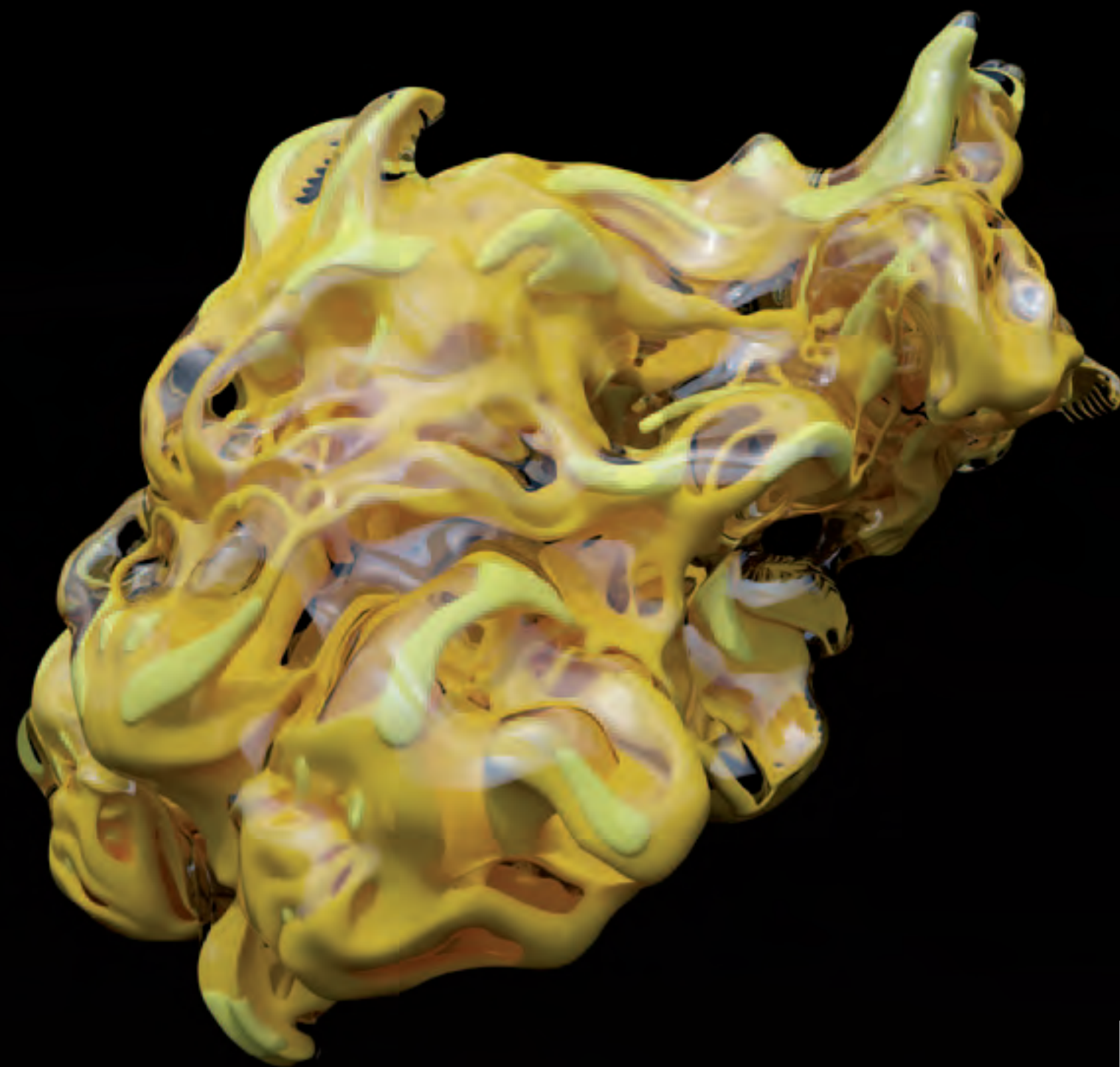
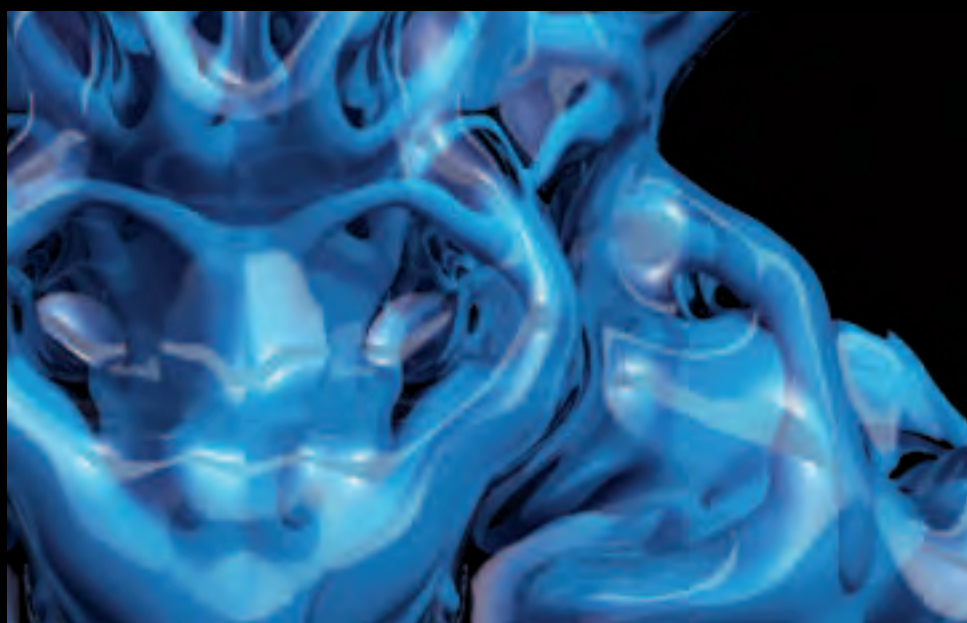
MOVEMENT:
NOITENA AND NOITULS



Study for
NOITENA, 2014
Designed by Nick Ervinck



NOITENA, 2014.
Designed by Nick Ervinck. Produced on Objet500
Connex3 3D Production System. 205 x 300 x 350 mm



NOITULS, 2014, Designed by Nick Ervinck.
Produced on Objet500 Connex3 3D
Production System.
320 X 245 X 195 mm

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ABOUT STRATASYS

Stratasys Ltd. (Nasdaq:SSYS), headquartered in Minneapolis, Minnesota and Rehovot, Israel, is a leading global provider of 3D printing and additive manufacturing solutions. The company's patented FDM®, PolyJet™, and WDM™ 3D Printing technologies produce prototypes and manufactured goods directly from 3D CAD files or other 3D content. Systems include 3D printers for idea development, prototyping and direct digital manufacturing. Stratasys subsidiaries include MakerBot and Solidscape, and the company operates a digital-manufacturing service comprising RedEye, Harvest Technologies and Solid Concepts. Stratasys has more than 2,800 employees, holds over 600 granted or pending additive manufacturing patents globally, and has received more than 25 awards for its technology and leadership. Online at: www.stratasys.com or <http://blog.stratasys.com>

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