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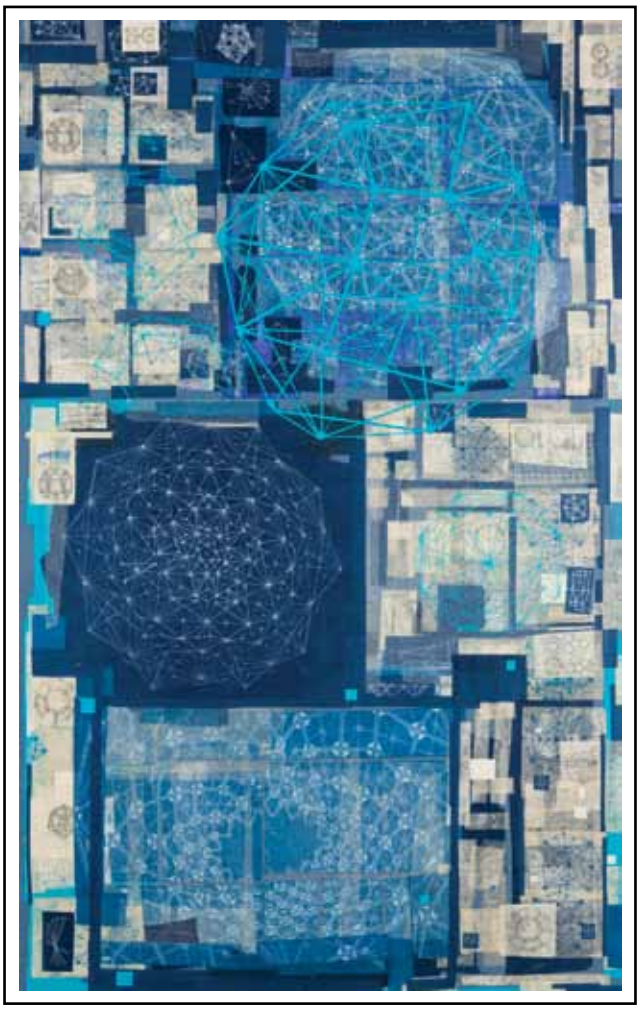


(UN)FOLDING PATTERNS

DRS. ERIK AND MARTIN DEMAINE, JOE DIEBES, MICHAEL JOAQUIN GREY, KYSA JOHNSON, TRISTAN PERICH, JANE PHILBRICK, THOMAS RUFF, STEPHEN SCHAUM, R. JUSTIN STEWART, STEPHEN TALASNIK, VARGAS-SUAREZ UNIVERSAL, BERNAR VENET AND SUSAN WEINTHALER

Curated by Ombretta Agró Andruff

May 20 – July 22, 2012
Opening reception: Sunday, May 20, 2:00–5:00 p.m.

"The mathematician's patterns, like the painter's or the poet's must be beautiful; the ideas like the colours or the words, must fit together in a harmonious way. Beauty is the first test: there is no permanent place in the world for ugly mathematics."

— G.H. Hardy

To many, mathematics and art could not stand on more different ground: one identifies with the left brain, the other with the right; one is analytical, the other creative, however "both disciplines are creative endeavors with analytical components that are essential elements of contemporary civilization."[1]

In his fascinating book, *Art & Physics*, Leonard Shlain, examines the parallel evolution of art and science from the ancient Greeks to today. Shlain highlights noteworthy commonalities between revolutionary art and visionary mathematics and physics: artists and scientists (including physicists and mathematicians) both investigate the ways the interlocking pieces of reality fit together, and often—unbeknownst to each other's research—achieved similar results in their respective fields.

Professors Carla Farsi and Doug Craft from the University of Colorado in their 2004 paper entitled *One in Two, Two in One: Mathematics and the Arts*,[2] detail the differences, and most notably the similarities, between the two disciplines making the case that "like the yin/yang symbol, art and mathematics are really one in two, and two in one." They noticed a "renewed interest in the mathematics of the natural world in areas such as minimal surfaces, fractals, symmetries, mirror reflections, chaos theory, and complexity."[3]

This interest and the exploration of the connection between these two disciplines is the spark that led to the conception of this exhibition and is evident in the creative process of several of the participating artists, starting with **Stephen Schaum**, whose highly polished relief welcomes the visitors as they enter the gallery.

Schaum is a Brooklyn-based artist focusing on the translation of dynamic patterns in nature into sonic, physical and spatial compositions. For this exhibition, the artist created a multi-faceted wall relief made of highly reflective mirrored stainless steel, the surfaces of which he envisions as being 'temporally activated' by the path of the sun on a clear day: as sun rays hit the relief they will create blinding reflections which will overwhelm the senses of the viewers and create a feeling of displacement and groundlessness. As Schaum explained in a phone conversation: "This work uses the geometry and time-arc path of the sun to generate its form, and is about the act of 'embodying' sensory patterns and rhythms, in a way becoming/being them, rather than just observing/translating them like in my previous work." A perfect introduction, indeed, to the abstract world of mathematics the visitor is about to enter.

Tristan Perich *Drawing Machine*, 2012

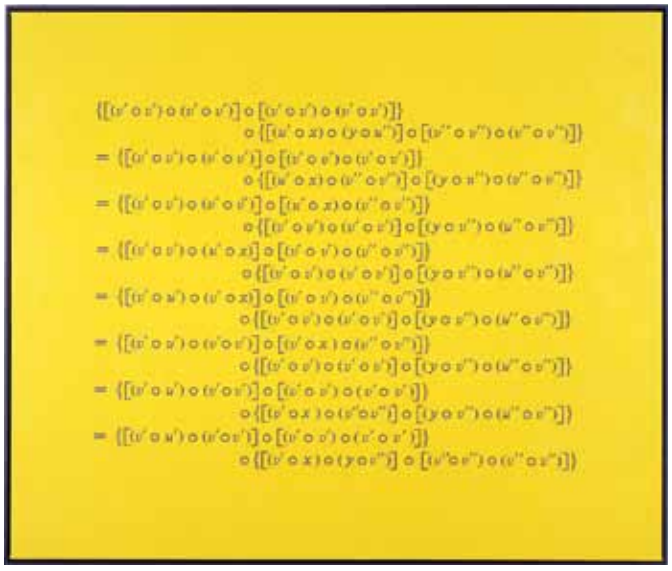
Susan Weinthaler *Echo Prototypes*, 2011

In the main gallery we'll encounter a similar play on mirror and reflections, along with an interactive and playful element achieved through a low-tech and hands-on approach, in **Susan Weinthaler**'s BITS corner installation *Echo*. The bits are small wooden blocks outfitted with a magnet and then placed on a large sheet of metal. This simple mounting mechanism encourages audience's participation and allows an infinite variable of compositions. In *Echo*, created specifically for this show, Weinthaler was inspired by the concept of infinity and the phenomenon of echo, rendered through a deconstructed portrait of the Greek nymph of the same name, combined with mirrors, the ideal medium to explore ideas of infinity.

In fact, both Schaum and Weinthaler's contributions to the show have a precedent in Lucas Samaras's *Mirrored Room* from 1966. In *Art & Physics*, Leonard Shlain observes how Samaras's room encompasses all of the features of the special theory of relativity elaborated by Einstein in 1905. A table and a chair are set in a room where every surface is covered by mirrors, as the viewer enters he/she is confronted with a kaleidoscopic splintering of reflected light. The light "creates a holistic, Cubist, simultaneous representation of space until it is all here…the moment of now within the room is infinitely dilated until it stretches into a changeless everlasting now."[4]

Also driven by the idea of endless possibilities and the ever-changing reality of nature is the projection screened in the back room: a study for a new computational film elaborated by **Michael Joaquin Grey**. Computational physics, which provides digital representations of natural phenomena by solving their governing equations numerically, has transformed areas as diverse as scientific research, engineering design and film production. The starting point for this specific work is the history of aspect ratio and how essential its development has been in the history of film-making. Grey's uses the rectangular shape of the classic 4:3 ratio, established by Thomas Edison in the late 19th century, sending it rotating in space to create endless spiraling configurations that remind us of an animation of a Serra drawing or the spinning of the black monolith in Kubrick's *2001: A Space Odyssey*.

Grey's interdisciplinary practice revolves around the development and origins of life and language, as well as morphology. This fascination and analysis of nature and its phenomena is behind the invention of ZOOB, a versatile building toy based in the science of motion and the course of organism development, invented by Grey in the mid-1990s. A 'ball & socket' connection system inspired by the 5 different sets of joints of the human skeleton became the preliminary model for the artist/inventor. ZOOB workshops, led by the artist, encourage visitors to frolic with Grey's ludic approach to art, science and natural phenomena.



Bernar Venet *Related to 'Commutative Operation',* 2001

In this high-tech/low-tech gap we can also place the *Machine Drawings* by NY-based visual artist and composer **Tristan Perich**. Perich is inspired by the aesthetics of math and physics, and works with simple forms and complex systems. His art and music are about simple forms and the intersection of randomness, order and composition. The *Machine Drawings*—pen on paper or wall drawings executed by a machine that he designed and built—use randomness and order as raw materials within a composition, and create works that are a combination of the delicacy of real drawings and the rigid, structured system of mechanics and code.

Mathematical formulas and geometrical figures can also be aesthetically pleasing in their own rights.

To mathematicians, great theorems and great proofs, such as Euclid's elegant proof of the infinity of primes, have about them what Bertrand Russell described as "a beauty cold and austere," akin to the beauty of great works of sculpture. In the 5-part documentary dedicated to Princeton professor Andrew Wiles's 7-year successful quest to prove the legendary Fermat's last theorem, he becomes emotional when describing the "eureka" moment that brought him to achieve success. "It was so indescribably beautiful," says Wiles, continuing, "It was so simple and elegant, I just stared in disbelief for 20 minutes."[5] Physicist Wolfgang Pauli said: "It is more important for an equation to be beautiful than exact" suggesting an aesthetic appreciation of what is implied by the mathematical statement of cause and effect.[6]

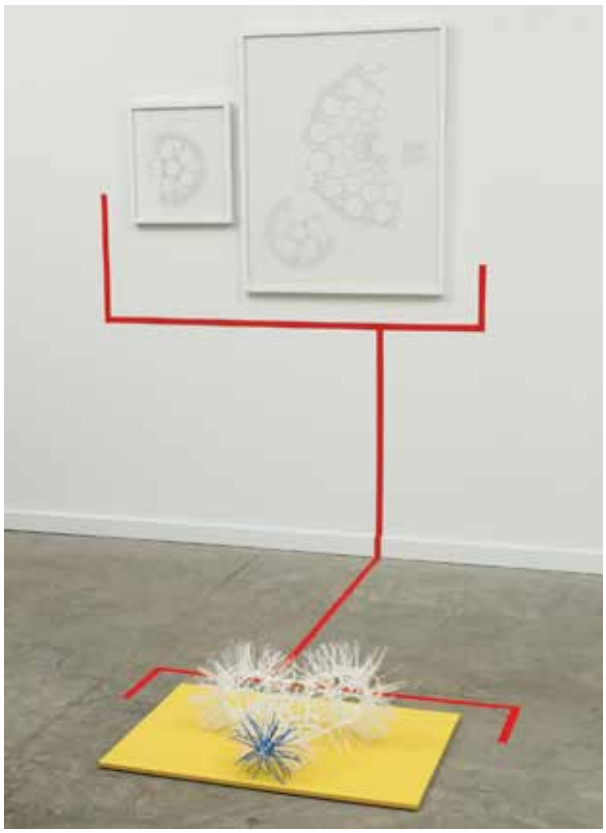
This fascination with mathematics and geometry for their own sake is evident in the works of **Stephen Talasnik**, **Bernar Venet**, **Thomas Ruff** and to some extent **Kysa Johnson** and **R. Justin Stewart**.

In his collages and sculptures, Stephen Talasnik's connection to mathematical systems seems blatant, but is entirely fictional, with the artist inventing non-existing yet plausible formulas and engineering diagrams that he embeds in his 2-dimensional works. As Lebbeus Woods writes in his essay for the catalogue of Talasnik's 2010 solo show at Marlborough Gallery: "The central element in Talasnik's mythical world is structure. His works reveal to us structures seemingly of different scales and evoke how these scales relate to one another. His paintings are encyclopedic catalogues of structural patterns and systems of connections that enable the inexhaustible variations required to construct an entire living, and ever transforming world."[7]

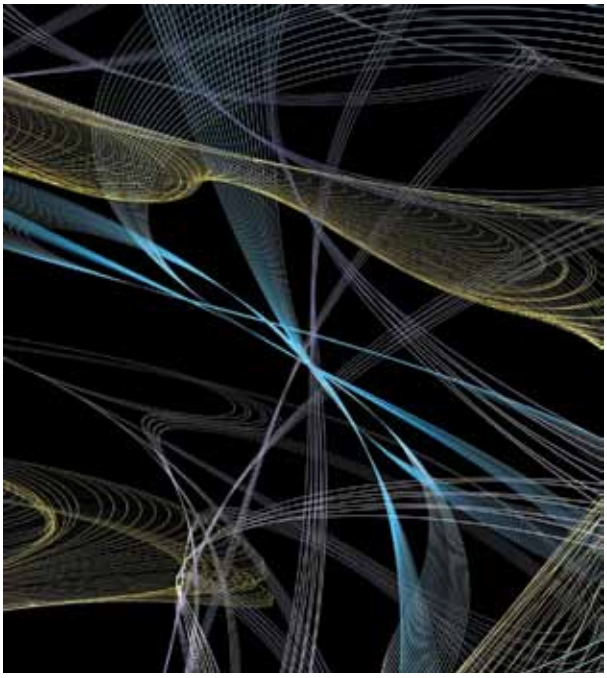
The panel exhibited in the gallery, *Endless Invention*, from 2009, is the perfect embodiment of Woods's statement. The artist is also featuring three small sculptures of basswood structures 'trapped' into semi-clear resin blocks from his *Fossil* series (2007-2008).

In Bernar Venet's paintings from both his *Equation* and *Saturation* series, the artist depicts mathematical formulas on large canvases. The work exhibited in this show, *Commutative Operation*, was executed in 2001. Starting in 1966 Venet began a series of conceptual work employing mathematical symbols and diagrams as a response to the minimalist art he saw during his first visit to New York. After a hiatus of approximately two decades Venet resumed painting, and his exploration of new forms of abstraction, with the *Saturation* paintings in which logical equations densely layer and overlap. In the artist's own words: "We know that in the 1960s I developed a body of work termed 'conceptual', which used language and mathematical figures. In a certain way I am returning to this now, but with different ambitions. Why? I would say because it involves a radically new language in art, a system of signs which offer unexplored formal and conceptual structures, repressed until now."[8]

Thomas Ruff's works from the *zycles* series, of which one example is here exhibited, are also grounded in mathematics and physics, and show 'computer screen-grab' recordings of curves modeled in three dimensions. The views captured by the computer are produced as large-scale chromogenic prints, or are printed directly onto canvas. Inspired by 19th century science books, Ruff's *zycles* present abstract contours based on "cycloids," the mathematical curves obtained from rolling one curve along a second, fixed curve. Particularly interesting to



R. Justin Stewart *System of Knowing 06 (turquoise end),* 2009



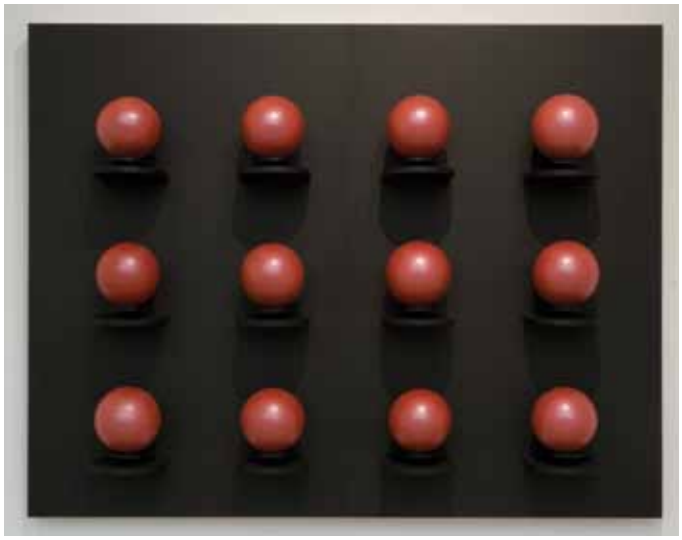
Thomas Ruff *zycles 4065*, 2009

Kysa Johnson *Blowup 31 Subatomic Decay Patterns (detail)*, 2003

Ruff was Scottish physicist James Clerk Maxwell's (1831-1879) treatise on electro-magnetism, accompanied by copperplate engravings of magnetic fields. Ruff found these delicate traceries, while not intentionally aesthetic, suggestive of minimalist drawings. To explore their visual and spatial possibilities, Ruff used a three-dimensional rendering program to translate the algebraic formulae of the cycloids—regarded in mathematics as 'the most aesthetic of curves'—into computer-generated imagery. The resulting virtual structures display the intricate linear filigree of cycloids as they would appear in space. The spiraling formations, always faithful to their mathematical origins, evoke a multitude of forms: the trajectories of planets, cascading ribbons, line drawings, or musical vibrations.

A similar approach and aesthetic sensibility is found in Kysa Johnson's drawing from the *Subatomic Decay Pattern Pieces*, a series of drawings of 11 of the most common subatomic decay patterns layered over and over each other. Subatomic decay patterns are the signature pathways that are created when unstable subatomic particles decay into other subatomic particles. The shapes of these pathways are determined by the mass, spin and charge of the particles involved in each decay. These marks are the most fundamental mark-making of the universe and are individually and collectively stunningly elegant. These pieces attempt to highlight the inherent beauty of the movement and architecture that lies at the base of all things. What from a distance may look like a series of colorful and random marks on a white board, magically come into focus once the work is approached. Lines, symbols and numbers come together to create a hypnotic two-dimensional 'chatter' that challenges our sense of scale, allowing us to consider beauty in purely abstract terms and beyond our visual perception.

R. Justin Stewart also explores and creates patterns in his drawings and sculptures from his *Systems of Knowing* series, one example of which is featured in the exhibition. Very much like patterns utilized by paper folders to create origami, Stewart makes two-dimensional detailed diagrams of what will become elaborate three-dimensional objects made with color-coded zip ties and o-rings; while the majority of zip ties are white, a few sculptures contain different colors to accent their forms. Inspired by the evolving interpretation of ideas, *Systems of Knowing* investigates how information is translated, transformed and conveyed across time and space. This series of installations investigates the interplay of information displayed through different frameworks. Surprisingly, the information manifests very differently; the drawings are very mechanical and rigid, while the sculptures feel softer and more natural. This series of work emphasizes the disconnect that arises when information migrates into a new context, highlighting the need for deep



Jane Philbrick *Floating Sculpture '09*, 2009

investigations in order to make sense of the world we live in.[9]

For the remaining artists in the show, **Jane Philbrick**, **Joe Diebes** and **Vargas-Suarez Universal**, the relationship of their work with mathematics may not be as overt, but is nonetheless equally significant.

Jane Philbrick's sculpture, composed by twelve red spheres magnetically "floating" against a black panel, was born out of the collaboration with mathematicians, physicists and evolutionary biologists during the artist's residency at MIT, and

was inspired by Marta Pan's 1961 *Sculpture Flottante*. After discovering preparatory sketches by the artist at the Skissernas Museum (Museum of Sketches) at the University of Lund, Sweden, Philbrick set to 'recreate' Pan's sculpture by "illuminating the creative process" behind the work, instead of simply copying the final product. The artist and her collaborators engaged therefore in a process of reverse engineering which would lead to discovering, as mathematical physicist Marco Gualtieri puts it, the sculpture's very own DNA. By studying the mean curvature of the two parts that make up the original work flow (which predicts the future motion of a two-dimensional surface in space), as well as the sound frequencies emitted by the sculpture, which are obtained by hitting its shape and letting the sound reverberate in space, Philbrick and her team effectively created a new artwork which embodies the sculpture's future; "updating it to the now present as a means of retrieving it in the future present tense."[10] The choice to use the geometrical shape of a sphere was a result of Gualtieri's studies of the mechanical and geometrical representation of the existing sculpture; while the decision to float the spheres through magnetic levitation came as a response to the original work floating on water.

Vargas-Suarez Universal
Jettison Re-entry II, 2012

Erik and Martin Demaine
0271, 2012

Joe Diebes' *Technical Support* is an interactive audio work created utilizing an algorithmic pattern designed by the artist. The viewer/listener is encouraged to dial a number and is prompted through what at first seems like a familiar set of options from an automated customer support center. The experience soon becomes labyrinthine—equal parts Escher and Kafka—drawing out the relations between the controlling language of corporate systems and the psychic disturbances associated with them. This is a continuation of the artist's extensive research into corporate optimization algorithms which led to the realization that the call center is based on schematic procedures and scripts that bear more resemblance to computer programming than to human interaction. In this work Diebes questions the use of algorithms to control and limit human behavior and desire, taking, as he himself says: "in a way, what Benjamin Buchloch, referring to '60s Conceptual Art, called the *Aesthetics of Administration* to the max."[11]

Vargas-Suarez Universal presents a wall installation featuring works from the Эльдорадо (*El Dorado*) series, abstract paintings on vacuumized aluminum thermal blankets on canvas and wall drawings based on the geometries of the architecture of the International Space Station, as well as Russian and American rockets and satellites. The paintings depict the geometries of the telemetry designs used for guidance, tracking and docking procedures, as well as the hardware associated with gyroscopes and other instruments forming avionics systems. The title refers to the mythical City of Gold, but also suggests that our current quest for space domination is perhaps another type of mythical false Promised Land or, perhaps better said, Promised Space.

The exhibition concludes with three examples of *Curved Crease Sculptures* by MIT professors **Dr. Erik Demaine** and **Dr. Martin Demaine**, a father and son team of origami masters. Each sculpture in this series connects together multiple circular pieces of paper (between two and three full circles) to make a large circular ramp of total turning angle between 720° and 1080°. Erik and Martin Demaine's works combine the art of origami with the science of geometric folding algorithms, a fitting conclusion for an exhibition that attempted to bring forth a rich mix of sensibilities towards art, abstraction, science, creativity, and meaning.

Having had the pleasure and honor to deal with these remarkable artists and brilliant minds and their artistic endeavors over the past four years, it is important to underline how the viewer's aesthetic appreciation of the works does not require an understanding of the mathematical principles they embody or that mark their genesis, however, as with all art, deeper knowledge leads to deeper appreciation.

So it is hoped that the visitors will spend enough time to study and enjoy each piece in the show and use this essay as a key to unlock their fascinating stories. ■

— Ombretta Agró Andruff
New York, 2012

NOTES

1. Carla Farsi and Doug Craft, One in Two, Two in One: Mathematics and the Arts, 2004, www.maa.org/mathhorizons
2. ibid.
3. ibid.
4. Leonard Shlain, Art & Physics, 1993, First Quill edition, reprinted in 2001 by Perennial of Harper Collins Publishers, pg. 270
5. Andrew Wiles: Fermat's last theorem, http://www.youtube.com watch?gl=US&hl=iw&v=CPRnUPH8sME
6. Carla Farsi and Doug Craft, One in Two, Two in One: Mathematics and the Arts, 2004,www.maa.org/mathhorizons
7. Lebbeus Woods, Stephen Talasnik Thought Pattern, essay for the catalogue of the artist's solo show at Marlborough Chelsea. March-April 2010
8. Bernar Venet, from the catalogue of the show "Bernar Venet. Paintings 1961-2011. A Retrospective", Seoul Museum of Art, pg. 73
9. R. Justin Stewart, excerpts from press release for exhibition System of Knowing, Plus Gallery, Denver, 2009
10. Jens Arvidson, Lecturer, Department of Arts and Cultural Sciences, Division of Cultural Management and Intermediality, Lund University, Sweden (The Vergegenkunftarchive /A Futuristic Archive essay)
11. Benjamin H. Buchloch, Conceptual Art 1962-1969: from the Aesthetics of Administration to the Critique of Institution, Paris, 1989

BIOGRAPHY

Ombretta Agrò Andruff is a New York-based freelance curator and art critic. She was born in Italy in 1971. Since her move to the US in 1998 she has curated solo and group shows in Europe, the US and India collaborating with museums, art festivals, commercial galleries and art fairs such as Artists Space, GAle GAtes et al., Queens Museum of Art, Lower Manhattan Cultural Council, The Armory Show, The Art Basel Miami Fair, The Downtown Arts Festival, The d.u.m.b.o. art under the Bridge Festival, the Esso Gallery, Dorsky Gallery Curatorial Programs, the 2006 Winter Olympic Games, and the Religare Arts Initiative. Ombretta is also a contributor to various art publications and has written essays for several books and catalogues. She is a consultant for the Italian Cultural Institute of New York, the advisory firm Art Assets and since 2007 has been the International Art Advisor for the New Delhi-based Religare Art. For more information: www.ombrettaagro.com

CHECKLIST

Drs. Erik & Martin Demaine

0271, 2012
Mi-Teintes watercolor paper
11 x 14 x 15 inches

0272, 2012
Mi-Teintes watercolor paper
9 x 13 x 13 inches

0273, 2012
Mi-Teintes watercolor paper
10 x 13 x 12 inches

Courtesy of the artists
Photo by Erik & Martin Demaine

Joe Diebes

TECHNICAL SUPPORT, 2012
Audio, public telephone network, IVR (Interactive Voice Response) system
Courtesy of the artist

Michael Joaquin Grey

STUDIES FOR 27 MONOLITHS (ASPECT RATIO AND PANOPTICON DEVELOPMENT), 2011-2012
Courtesy of the artist

Kysa Johnson

BLOWUP 31 SUBATOMIC DECAY PATTERNS, 2003
Ink on panel
24 x 48 inches
Courtesy of Morgan Lehman Gallery and the artist

Tristan Perich

UNTITLED MACHINE DRAWING (2012-05-20 11:00 AM - 2012-07-22 6:00 PM), 2012
Ink on wall
Courtesy of the artist

Jane Philbrick

FLOATING SCULPTURE '09, 2009
Electrical magnets, permanent magnets, balls, sheet aluminum, plywood, cable, paint
63 x 81 x 2 inches

SCULPTURE FLOTTANTE: FLOW, 2009
Audio sculpture: ultra sound speaker, steel, mp3 player, amplifier, cables; audio created in collaberation with Enno Lenzmann, Benjamin Seibold, and Yossi Farjoun
72 x 12 x 12 inches

Courtesy of the artist

Thomas Ruff

ZYCLES 4065, 2009
Chromogenic print
80 3/4 x 68 7/8 x 2 3/4 inches
Edition 1 of 4
Courtesy of David Zwirner Gallery

Stephen Schaum

WE MUST BE STILL AND STILL MOVING INTO ANOTHER INTENSITY, 2012
Mirrored stainless steel, astralcathetic object
48 x 48 x 3 inches
Courtesy of the artist

R. Justin Stewart

SYSTEM OF KNOWING 06 (TURQUOISE END), 2009
Teflon o-rings, zip ties, pencil and ink on paper, wood, paint
Courtesy of the artist

Stephen Talasnik

ENDLESS INVENTION, 2009
Acrylic and collage on panel
60 x 36 inches

CONSTELLATION, 2008
Wood and resin
16 x 7 x 8 inches

TUNNELING, 2008
Wood and resin
14 x 5 x 9 inches

FOSSIL, 2008
Wood and resin
12 x 6 x 6 inches

Courtesy of the artist

Vargas-Suarez Universal

ORBITAL DEBRIS, 2012
Mixed media
Courtesy of the artist

Bernar Venet

RELATED TO: 'COMMUTATIVE OPERATION', 2001
Acrylic on canvas
76 x 90 inches
Courtesy of Archives Bernar Venet, New York

Susan Weinthaler

ECHO, 2011
Wood, mirror, magnets
Courtesy of the artist

Cover: **Stephen Talasnik**, *Endless Invention*, 2009

ACKNOWLEDGMENTS

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11-03 45th Ave., Long Island City, NY 11101 | T: 718 937 6317 | F: 718 937 7469 | E: info@dorsky.org | www.dorsky.org

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