

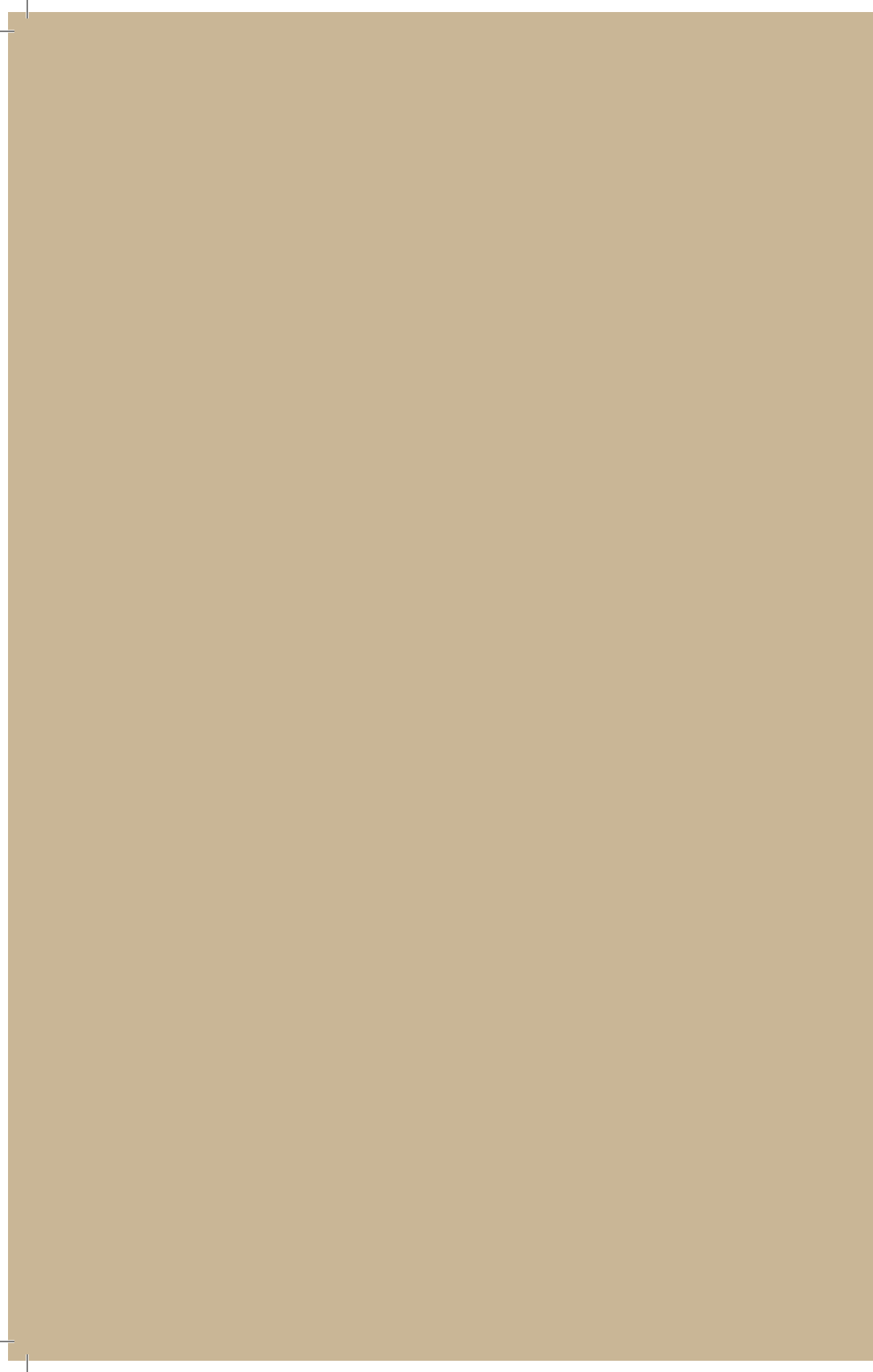
How THINKS Work

An Artistic Exploration of Mathematical Thinking



presented by

SIMONSCENTER
FOR GEOMETRY AND PHYSICS



How THINKS Work

This exhibition is an exploration of the human thought process as it relates to mathematics, perception, philosophy, language, and nature. The title alludes to the common phrase “How Things Work,” and suggests the treatment of the thinking process as a universal mechanism.

How ‘Thinks’ Work is free and open to the public every weekday from 10 am to 5 pm from November 30 through March 1, 2012. The exhibition is located in the SCGP Gallery and throughout the first and second floors of the Simons Center for Geometry and Physics.

How Thinks Work is curated by Nina Douglas, Director and Curator of the SCGP Arts and Sciences Program.



Blue

By Tatjana Busch, with music composed by Wolfgang Schmid-Grandy

Aluminum abstract sculpture by Tatjana Busch, with music written and performed on the piece by composer Wolfgang Schmid-Grandy. The piece is about the synergy of the mind-body experience. The contradiction between planning and intuition, structure and deconstruction, even and curved surfaces, accurately applied color and decomposition accounts for the tension and fascination in the works of Tatjana Busch. Repeatedly, she breaks with her

originally strictly reduced pictorial language in the course of the creation of her objects. She begins with stern graphic and geometrical shapes like the circle, the rectangle and the triangle. Then she bursts open these forms via alteration of the surface in the third dimension from which arise completely different, manifold shapes for the eye of the spectator, dependent on his perspective in the approach of the respective art work.

Tatjana Busch attended the College of Graphic Design and Fine Arts in Freiburg and Sean Scully's class at the Academy of Fine Arts, Munich. She exhibits in galleries worldwide including recent exhibitions in Munich, Switzerland, Lebanon, and Miami. She is represented by Gallery Thomas Jaeckel, New York.

Wolfgang Schmid-Grandy is a bassist, composer, and producer. He was honored as artist of the year by the phono-academy in Germany; and has made multiple tours and festival appearances; TV shows mark his rich carrier in pop and jazz. He composed and recorded the musical "Manaus", with Andrea Baker as vocalist. He is a distinguished composer, who composed and produced more than 50 CDs/ LPs. He is bass player on over 400 LPs/CDs.



Portraits of Physicists

by Miriam Carothers

19 prints

This series captures an era in Theoretical Physics through the faces of the Protagonists: some of them are the Pioneers, who laid down the ground for string theory by uncovering the mathematics that describes the world; then comes the New Generation, who after the Second Superstring Revolution reinvented the theory; and finally today's PostDocs and Graduate Students, who will take up the challenge of the future of Physics.

For the Scientists, by the Scientists, the making of Portraits of String Theorists was a collective effort to glorify this moment in scientific history. It grew out of a Simons Summer Workshop in Mathematics and Physics poster in which the main theme was to pay attention to the people describing their vision and create a poster about the researchers themselves. This project was carried out during several weeks of meetings in New York City and Stony Brook, where String Theorists gathered to fill the portraits of their colleagues, each with their own equations. Each Protagonist's face is a tribute to her/his own work and to String Theory, forged by the very pen of peers. By looking closely you will recognize worldsheet actions, equations of motion, partition functions, flatness equations, higher genera Riemann surfaces, geometric transitions, scattering amplitudes, superspace constraints, integrable hierarchies, topological vertices, superconformal indices, black hole entropy formulas, holographic dictionaries...the whole zoo of mathematics that constitutes String Theory. This series is a celebration of the very people who every day push the edge of knowledge. This is a story narrated by them, in their own secret language.

Miriam Woodwell Carothers was educated at the Pratt Institute at Columbia University and at the Art Students League. She has worked as an illustrator and textile designer, a courtroom illustrator and entomologist, and she has taught Color Theory to seventh and eighth grade students. Her exhibitions and projects include poster design for the Simons Center for Geometry and Physics workshops in Low Dimensional Gauge Theories, and Integrability and in Higher Spin Theories and Holography; as well as poster design for the group show Fair Folks and Goat Gallery; as well as an installation project Mad Arts at the Giacobetti Paul gallery.



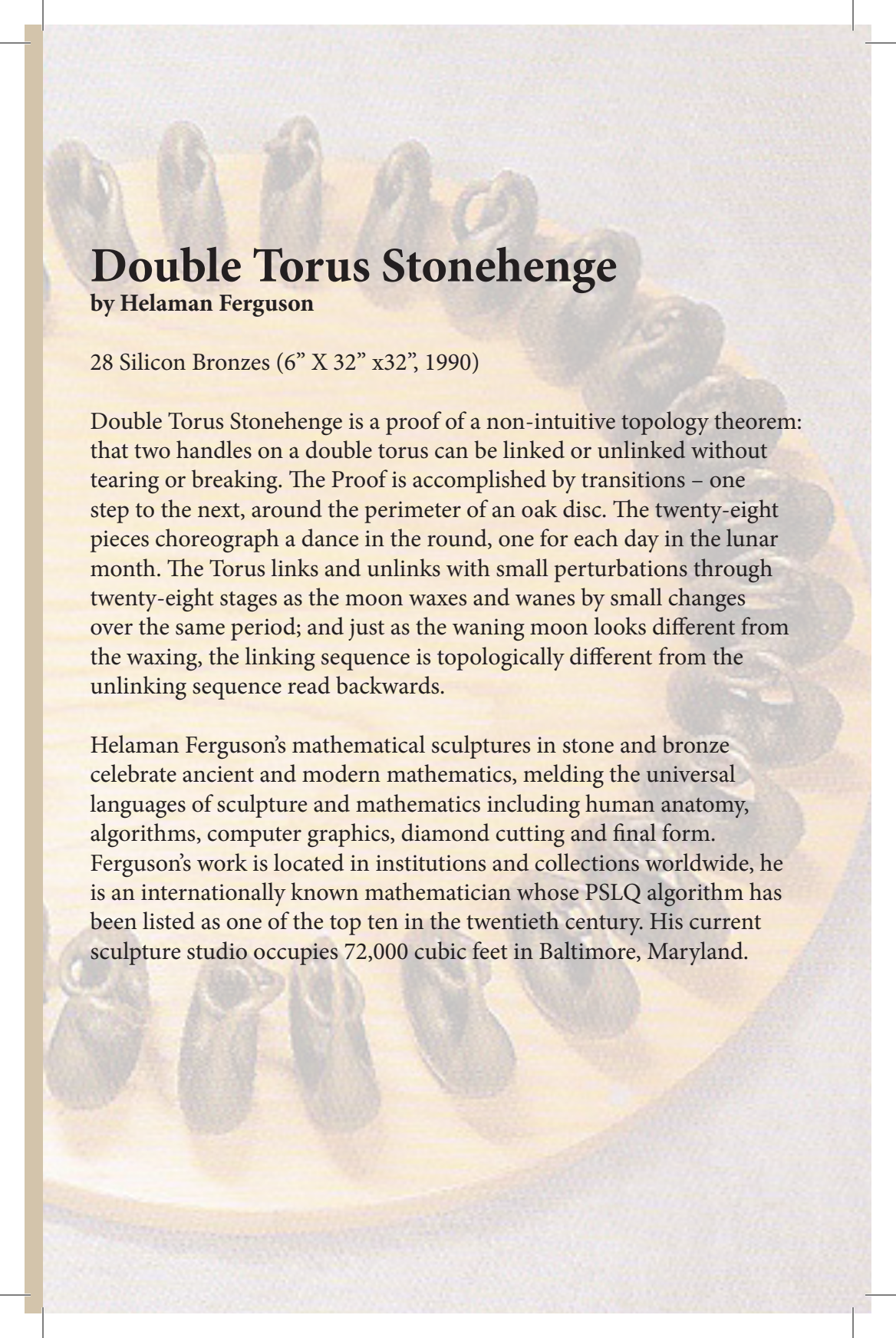
Spider Ruler of the Universe

by Ji Choi

Sculpture

The spider is a mighty representation of the power of and submission to the forces of Nature. This work is a sheer force of the mother instinct, crunched up in that little corner of the universe, which is given to us, humans, to prove our existence. The work was created with the help of the Ars Cora.

Ji Choi is a Korean artist who travels often between Seoul, Europe and the US. She spends a fair amount of time near Carrara, Italy, working on stone and with traditional foundries all over the world to master her bronzes. Choi has a sense for the mythological dimension of our everyday life and tries to constantly build parallel universes out of these two worlds.



Double Torus Stonehenge

by Helaman Ferguson

28 Silicon Bronzes (6" X 32" x32", 1990)

Double Torus Stonehenge is a proof of a non-intuitive topology theorem: that two handles on a double torus can be linked or unlinked without tearing or breaking. The Proof is accomplished by transitions – one step to the next, around the perimeter of an oak disc. The twenty-eight pieces choreograph a dance in the round, one for each day in the lunar month. The Torus links and unlinks with small perturbations through twenty-eight stages as the moon waxes and wanes by small changes over the same period; and just as the waning moon looks different from the waxing, the linking sequence is topologically different from the unlinking sequence read backwards.

Helaman Ferguson's mathematical sculptures in stone and bronze celebrate ancient and modern mathematics, melding the universal languages of sculpture and mathematics including human anatomy, algorithms, computer graphics, diamond cutting and final form. Ferguson's work is located in institutions and collections worldwide, he is an internationally known mathematician whose PSLQ algorithm has been listed as one of the top ten in the twentieth century. His current sculpture studio occupies 72,000 cubic feet in Baltimore, Maryland.



The Magic Boxes

by the Houdini Collective

Acrylic and metal (various sizes, 2011)

In his Philosophical Investigations, 20th century philosopher Ludwig Wittgenstein uses an analogy in an attempt to clarify some of the problems involved in thinking of the mind as something over and above behavior. Imagine, he says, that everyone has a small box in which they keep a beetle. However, no one is allowed to look in anyone else's box, only in his or her own. Over time, people talk about what is in their boxes and the word "beetle" comes to stand for what is in everyone's box. Everybody has his own beetle in his head. And, they are all different. How is it possible that everybody has the same Platonic solids in his head? This work is an interactive installation of five acrylic boxes containing beetles and Platonic solids, sound installation.

The Houdini Collective is a group formed by Nina Douglas and includes Professor David Westerfeld, Electrical and Computer Engineering; Bipin Birari, a recent Engineering MA graduate; Varun Deshpande and Parikshit Desai, Masters students in Engineering; and Anthony Tricarichi, a dual major Physics and Engineering; with the help of the Physics Machine Shop led by Walter Schmeling.



The Big X

by Pi (Andrew Logan)

Sculpture, bronze

This work explores the many representations that X embodies. The X is used for an independent variable or unknown value in mathematics, comes from the Arabic word for “thing,” used in Arabic algebra texts such as the Al-Jabr. It came into Old Spanish with the pronunciation of /fei/, which was written xei and soon habitually abbreviated to x. (The Spanish pronunciation of <x> is not the same now.) X signifies the multiplication operation. An “italic x” is often used to avoid potential confusion with the multiplication symbol. X in mathematics also represents the cross product.

X-rays are so called because their discoverer did not know what they were. Who knows what the Generation X is, commonly abbreviated to Gen X? It is commonly used in correspondence along with the letter O to indicate affection (as in “XOXO” - the Xs representing kisses and the Os hugs). X is also used for referring to ‘the end of conversation’. X is used by the illiterate in lieu of a signature and indicates a signature line on forms. In cartoons, Xs are drawn instead of eyes to indicate the death of a character. X is commonly used as a generic mark (e.g. selecting an item on a form, indicating a location on a map). X (ex) is your lover, husband or wife, after you separate from them. In Ancient Greek, ⟨X⟩ and ⟨Ψ⟩ were among several variants of the same letter, used originally for /k^h/ and later, in western areas such as Arcadia, as a simplification of the digraph ⟨XΣ⟩ for /ks/. In the end, more conservative eastern forms became the standard of Classical Greek, and thus ⟨X⟩ (Chi) stands for /k^h/ (later /x/). However, the Etruscans had taken over ⟨X⟩ from western Greek, and it therefore stands for /ks/ in Etruscan and Latin. The letter ⟨X⟩ ~ ⟨Ψ⟩ for /k^h/ was a Greek addition to the alphabet, placed after the Semitic letters along with phi ⟨Φ⟩ for /p^h/. (The variant ⟨Ψ⟩ later replaced the digraph ⟨ΦΣ⟩ for /ps/; omega was a later addition.) There has been much debate about the origins of these added letters.

Andrew Logan decided as a child growing up in the Australian bush that one day he would travel the globe. In doing so he found that he was a sculptor. 15 years later, since all roads lead there, he ended up in New York City. Logan’s sculpture revolves (elliptically) around his “poetic” understanding of time and space, intuition and reason, life and death.

Spider in Aleph 0

by Lydia Nestor

Sculpture

This work refers to the mythological image of the spider as a primeval ruler of the world, and connects that image with the mathematical symbol of Aleph 0, which refers to the basic infinity, in comparison with the other infinities, like Aleph 1, Aleph 2, Aleph 3... The work was created the help and creative support of the Ars Cora and the Art and Science Program at the Simons Center for Geometry and Physics, it was produced by Canal Street Studios.

Lydia Nestor was born in Moscow, Soviet Union. She finished the Leningrad School of Fine Art and a Masters in Fine Arts at Rutgers University. Nestor is working primarily as a portrait painter and her works are owned by numerous private sponsors over the world. She had shows in Eastern Europe, Germany, France, Switzerland, Spain, Italy, Argentina, Brazil, and the US. Nestor is currently experimenting in sculpture and installation art. She is very interested in the symbolic meaning of letters and signs, in connections to myths and legends from all cultural traditions. Lydia lives and works in the US and Germany.

One Idea Coming Up

by Peter Nicks

Sculpture, bronze

Peter Nicks is a philosopher who has an active interest in experimental film and video making, and, when he is not jogging with his dog in the parks of Potsdam, spends his spare time watching experimental performances in Berlin and London. He grew up in a family of lovers of the minimalist art, the German expressionism and the Russian experimentalism of the 1920's and 1930's. His sculptures are more to be thought of as stage props, although he takes the effort to have them produced in more durable classic materials, like bronze, such as in this sculpture that Nicks created with the Ars Cora.



Spinal Cuttle Cutter

by Robert Michael Smith

Stainless steel (19'x36'x21')

Art is alchemy. Alchemy is the magic, observation, process and ritual of life. The artist's sculptures, both virtual and actual, are conversations regarding the archetypal forms that are the basic structures of nature. Smith builds alien abstract worlds that become familiar through frequent immersion. These worlds are constructed to open exploration to the deepest regions of the human psyche for development within the landscape of the imagination. During the past several years the artist has worked with artisans to realize in stone, metal, and wood the fantastic forms that he had been developing in Cyberspace since the early 1990's. This development afforded the artist the quantum aesthetic leap that has impacted his work for the past twenty years by significantly speeding up the dimensional design process while simultaneously allowing him to view evolutionary changes in his forms through time (animation).

Robert Michael Smith has been an active pioneer of digital sculpture, 3D computer visualization/animation, web design, and virtual sculptures for the web, as well as an Associate Professor of Art and Technology at New York Institute of Technology, Fine Arts Department. Smith is also the NYIT Middle East Fine Arts Computer Graphics Coordinator for Global Exchange Programs in Amman, Jordan; Adliya, Bahrain, and Abu Dhabi, United Arab Emirates. Smith serves as a Board Director for the Digital Stone Project and currently President of the Sculptors Guild. During the past two years Smith has also been the Director of Beijing Tomorrow Art Gallery in v Beijing, China. Smith's art has been exhibited worldwide for over thirty years including the acclaimed

Digital Stone Exhibition at Beijing Today Art Museum, Shanghai Duolun Museum of Modern Art, Chongqing Jinse Gallery, and Wenzhou ArtMap Gallery. Smith's sculpture "Paradise Bird Burlesque" is included in the permanent collection of the China National Museum of Fine Art in Beijing. Smith has been a guest lecturer at numerous universities, international conferences, and featured in several articles and books including "Art of the Digital Age" published by Thames.

Ars Cora

The visitors of this exhibition will notice that several works here were created with the help of the Ars Cora. The Ars Cora is an artistic collective, which is built upon artists willing to join their skills and financial power to help produce each other's works of art. "Cora" comes from Greek and means the pupil of the eye, and is another name for Persephone. Ars Cora refers to the arts of the pupil of the eye: as artists, we are meant to represent things not by their appearances, but the way they really are for the very pupil of the eye. Art looking for the truth and escaping the allure of the semblances experiences itself as a science, and science, trying to dissect the various appearances of reality to reach for the hidden core vision, is art. Therefore, the Ars Cora dedicates itself to the joyful union of art and science; that does not mean trying to play in both playgrounds at the same time, but trying to achieve a perception which unites the two human experiences of the world: the artistic and the scientific, as they join in the united vision of the Ars Cora.

Black Apples

by Kiki Smith

Bronze (38 units ranging in size from 2 ½" x 1" to 3 1/2" x 4")

Kiki Smith was born in 1954 in Nuremberg, Germany. The daughter of American sculptor Tony Smith, Kiki Smith grew up in New Jersey. As a young girl, one of Smith's first experiences with art was helping her father make cardboard models for his geometric sculptures. This training in formalist systems, combined with her upbringing in the Catholic Church, would later resurface in Smith's evocative sculptures, drawings, and prints. The recurrent subject matter in Smith's work has been the body as a receptacle for knowledge, belief, and storytelling. In the 1980s, Smith literally turned the figurative tradition in sculpture inside out, creating objects and drawings based on organs, cellular forms, and the human nervous system. This body of work evolved to incorporate animals, domestic objects, and narrative tropes from classical mythology and folk tales. Life, death, and resurrection are thematic signposts in many of Smith's installations and sculptures. In several of her pieces, including "Lying with the Wolf, Wearing the Skin," and "Rapture," Smith takes as her inspiration the life of St. Genevieve, the patron saint of Paris. Portrayed communing with a wolf, taking shelter with its pelt, and being born from its womb, Smith's character of Genevieve embodies the complex, symbolic relationships between humans and animals. Smith received the Skowhegan Medal for Sculpture in 2000, the Athena Award for Excellence in Printmaking from the Rhode Island School of Design in 2005, the fiftieth Edward MacDowell Medal from the MacDowell Colony in 2009, and has participated in the Whitney Biennial three times in the past decade. In 2005, Smith was elected to the American Academy of Arts and Letters. Smith's work is in numerous prominent museum collections, including the Museum of Modern Art, New York; Walker Art Center, Minneapolis; Whitney Museum of American Art, New York; Solomon R. Guggenheim Museum, New York; the Metropolitan Museum of Art, New York; and the Museum of Contemporary Art, Los Angeles. Smith lives and works in New York City.



