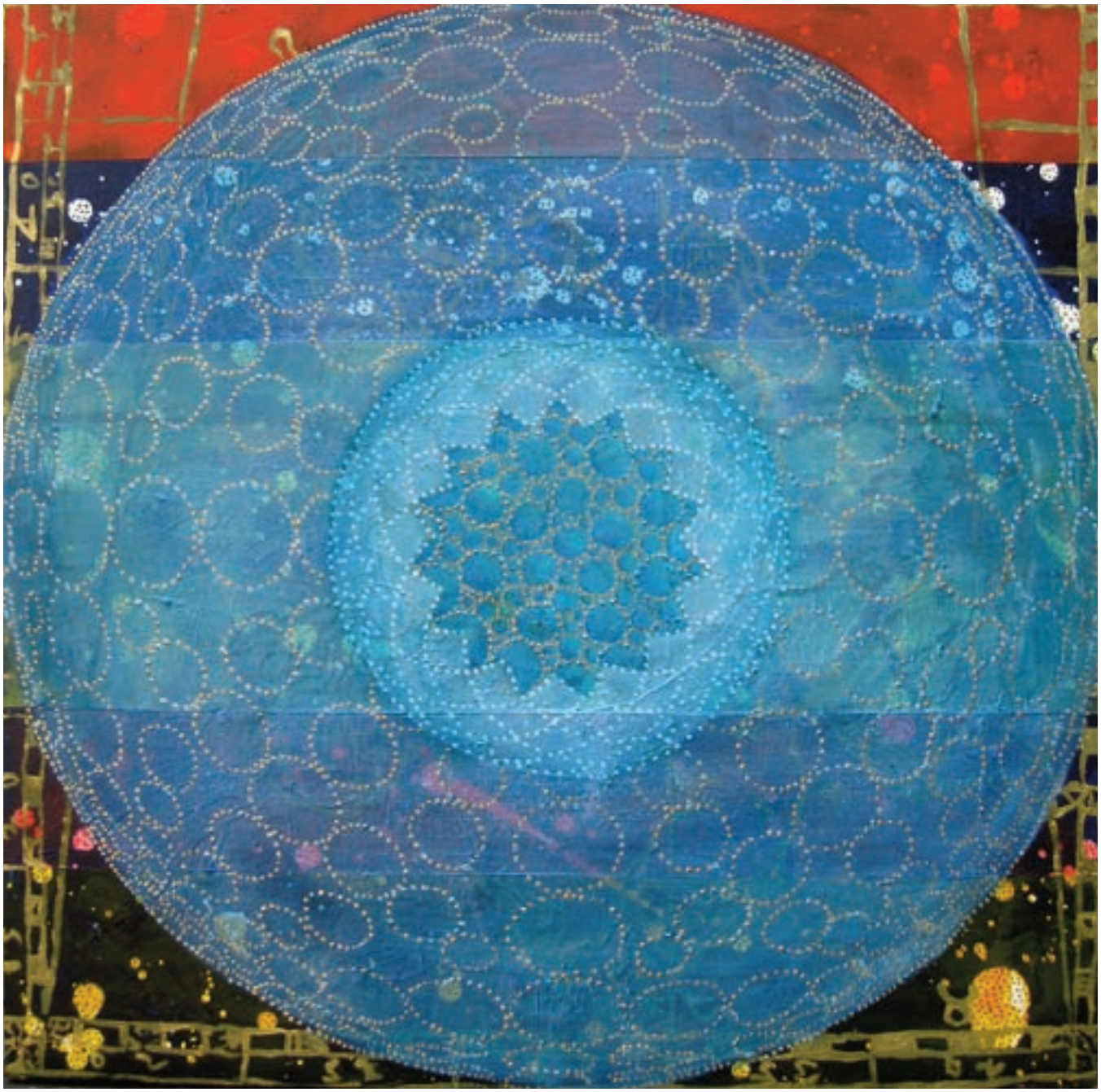
I AM THE COSMOS



NEW JERSEY STATE MUSEUM TRENTON

December 4, 2010 through May 29, 2011

This publication accompanies the exhibition:

on view at the
NEW JERSEY STATE MUSEUM, TRENTON
from December 4, 2010 through May 29, 2011

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I AM THE COSMOS

NEW JERSEY STATE MUSEUM TRENTON

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INTRODUCTION

Since it was established in 1895, the New Jersey State Museum has developed collections, exhibitions and programs in broad and varied areas disciplines including archaeology, cultural history, ethnology, fine art and natural history. While there have been a number of projects that have brought two or more of these areas together, this is the first time that the fine arts and astronomy have together been the focus of an exhibition. Our recently renovated, state-of-the-art planetarium brings the universe right to visitors through exciting, state-of-the-art, full dome digital video presentations. Now, this exhibition allows our visitors to see the ways contemporary artists interpret these new images of the universe which have been made possible by the Hubble Space Telescope and other explorations like it.

Works came from artists as near as Bound Brook, NJ and as far away as Seoul, South Korea. This is an exciting time for space exploration and for the visual arts, and we are so pleased to be able to bring this fascinating subject to New Jerseyans.

This exciting work has been explored by guest curator Dr. Sara Lynn Henry, Drew University Professor of Art History, *Emerita*, and NEH Distinguished Teaching Professor of Humanities, *Emerita*. Dr. Henry has published extensively on Paul Klee, and in concerned with art, nature and science matters, as well as the East-West aesthetic dialogue. The State Museum has been honored and energized to work with such a well-respected scholar. Through this exhibition and the insightful essay included here, she has clarified for New Jerseyans this exciting new mode of art.

This exhibition would not be possible without the generosity of the many artists, institutions, galleries and private collectors 1who have participated in, and generously lent works to, this project. We are so pleased to acknowledge the artists David Ambrose, Alice Aycock, C Bangs, Paul Brach, Amy Cheng, Kwang-Young Chun, Russell Crotty, David Hardy, Carter Hodgkin, Ellen Levy, Robert Longo, David Mann, Matthew Ritchie, Dorothea Rockburne, Todd Siler, Barbara Takenaga, John Torreano, Sarah Walker and Marlene Tseng Yu. We extend our gratitude to our colleagues at The Museum of Modern Art, New York, NY; Denise Bibro Fine Art, Inc., New York, NY; Estate of Paul Brach and Flomenhaft Gallery, New York, NY; Feature Inc., New York, NY; Ronald Feldman Fine Arts, New York, NY; Kim Foster Gallery, New York, NY; Green Van Doren, New York, NY and Rockburne Studio, New York, NY; McKenzie Fine Art, New York, NY; DC Moore Gallery, New York, NY; Pierogi Gallery, New York, NY; Salomon Contemporary, New York, NY; and Michael Steinberg Fine Art, New York, NY. The exhibition also benefited from the generosity of the E. Buk Collection, New York, NY; Ben Evans, Los Angeles, CA; and a Private Collection, Woodstock, NY. Moreover, of course, the project is enhanced by the inclusion of images from the National Aeronautics and Space Administration (NASA), the Hubble European Space Agency (ESA) and the Hubble Heritage Team (STScI).

This exhibition has been supported in part by the Friends of the New Jersey State Museum through the Lucille M. Paris Fund. For over 40 years, the Friends and Museum have participated in an extraordinary public/private partnership. The Friends, a private 501(c)(3) organization, provide fundraising, advocacy, marketing and volunteer support to the Museum. It is through the generous support of corporate, foundation and individual members that the Friends are able to help the Museum meet its mission. We extend our thanks to the Friends Board and their Executive Director Nicole Jannotte for their support of this and all Museum projects.

Staff in the Fine Art Bureau – Registrar Jenny Martin-Wicoff, Preparator Henry Hose and Office Assistant Mary Ann Argust – handled the myriad details of correspondence, loans, transportation, installation and more that go into realizing a project of this variety. Additionally, Exhibits Supervisor Elizabeth Beitel and the team in the Exhibits Bureau – Jenaro Vasquez, Richard Large and Melissa Gabel – worked tirelessly to ensure the needs of the project were met. Assistant Curator of the Planetarium, Jay Schwartz, has been an enthusiastic supporter of this project from the beginning. We extend our gratitude to all.

On behalf of the State Museum, we acknowledge and extend our appreciation to Governor Chris Christie and Lieutenant Governor Kim Guadagno for their ongoing dedication to arts and culture throughout the state, and in particular for their support of the New Jersey State Museum.

ERIC PRYOR
Executive Director, New Jersey State Museum

MARGARET M. O'REILLY
Curator of Fine Art, New Jersey State Museum

Astrophysicists say that we are all made of old stars [originating] from the time of the Big Bang. When I look at my hands I know I am made of old stars, and that I am part of a vast universe.

ARTIST DOROTHEA ROCKBURNE

I AM THE COSMOS

Most of what is currently known about the universe was not fully realized thirty years ago. Most of what can now be seen of the universe could not be seen thirty years ago. A large cohort of artists, now in their 40s and older, has resonated with recent discoveries about the stars, galaxies, deep space, cosmic origins and also with the vast pico-world found under the electron microscope and within atoms themselves ("pico" is just one trillionth of a meter in size!). Certainly, the stunning photographs from the Hubble Space Telescope and from space probes have made the actualities of deep space phenomena become real to the layperson. For some artists, recent discoveries have inflected directions they were already undertaking; for others it has opened up whole new terrains. What is the context for all this?

THE MIND-BLOWING DISCOVERIES ABOUT THE UNIVERSE

Up until the l920s, the universe was considered by most to consist of just our own Milky Way Galaxy. That was it! Then, as announced in 1925, Edwin Hubble, using a new huge telescope, discovered that the elliptical and spiral smudges in the night sky were indeed distant galaxies, rather than just nearby nebulae (clouds of gas and dust). Some astronomers had wondered about the existence of this larger universe, but now there was observational proof. Hubble also learned that these galaxies are moving away from us in all directions; in other words, the universe was expanding (as later understood, space itself is growing larger). By reeling this expansion backwards and knowing the theories of some earlier scientists, Alpher and Gamow in 1948 proposed that the origin of the universe could best be explained by a Big Bang. This theory was confirmed in the 1960s when the ubiquitous microwave background was discovered. These microwaves were a form of light that traveled and lengthened in wave length 13 billion years from the past through the expanding universe. This radiation is no less than the embers of the Big Bang! What this all shows is that the universe as we know it, is both vast and finite. It is subject to staggering forces, dramatic changes, and possible demise – insights that have been relevant to works in this exhibition.

As it is now understood, about 13.7 billion years ago, a fierce vacuum energy pressed space outward from a single point and subatomic particles burst forth. Matter and energy were so densely packed that "one teaspoon of space contained 100 trillion trillion trillion pounds!"[1] It is not known why this Inflationary Big Bang occurred or what might lie beyond our burgeoning observable universe, but the rapid mechanisms of origins have been partially understood through experiments in particle physics. Within the first 100 microseconds the basic forces were articulated and the primary particles of matter – quarks, photons, electrons and neutrinos, then protons and neutrons – were formed. By the first three minutes, some of the particles fused into hydrogen, then helium plasma, but not yet full atoms. It was only about 400,000 years later, after the temperature of the expanding universe cooled enough, that atoms began to form. It was at this point that the haze of colliding, unattached particles cleared and the first light waves were released as what is now known is the cosmic microwave background. Minuscule variations of temperature density (only a few micro degrees), discovered in 1992 through a NASA

study, were decidedly the seeds for stars, then galaxies. By about 200 million years after the Big Bang (ABB), the densest clumps of matter began to collapse into themselves to create brilliant stars, which lit "up the sky like thousands of jewels."[2] Stars were huge, lived briefly and then exploded in supernova explosions, which sent the elements forged in their fiery furnaces out into the environment as gas and dust, the seedbed for new stars – the same way star birth still occurs. By one billion years ABB, the myriads of stars began to cluster into infant galaxies, with frequent galaxy collisions, prodigious star birth and explosions. At about five billion years ABB, mature, more stable galaxies formed, including our own Milky Way, with our sun and solar system in one of its spiral arms. Clusters of galaxies and super clusters came together to create webs of galaxies throughout the universe. It is now estimated that there are up to 400 billion stars in our own galaxy and over 100 billion galaxies in the observable universe. We as humans are merely a "mote in the eye of the universe." We are all indeed made out of this original star stuff created billions of ago, yet if the life of the universe were conceived of as a day long, then we humans have only existed for two seconds.[3]

Out of these discoveries, yet more mysteries are being probed. First, the existence of dark matter was posited in the 1930s and has been more fully explored since the 1980s to explain how galaxies cohere and orbit at the speeds they do (among other observational puzzles). Dark matter (not emitting or reflecting light) penetrates galaxies, extending beyond these galaxies as huge halos of some as-yet mysterious gravitationally effective substance. Second was the 1998 discovery that the expansion of the universe is accelerating. In order to explain this, there must be some sort of dark energy, countering gravity, propelling the universe outward at a faster and faster pace.[4] This being so, at some point in the future, the speed will become even more than the speed of light, and "we" would not be able to see any of the galaxies that are beyond our own galaxy group (which would have already merged into a single entity anyway).[5] The "we" is a conjecture, since our own sun will have heated up, sizzled the Earth and died some billions of years before that. Extrapolating this cosmic expansion out into time, some astrophysicists surmise that the universe may end in a Big Chill with the dispersal and decay of all matter. Some consider that our universe may be just one of many expanding bubble universes. Maybe our cosmos is not all there is!

THE ARTISTS: WHY AND HOW THEY DO IT. THE "I" IN THE COSMOS

In both science and art, the mind plays an exploratory, evaluative and structuring role. The scientist is constrained by the quest for verifiable systematic formulations of the workings of the physical world, while artists have more freedom to explore subjective analogies, symbols and personal expression as they develop their art. They can draw upon the workings of their mind, experience, feelings and even their artistic means to create their formulations. In relation to their art, they frequently gaze far out to wonder about what is beyond the exploratory self in this vast universe. As Russell Crotty put it, "Looking up at the sky can be dizzying when you are in a dark location – deep time passing all around you, the Milky Way passing above your head, and yet you are part of it." Crotty is aware that the telescope he uses for his art exploration is "like a time machine….When you're looking at some galaxies, you're looking at something 50 million light years away."[6] All of these artists want to bring about that sense of deep time and space in their art.

Is this contemporary art therefore subjectively arbitrary in relation to natural phenomena? The answer is a decided "no." Although all the artists eschew literal demonstrations of scientific material, they wish to resonate with the content and implications of these new discoveries. Artist **Dorothea Rockburne** seeks the deep structures and geometries of natural phenomena. She is excited about the new insights concerning cosmic processes, such as star birthing or the concept of light as both particle and wave, or even the notion of the origin of "universes." She wants to convey these, rather than depict them by creating parallel structures and processes. **John Torreano** wishes to take people where they cannot go themselves, to make the unimaginable something that can be experienced. He goes so far as to translate the feeling of an event through his own body and through the materiality of the work of art. He enacts gestural strokes and applies tangible materials, such as glass gems as stars or painted wooden balls as galactic stuff. **Marlene Tseng Yu** is more inner-spirit oriented. She wants her own personal vitality

and painting process to resonate with the dynamic movements of nature. For **Sarah Walker**, the creative process can be mind travel as much as space-time travel. Her multidimensional images suggest diagrammed neural pathways as much as deep space grids (with references also to geology, architecture and technology. Some artists, including **David Ambrose**, **Amy Cheng**, **David Mann** and **Barbara Takenaga**, extrapolate imaginative dynamic patterns out of seed ideas. Two artists have a critical edge to their outlooks. Ellen Levy wants to deal with "the sensual dimensions of science and its generative processes," but also wishes to make us aware of "the drastic ramifications of the application of science and technology" to our natural world.[7] Alice Aycock considers that the more the sciences reveal about the miniscule place of the human in the whole, the more contemporary persons have retreated to comforts of the everyday, such as Campbell's soup cans, and also, for many, to the assurances of traditional anthropomorphic religious viewpoints.[8]

COSMIC ART, THEN AND NOW

Earlier 20th century precedents for this 21st century cosmic art exist in the work of Wassily Kandinsky and Paul Klee, and also in the works of a few artists from the Abstract Expressionist movement including Adolph Gottlieb, Richard Pousette-Dart, Gordon Onslow Ford and Mark Tobey. The images these artists present use flattened signs for solar and moon shapes and small dots or gestural marks for stars and star energies. Space is generally flat or a colored scrim. At most, there might be a barely shaped aura around celestial discs. The abstracted references of the works signal suns, moons, planets, stars and night skies — our closer star terrain – often with an earthly gravity as a grounding point. The artists tended to be more mystical than outer space oriented. As Pousette-Dart wrote, art is a "transcendental language of form, spirit, harmony" telling us there is "one universal eternal presence."[9]

By contrast, these 21st century artists plunge the viewer into a vast new terrain of space and time. The viewer hovers and moves within the universe freed from any earthly grounding. Images are more three-dimensional and tangible, more astronomically informed by newly available sources. Outer-space references are multiple, suggesting, not only suns and planets, but abstracted star fields, nebulae, comets and cosmic webs of macro and micro phenomena. Spheres expand and explode with energy, radically moving out into space. Some spherical forms are created from concentrations of progressively larger forms, a self-similar replication, radically inflating, suggestive of a Big Bang. Fiery clouds of luminous, exploding atmospheres give birth to metaphoric stars. Galaxies spin and points of light congregate in fathomless dark black and blue spaces. Movements are elliptical, spiral and curved (it is known today that, astronomically, things move in curved paths, rather than the more static, idealized diagonals and perfect circles of the earlier art). There are even indications of human space travel.

STARGAZING

Traditional star gazing tracked major sky configurations using such instruments as an armillary (delineating the zones of the celestial sphere around the earth), a tellurion (demonstrating the movement of the earth around the sun), handheld celestial maps (e.g. the Barrett-Serviss Star and Planet Finder), and light shows of the changing constellations (as the Bailey's Astral Lantern) – all of which are shown in this exhibition as sculptural objects, as well as compelling scientific instruments. By contrast, since the 1990s, it has been one huge step directly into space through the images of the Hubble Telescope, which have thrust us close up to the stars, the galaxies and cosmic processes. One can see several Hubble photographs in the exhibition. As a result, the current experience of stargazing in art is direct, enveloping and frequently experientially layered. The viewer is thrust into the space of the stars themselves. **Russell Crotty** directly observes the stars through his own telescope, while perched on a ladder in his homemade observatory, making notations in his sketchbook – no camera, no digital enhancements, no computer sources. He then delicately sketches his found configurations onto a paper-covered globe by tiny, inked striations of sky and wavy lines around each star – all shimmering with sky energy. His large star cluster, *M37 in Auriga* (2008), envelops us, as if we were located on a micro spot on his globe, experiencing the configuration close up as it scatters out around the whole earth sphere. There is both

intimacy and vastness at the same time. In *Starfield #4* (2006), **Robert Longo** propels us directly into a vast starry depths with no grounding or bearings, where we experience a myriad of dazzling, peppered points of light scattered through a charcoal black sky. Some stars seem nearer and brighter, some more faint in a measureless regression. Elements of the image have been found digitally, then enhanced and vividly altered. In this nearly 8' tall work on paper, the deep star space engulfs the viewer, extending from below our feet to far above our heads. The night sky can also be a place for passing thoughts, dreams and the sometimes uneasy sense of inchoate transmigrations. Presented within a sky chart circle is **Alice Aycock**'s *Things Pass by in the Night: Murmuration 1* (2009). Strange and unnerving, the image seems at once murmurings passing through the Milky Way and also a hovering flock of propeller birds, beating their flight through outer space. (The term "murmuration" means both murmured sounds and a flock of starlings.) Metaphysical longing is found in a late work, *Star Map* (2005), by **Paul Brach**, where a luminous vermillion orb is split open to reveal constellated stars in the distance, along with stars in the foreground, as well as on the star itself – all is holistic energy.

COSMIC ORIGINS

The birthing of stars, galaxies and even of the cosmos itself are prime similes. Some images start from Hubble photographs, some invent their own emergent patterns, others seek pure light and radiant energy. **John Torreano**'s three works are viscerally transformed Hubble and NASA images. *A Star(s) is Born* (2007), fashioned from a Hubble image of the Large Magellanic Cloud Galaxy, shows new stars emerging from illuminated nebular clouds. The light opens into a sky blue, suggestive of a Baroque ceiling painting, the opening gently articulated by a centered subliminal cross, formed where the four panels meet. Applied faux gems glitter as you walk by. Torreano's *Orion's Edge* (2009), using Hubble images as a starting point, is ripped open by painterly strokes of exploding light. Portions of the plywood base are sunken or raised, and wooden balls and acrylic and glass gems are applied to the surface – all tactile enactments of the explosive stuff of the Orion Nebula (which is astronomically known for its brown dwarf stars, protoplanetary discs, and supersonic "bullets" of gas piercing the hydrogen clouds).[10] *Dark Matters - pink* (2010), inspired by a NASA image of the origins of the universe, presents three-dimensional white balls edged by white and pink auras and glass gems, emerging from the thick black stuff of galactic origins. Also seeking the birthing heart of space is **Dorothea Rockburne**'s *Magellanic Magnification II* (1994-98), with its dazzling nebular white light, shaded to yellow and red heat, which hits the viewer like the shock of a sonic boom. This heart of light, shaped like a pod, is suggestive of seed origins and also of fundamental cosmic elliptical movement.

The power of a whole galaxy is seen in **Marlene Tseng Yu**'s *Whirlpool I* (1996), a spiral type, like our own Milky Way, here confounded with an aqueous whirlpool, the actual name of a nearby galaxy.[11] The spiral form can symbolize growth and the evolution of the universe and is found in many objects macro and micro in nature. Yu's glowing yellow center suggests the dense pack stars that might astronomically be at the center location of a galactic black hole, but also could be reflected sun on water. Her clouds are stellar, earthly sky and painterly all at once. Yu resonates with the experience of Chinese *qi*, the universal vital energy in mind and matter, which is constantly changing from one form into another. **Barbara Takenaga** also uses a galactic spiral to structure her image *Last Blue Wheel* (2008), here with a double reversed spin. The image articulates a seeming Big Bang expansion, lighter and hotter in the center, cooler and darker as it moves out. Like the universe, the process is inflationary rather than a burst causing an empty center. The development moves out through the replication of similar forms from smaller to larger, evolving by a random self-organization, guided by her subliminal rules as to sequences, encounters and occasional breakthroughs. Takenaga has had an interest in Hubble images as also those of the electron microscope, as is the case with **David Mann** as well. Mann's resulting images are tangible, biological, yet also stellar-like constellations of radiant light. He conflates the macro and the micro. His *Light Year* (2008) is illumined and airy yet also seemingly liquid, allowing for the free mobility of his gelatinous undulating entities, edged with light and emanating light. The title of "light year" came after the fact, yet is suggestive of the cosmic space-time journeys of forms of light through space. **Amy Cheng**'s generative sphere boldly fills her canvas. A celebratory budding core is surrounded by spiral and circling configurations of dancing

pearls, moving out across the ethereal blue orb. She sums it up in the title that named the exhibition, *I Am the Cosmos* (2010).

ENERGETIC PARTICLES

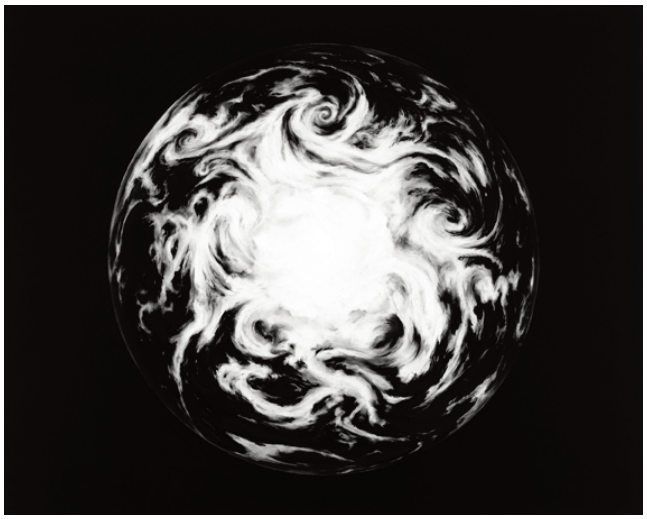
If the deep skies have offered a vast terrain of discoveries and wonders, what about that equally vast subatomic terrain of elementary particles of matter and energy? By 1939, atoms had been both shattered and fused, and by the 1950s and 60s a bewildering array of subatomic particles had been discovered as a result of experimental high-energy particle collisions. At first referred to as a "particle zoo," these bits have been reduced since the l970s in the Standard Model of the most elementary particles that combine to make the more complex. Artist **Carter Hodgkin** became interested in the strange visual dramas of particle collisions. She manipulates the computer codes that run virtual experiments, revealing explosive encounters and trajectories. Using the codes, Hodgkin can vary factors, such as speed and gravity. The resulting ink jet prints are the starting point for her invented poetic visions on canvas. Her *Grand Singularity* (2009) is an anthropomorphic dance of spiral spins and cascading paths of colored light particles on the pitch-black ground of ink jet and paint. The "singularity" of the title signals the nobility of a single collision.[12] In *Particle and Wave* (1994), **Dorothea Rockburne** grapples with the particle physics concept that all elementary particles of mass and energy behave like both particles and waves (depending on the conditions and mode of measurement). Her personal visualization is as telling and strange as the scientific concept. Her spherical forms can be read on the particle level (as if photon or electron), and also at the level of cosmic bodies (as if the sun). Circular fields of rotating energy, suggesting energy and mass particle densities, intersect each other. Flowing through them, yet not quite identical with them, are undulating waves of activity — i.e., the configurations seem to be both particle and wave at the same time – a poetic parallel to the science concept. But, as Rockburne says, "the image is ultimately mysterious."[13]

One artist/researcher works with the actual. **Todd Siler**'s conceptualizations for the development of a nuclear fusion energy system are being taken seriously by a group of innovators within the fusion physics community. Fusion energy has been researched for decades as a safer and ultimately more plentiful source of energy than our current nuclear power plant fission mode.[14] Functioning as both art and science, Siler's large drawings and his sculpture from his series, *Fractal Reactor: Re-Creating the Sun*, visualize the core of a fusion reactor, based on his original notion of using "fractal" geometry[15] for the magnets, which would irregularly compress and contain plasmas just as gravity does in the stars. This new "geometry of nature" contrasts with the idealized shapes and symmetry of Euclidean geometry, which is currently being used for mainstream fusion design. By omitting the building-scaled internal and external support structures, Siler chose to visualize directly the hot plasma reaction (i.e. of charged particles), activated by surrounding superconducting magnets and insulated by a lithium blanket. Three of his drawings envision the hot shimmer and flow of the energy itself.[16] Another drawing elegantly details parts and processes as a verbal/visual display. Artist **David Ambrose** pictorially creates his own sun in *Mashriq* (2008) (*Mashriq* is Arabic for "place of sunrise"), by using his concentrated method of pierced paper, pooled watercolor and cell-like outlines. Serendipitously, a brilliant ball of energy emerges, suggesting the granulation of the rising and falling of fiery plasma within the mass of the sun, similar to the naturalistic model that engendered Siler's conceptualizations.

EARTH FROM SPACE

Our existence on this planet earth is precarious. We are living on the only, as yet discovered, cosmic body that can support life forms. First in the 1960s, then published since the mid-l980s, photographs taken by astronauts of earth from space have been made available in book form and then on the NASA web site. As of November 1, 2010, the images number 1,030,759 in the online archives.[17] NASA has recently deployed its Earth Observing System of low satellites to track changes in land surface, biosphere, atmosphere and oceans for environmental purposes.

The various images from all these sources have changed our sense of who and where we are and how we are going to cope with the drastic environmental changes underway. **Longo**'s *Untitled (Bottom of the Earth, Antarctica)* (2008) (shown



ROBERT LONGO
untitled (Bottom of the Earth, Antarctica) (2008)

above) is one of a handful of his astonishing earth-in-space views, using such digital images as a starting point. Shown straight on from the bottom of the planet, suspended in black charcoal space, the image abstracts the dynamic swirling patterns of the dense clouds, ice and earth forms of our South Pole. Such a view changes our sense of place. **Tseng Yu** has created the painterly rhythms of aerially experienced forests, ice and sea since the l960s. Beginning in the 1980s, her forms became more particularized, more natural. One finds a varied terrain of expressive deep sea, reef, glacier and forest flowing shapes, seemingly layered with air, clouds and weather – all metamorphosing into each other (e.g., *Forest Moss* [Rain Forest Series], [1998]). We are suspended far above; yet participate in the very processes of a poetic earth biosphere. **Kwang-Young Chun** thrusts us directly onto an invented barren planet/moonscape in *Aggregation 10-SE030* (2010). Created out of small Styrofoam polygons, covered with Korean herbal medicinal papers, Chun's multiple elements project in relief, as if the rugged surface of rocks, mountains and perhaps precarious city towers. Deep dark craters are dug into the support. Elements diminish in size toward the edges, suggesting a cosmically blasted orb. Reminding us further of our fragile existence is **Matthew Ritchie**'s *I Hear We're All Coming Back* (2003). Spindly, hopeful figures, arms raised, are floating on a horizontal terra (not so) firma within the vastness of the universe.

HYPERSPACE REALITIES

"Hyperspace" is a science fiction mode of space, co-existing with our own universe. Constituted of four or more dimensions, circumventing the laws of physics, it may be entered through strange energy portals for faster-than-light space and time travel. Such is an apt naming of the reinvented space of much recent cosmic art, not only shattering the remnants of Euclidean three-dimensionality but also the four dimensions of faceted Cubism. **Sarah Walker** dissolves bits of mass into edged remnants of space and light, one layer over another, as if superimposed up over time and alternate dimensions. Technological grids and radically receding diagonals in *Continental Drift* (2010) thrust us into such layers for futuristic otherworldly experiences, as much mental as physical. **Ellen Levy**'s object and energy elements are similarly gravity free, floating, intersecting, dissolving, near and far, and opening into deep space – all at the same time. Her images symbolically reference both the microscopic and the macroscopic. Techno elements tell of deconstructed space travel, microbiology, physics and outer space, presenting semiological messages that provoke thought. On *Imaging Coronas* (2006), Levy inscribes "Corona Discharge Images," "Life Force Technologies" and "Coronavirus," signaling different uses and misuses of natural and industrial activity. For example, a "coronavirus" was the cause of the deadly SARS virus in Asia in 2003, while an electrical discharge, also called a "corona," can present mysterious streamers of light. Edged by shifting luminous planes, diagonally crossed by corona discharge, Levy's image opens up through floating space-station geometries into a deep black space, where a beautiful solar corona shines forth through a dark eclipse. The viewer hovers within the hyperspace of all these elements. Such alternate contemporary spaces give us a place to examine our culture's science and technology trajectories.

FUTURES

A class of artists has worked directly with current research that envisions new human frontiers in space. Human outer-space capabilities may be necessary for a thriving human future or even for survival of life as we know it. Astro-artist **David Hardy** has illustrated books by Patrick Moore, Arthur B. Clarke and Carl Sagan, among others, authentically picturing the sun,

planets, moons, asteroids and comets in ways that photographs have yet been able to record. He projects space travel that has yet to be possible, such as *Soft Landing on a Comet* (2004). He also takes up such questions as the possibility of a near-time asteroid crash onto the earth, such as caused the extinction of dinosaurs twenty-five million years ago.[18] **C Bangs** has directly collaborated with NASA physicists, engineers and space scientists to help visualize their concepts. In collaboration with her astronomer husband, Gregory Matloff, and Les Johnson of NASA, she illustrated the book *Living off the Land in Space: Green Roads to the Cosmos* (2007), which presents current research on the possibilities of intra-solar system travel, the mining of space objects (such as the moon, asteroids, comets and even other planets), human settlement in space and interstellar space probes. (See Bangs' digital prints *Orbital Steam Locomotive* (2005) and *Raw Materials in Space* (2009).[19] Bangs' images are provocatively symbolic and accurate at the same time. Perhaps these futuristic possibilities are – guardedly – our new frontier.

Sara Lynn Henry, *Guest Curator*

[1] From the NASA Universe Forum, produced by the Harvard Smithsonian Center for Astrophysics, completed 2009, http://www.cfa.harvard.edu/seuforum/bb_popup_history2.htm.

[2] Mark Whittle, *Cosmology: The History and Nature of Our Universe*, Chantilly, VA: The Teaching Company, 2008, Lecture Five.

[3] Helpful for this account were: Ken Croswell, *The Universe at Midnight*, NY: The Free Press, 2001; Alex Flippenko, *Understanding the Universe: An Introduction to Astronomy*, Chantilly, VA: The Teaching Company, 1998; Steve Nadis, "Will Dark Energy, Steal the Stars," *Astronomy* magazine, Nov. 2004, 100-105; NASA website http://www.nasa.gov/; Colin A. Ronan, *The Natural History of the Universe*, N.Y. Macmillian Publishing Company, 1991; Mark Whittle, *Cosmology: The History and Nature of Our Universe*, Chantilly, VA: The Teaching Company, 2008; plus correspondence with astronomer Bob Berman.

[4] According to the major theory, this may be an energy that is a property of space itself, i.e. the more space created by expansion, the more energy to press outward, therefore the whole movement keeps speeding up.

[5] It is predicted, for example, that our Milky Way and our closet neighbor Andromeda Galaxy will likely merge in about 4.5 billion years, creating an already named future spherical galaxy to be called "Milkomeda." (Astronomer Bob Berman)

[6] Quoted in *Russell Crotty*, essay by David Frankel, Seattle, WA: Marquand Books, 2006, p. 15.

[7] *Ellen K. Levy, Decoding Metaphors for the 21st Century*, Lawrenceville, N.J.; Rider University catalogue, 2009, p.4.

[8] Unless footnoted, all quotes and comments are from interviews with the artists by the curator, September and October, 2010.

[9] Quoted in Lowery Stokes Sims and Stephen Polcari, *Richard Pousette-Dart (1916-1991)*, N.Y.: Metropolitan Museum of Art, 1997, p. 13 from Pousette-Dart, Notebook B 158, dated by the artist 1960; this entry dated Feb. 1964.

[10] http://en.wikipedia.org/wiki/Orion_Nebula

[11] Yu's image is an inspired transformation of a Hubble Image of M51, called the "Whirlpool Galaxy."

[12] The title also obliquely invokes the initial "singularity" of all particles and forces at the time of the Big Bang and found in black holes, though this reference was not consciously intentional on the artist's part.

[13] Conversation with the curator, 9/11/10.

[14] Fusion energy involves the fusion of atomic nuclei to form a heavier nucleus, releasing four to five times more energy than nuclear fission (our current mode of splitting atoms). For fuel, fusion uses isotopes of hydrogen, which are found in seawater, plentifully available. The reactors are inherently safe and cannot explode or meltdown. When accomplished fusion power could supply the world's needs for millions of years. Todd Siler has been invited to present his concepts for four international conferences regarding plasma fusion research. His next step, working with collaborators, is to develop and test mathematical models for his concepts.

[15] "Fractal" refers to irregular patterns in nature, that are "self similar," i.e. formed by the same random forces, resulting in similar shapes at many levels of magnification, but with individual differences. For example, a satellite view of a coastline has a similar pattern as that of one small part of that coast.

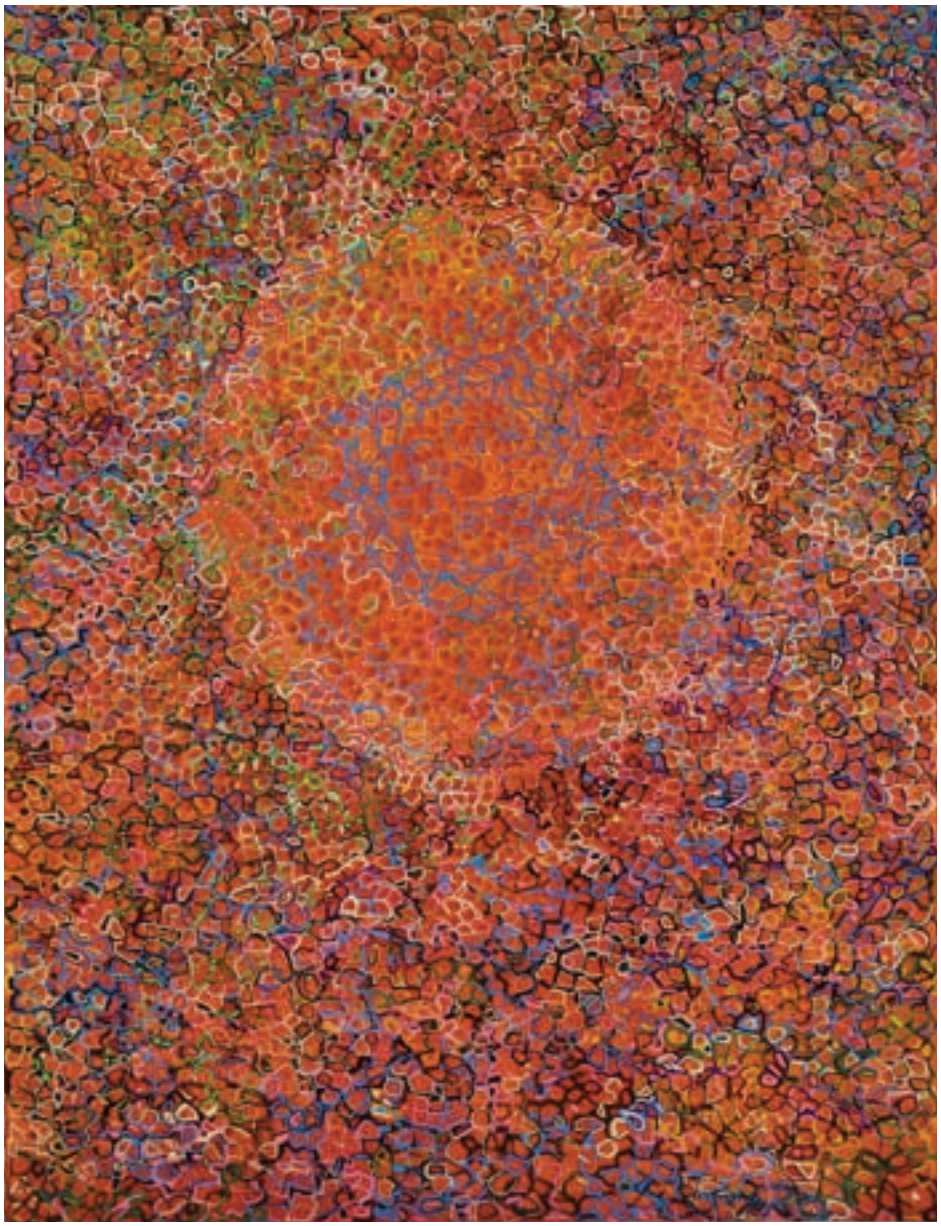
[16] For a fuller account of Siler's project, see his article in *Leonardo, Journal of Arts, Sciences and Technology* (MIT Press), Vol. 40, Issue 3, June 2007, pp. 270-278.

[17] (The *Earth from Space* photo database is the easiest to access and search by topic such as "Earth Landscapes," "Hurricanes and Weather," etc. (http://earth.jsc.nasa.gov/sseop/efs/). For the most complete collection of photos, see "The Gateway to Astronaut Photography of Earth," http://eol.jsc.nasa.gov/sseop/clickmap/

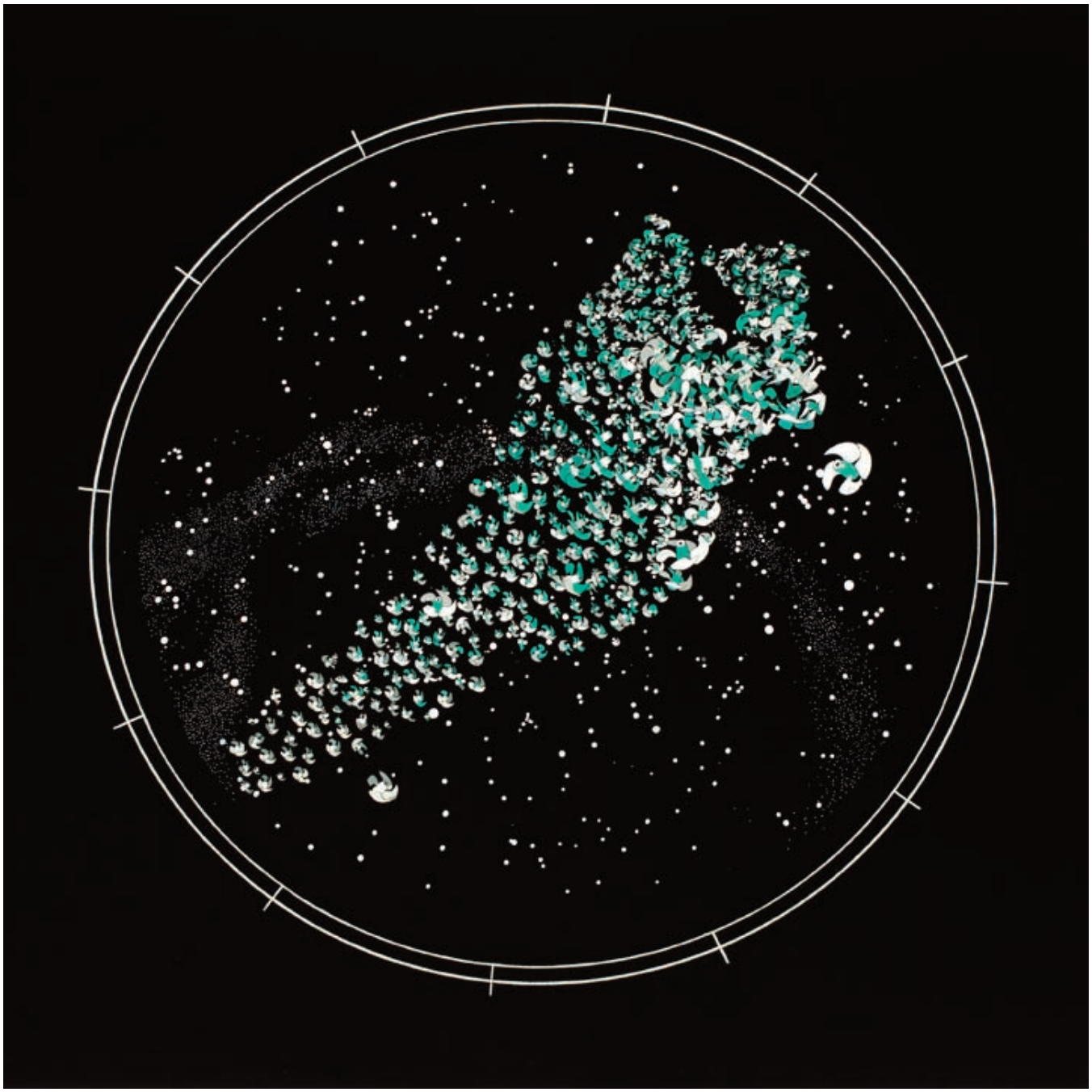
[18] See Hardy's web site, http://www.hardyart.demon.co.uk/pages-gallery/p-debrs1.html

[19] C Bangs had a NASA grant to create a holographic "message plaque" in 2001. During 2002-2004, she was a "Summer Faculty Fellow" at the NASA Marshall Spaceflight Center, Huntsville, Alabama. Gregory Matloff is an interstellar travel expert and NASA consultant. He has authored and co-authored eight books. His papers on interstellar travel, the search for extraterrestrials, and Earth protection from asteroid impacts have been widely published. Les Johnson is Program Manager at the NASA Marshall Space Flight Center.

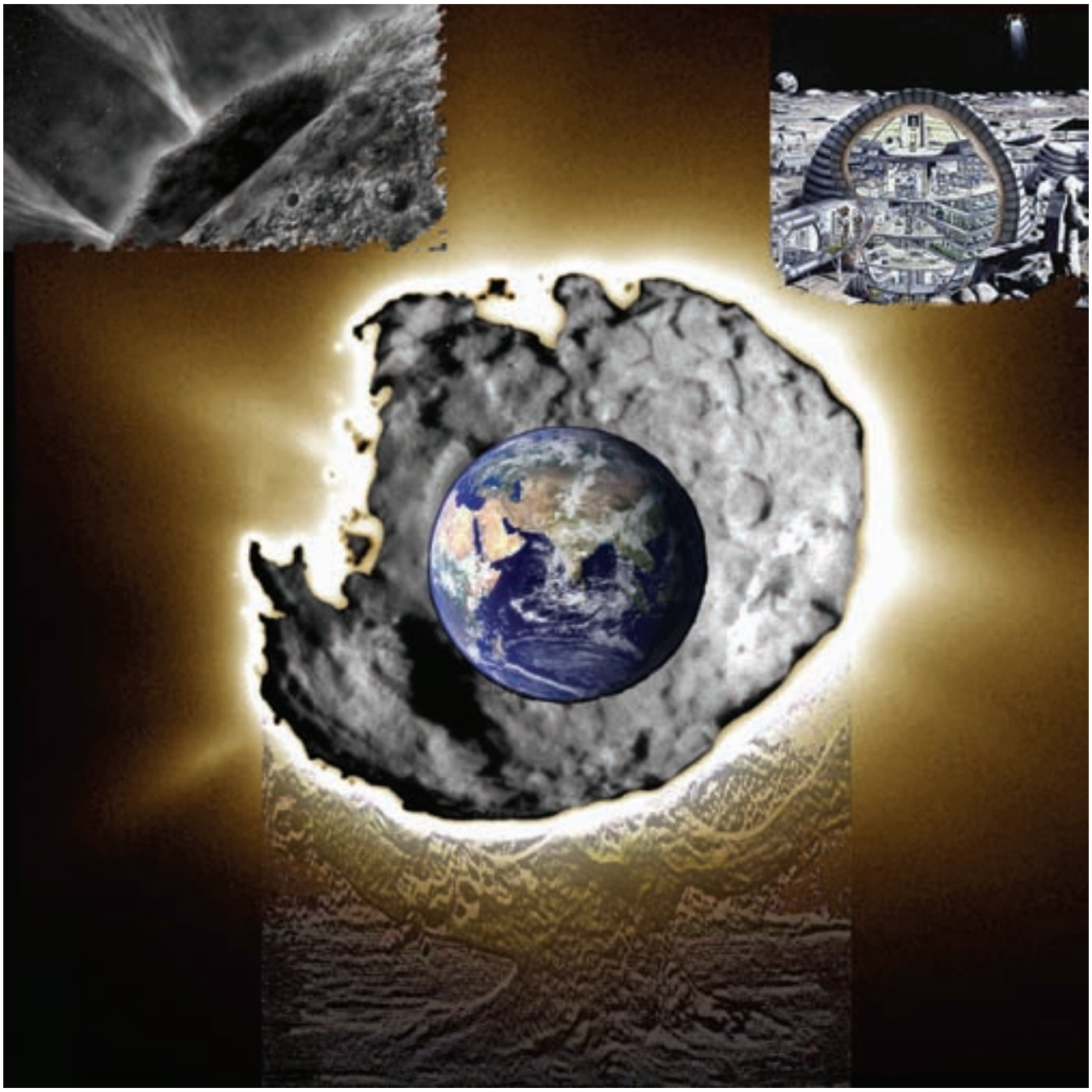
PLATES



DAVID AMBROSE
Mashriq 2008
watercolor and gouache on pierced paper, 10 ¾ x 8 ½ inches
Courtesy of Private Collection, Woodstock, NY

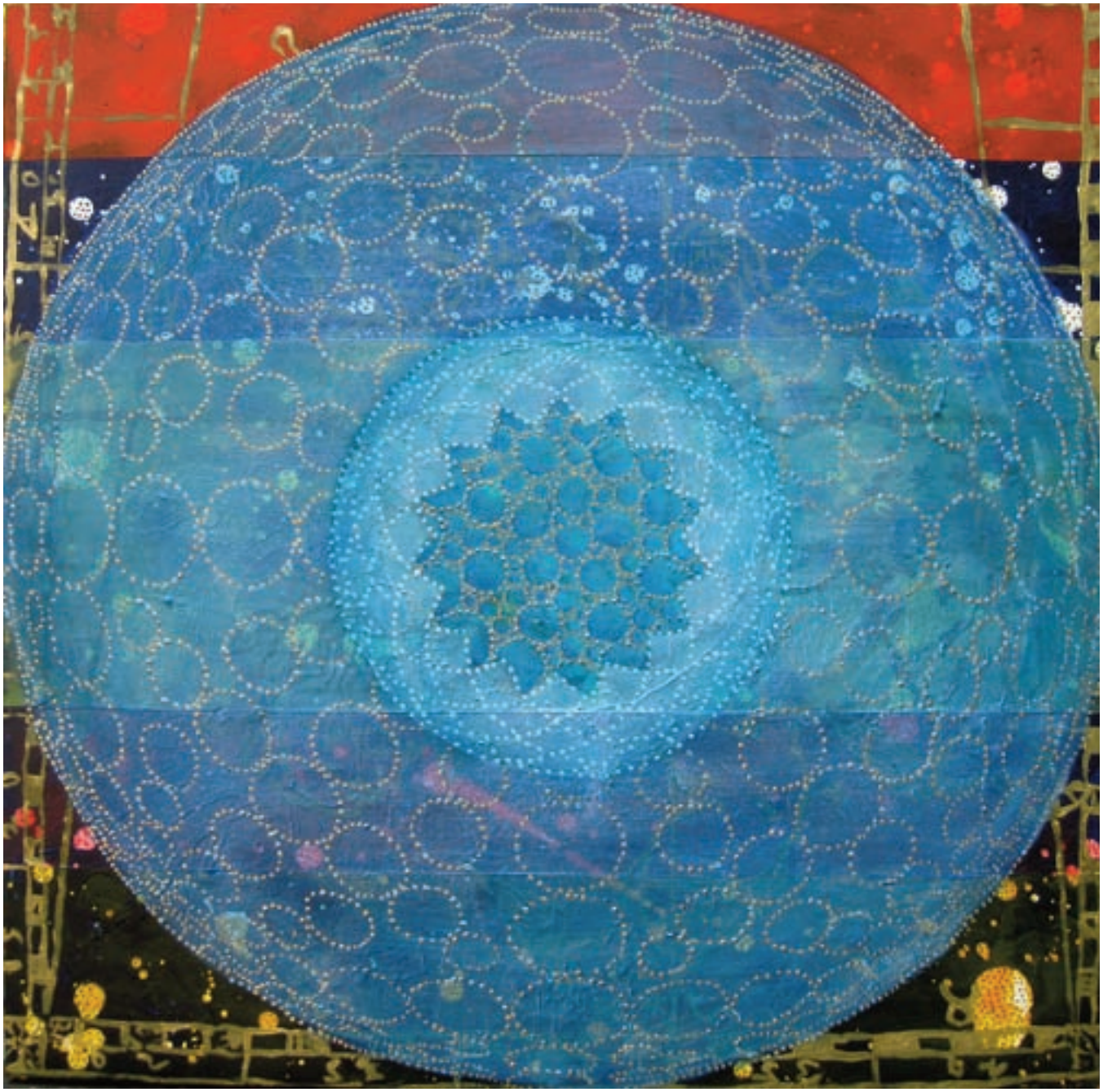


ALICE AYCOCK
Things Pass by in the Night: Murmuration 1 2009
from the *On the Starry Night* series
ink, pencil and watercolor on paper, 61 x 61 inches
Courtesy of the Artist and Salomon Contemporary, New York, NY



C BANGS
Raw Materials from Space 2009
digital collage, 14 x 20 inches
Courtesy of the Artist

PAUL BRACH
Star Map 2005
oil on canvas, 48 x 48 inches
Courtesy of the Estate of Paul Brach and Flomenhaft Gallery, New York, NY

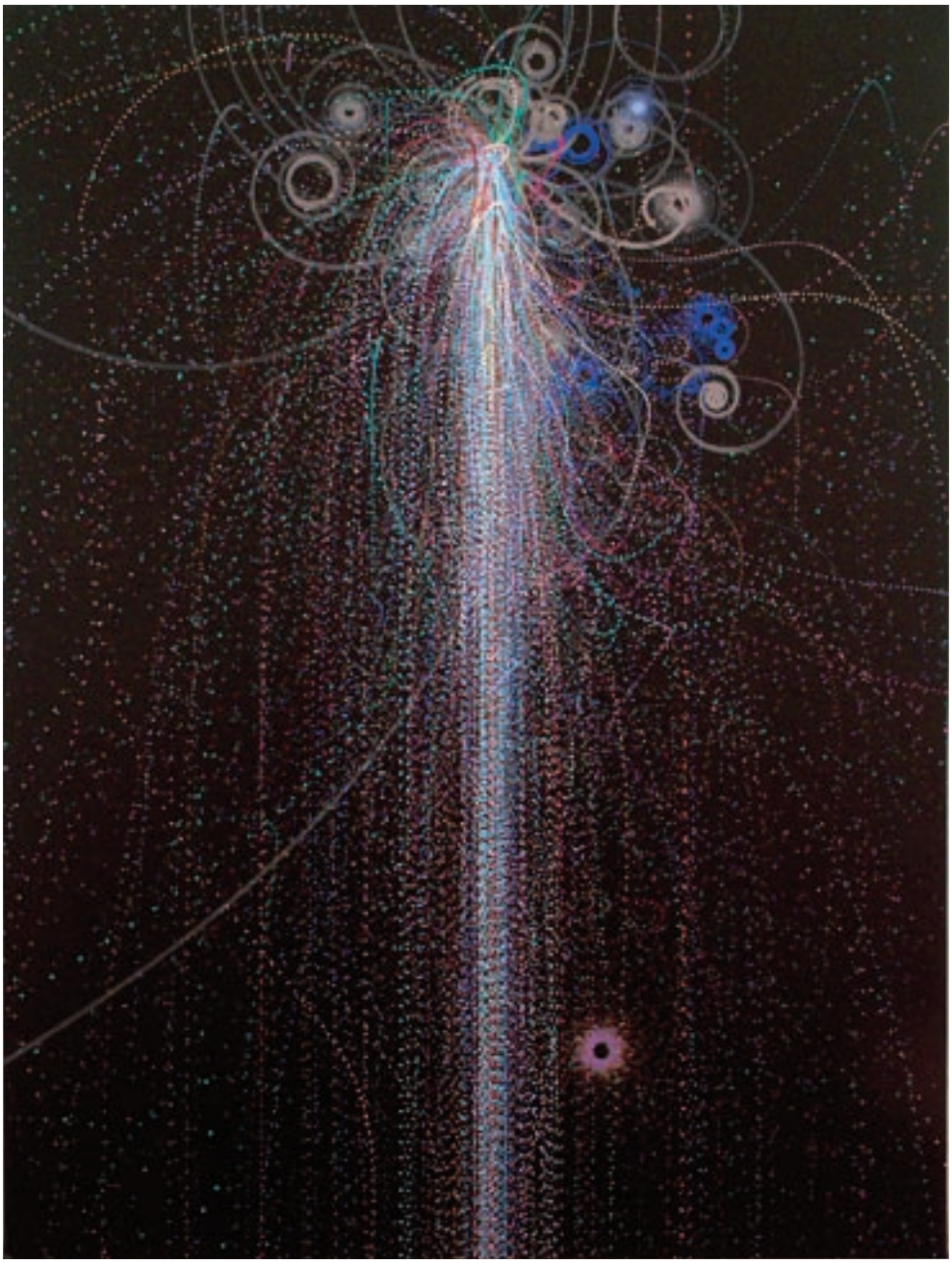


AMY CHENG
I Am the Cosmos 2010
oil and wax on wood panel, 24 x 24 inches
Courtesy of the Artist

KWANG-YOUNG CHUN
Aggregation 10-SE030 2010
mixed media with Korean mulberry paper, 90 x 64 ½ inches
Courtesy of the Artist and Kim Foster Gallery, New York, NY

RUSSELL CROTTY
M37 in Auriga 2008
ink and watercolor on paper, mounted on fiberglass sphere, 12 inch diameter
Courtesy of Ben Evans, Los Angeles, CA

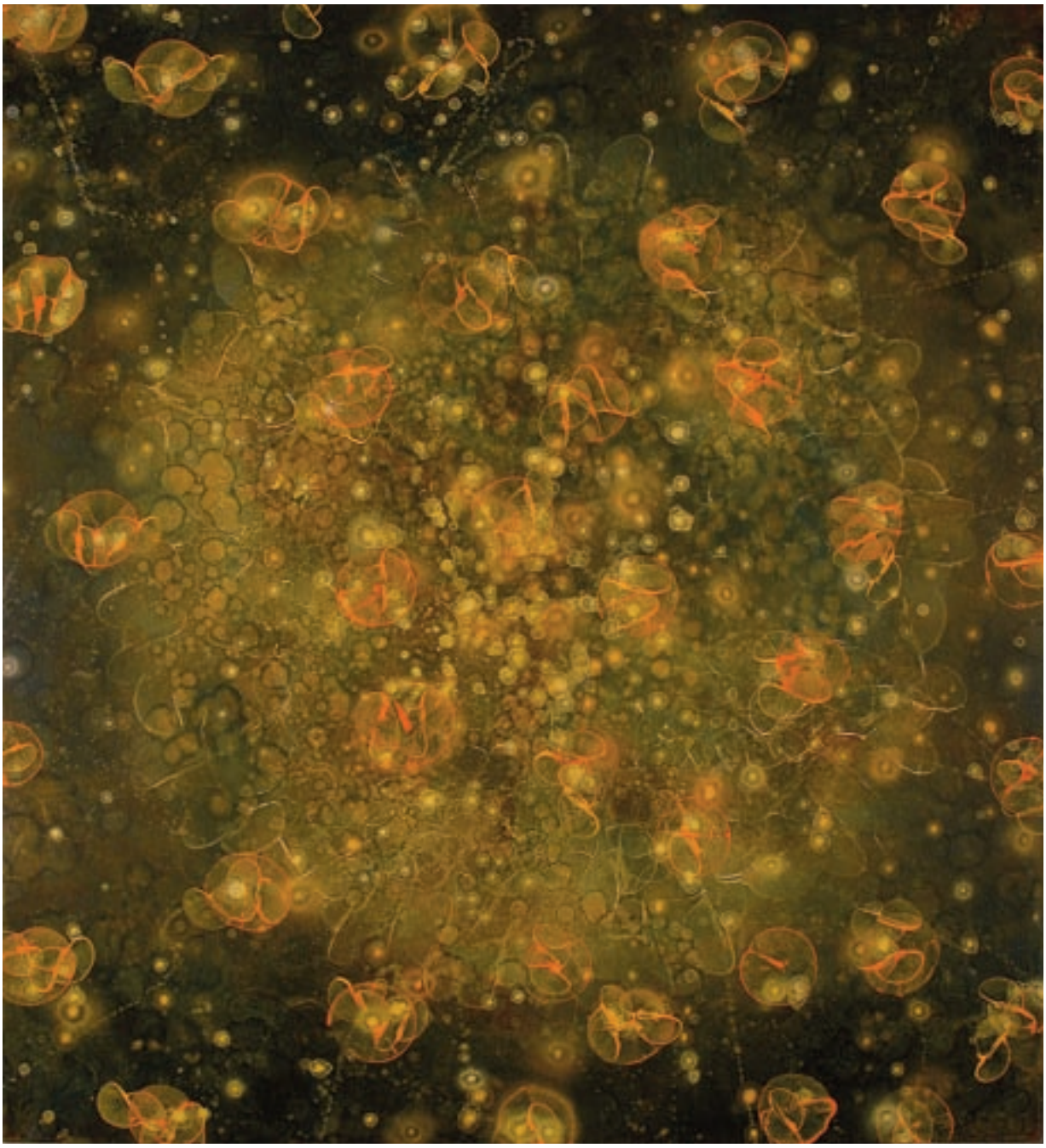
DAVID A. HARDY
Soft Landing on a Comet 2004
from *Futures: 50 Years in Space* (2004) by David A. Hardy & Sir Patrick Moore
digital print, 13 x 20 inches
Courtesy of the Artist



CARTER HODGKIN
Grand Singularity 2009
oil, enamel and ink on paper, 50 x 76 inches
Courtesy of the Artist and Denise Bibro Fine Art, Inc., New York, NY

ELLEN LEVY
Imagining Coronas 2006
mixed media on panel, 60 x 40 inches
Courtesy of the Artist and Michael Steinberg Fine Art, New York, NY

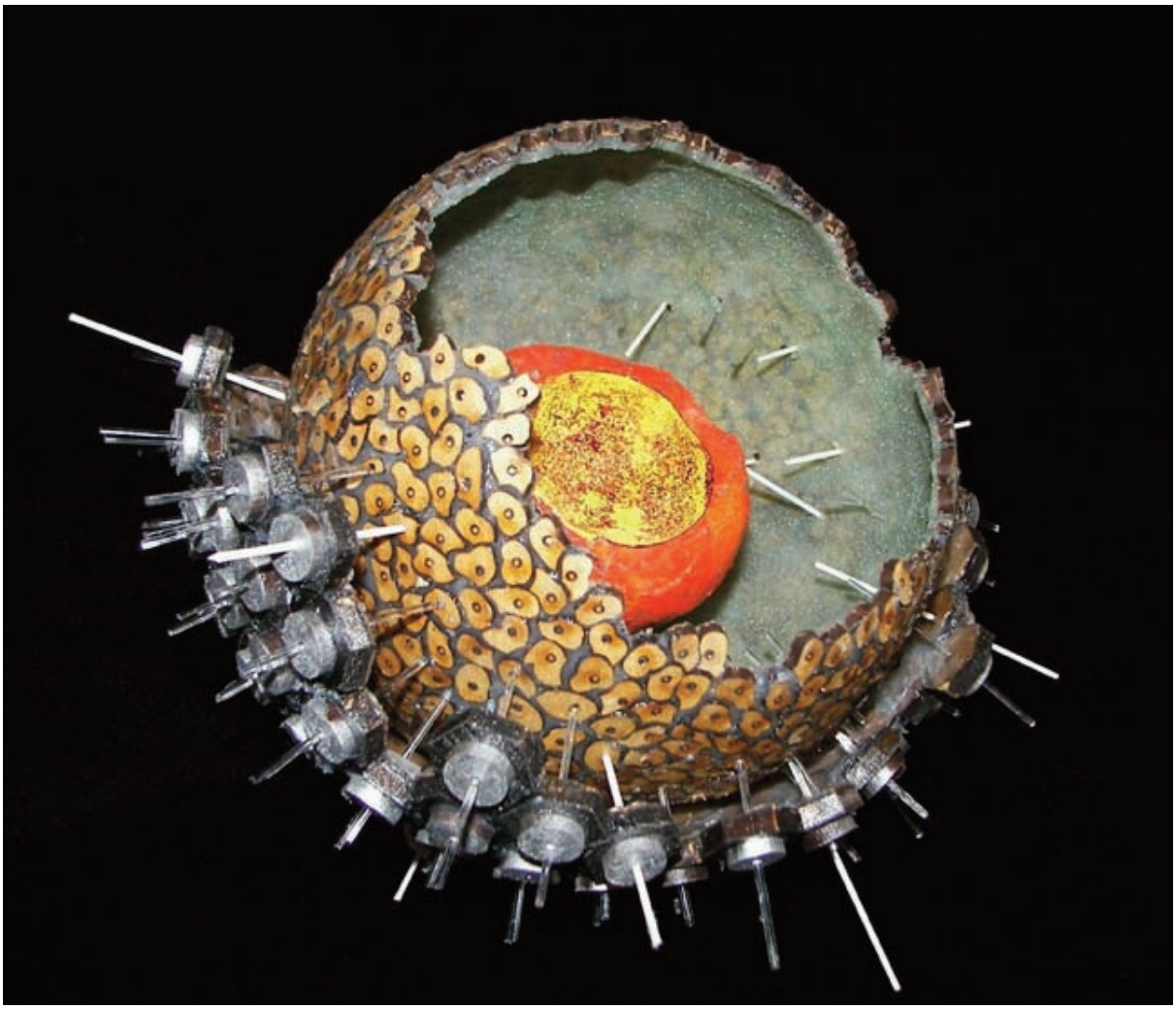
ROBERT LONGO
Untitled (Starfield #4) 2006
charcoal on mounted paper, 94 x 48 inches
Courtesy of the Artist



DAVID MANN
Light Year 2008
acrylic and oil on canvas stretched over board, 72 x 65 inches
Courtesy of the Artist and McKenzie Fine Art, New York, NY

MATTHEW RITCHIE
I Heard We're All Coming Back 2003
felt tip pen and colored ink on transparentized paper, 12 x 48 inches
Courtesy of The Museum of Modern Art, New York, NY.
The Judith Rothschild Foundation Contemporary Drawings Collection Gift, 2005

DOROTHEA ROCKBURNE
Magellanic Magnification II 1994-98
colored pencil, charcoal, labels, conservator's glue and papyrus on handmade paper, mounted on rag board, 50 x 41 inches
Courtesy of Green Van Doren, New York, NY, and Rockburne Studio, New York, NY



TODD SILER
Fractal Reactor: Re-Creating the Sun
An Alternative Nuclear Fusion Energy System Based on Nature's Fractal Geometry 2000
mixed media, 10 x 10 x 8 inches
Courtesy of the Artist and Ronald Feldman Fine Arts, New York

BARBARA TAKENAGA
Last Blue Wheel 2008
acrylic on canvas, 70 x 60 inches
Courtesy of DC Moore Gallery, New York, NY

JOHN TORREANO
A Star(s) Is Born 2007
acrylic, Krylon spray paint, acrylic gems, glass gems, wood and silicon on plywood,
mounted on aluminum frames, 90 x 90 x 2 ¾ inches
Courtesy of the Artist and Feature Inc., New York, NY

SARAH WALKER
Continental Drift 2010
acrylic on panel, 36 x 38 inches
Courtesy of the Artist and Pierogi Gallery, New York, NY

MARLENE TSENG YU
Whirlpool 1 1996
from the *Galaxy and Milky Way* series
acrylic on canvas, 96 x 168 inches
Courtesy of the Artist

Armillary Sphere early to mid-19th century
wood, steel, brass, papier-mâché and paper, 17 x 10 ¾ inches
Courtesy of the E. Buk Collection, New York, NY

Hubble Captures View of "Mystic Mountain" February 1-2, 2010
digital print, size variable
Courtesy of the National Aeronautics and Space Administration (NASA),
the Hubble European Space Agency (ESA) and M. Livio and the Hubble 20th Anniversary Team (STScI)
http://hubblesite.org/gallery/album/entire/pr2010013a/from/show/

Dimensions are given in inches; height by width (or diameter) by depth, unless otherwise noted.
Objects illustrated in this catalogue are indicated with an asterisk *

ART

DAVID AMBROSE
http://www.davidmambrose.com/wpaper.html
Mashriq 2008 *
watercolor and gouache on pierced paper
10 ¾ x 8 ½
Courtesy of Private Collection, Woodstock, NY

ALICE AYCOCK
http://www.aaycock.com/drawings.html
Things Pass by in the Night: Murmuration 1 2009 *
from the *On the Starry Night* series
ink, pencil and watercolor on paper
61 x 61
Courtesy of the Artist and Salomon Contemporary, New York, NY

C BANGS
http://www.cbangs.com
The Orbital Steam Locomotive 2005
digital collage
14 x 20
Courtesy of the Artist

Raw Materials from Space 2009 *
digital collage
14 x 14
Courtesy of the Artist

PAUL BRACH
http://www.flomenhaftgallery.com/flomenhaft_gallery_artists_biographies/paul_brach_artist_bio.php
Star Map 2005 *
oil on canvas
48 x 48
Courtesy of the Estate of Paul Brach and Flomenhaft Gallery, New York, NY

AMY CHENG
http://www.amychengstudio.com
I Am the Cosmos 2010 *
oil and wax on wood panel
24 x 24
Courtesy of the Artist

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Aggregation 10-SE030 2010 *
mixed media with Korean mulberry paper
90 x 64 ½
Courtesy of the Artist and Kim Foster Gallery, New York, NY

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http://russellcrotty.com
M37 in Auriga 2008 *
ink and watercolor on paper, mounted on fiberglass sphere
12 inch diameter
Courtesy of Ben Evans, Los Angeles, CA

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digital print
13 x 20
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oil, enamel and ink on paper
50 x 36
Courtesy of the Artist and Denise Bibro Fine Art, Inc., New York, NY

ELLEN LEVY
http://www.complexityart.com
Imagining Coronas 2006 *
mixed media on panel
60 x 40
Courtesy of the Artist and Michael Steinberg Fine Art, New York, NY

ROBERT LONGO
http://www.robertlongo.com
Untitled (Starfield #4) 2006 *
charcoal on mounted paper
94 x 48
Courtesy of the Artist

DAVID MANN
http://www.mckenziefineart.com/artists/mann/mann.html
Light Year 2008 *
acrylic and oil on canvas stretched over board
72 x 65
Courtesy of the Artist and McKenzie Fine Art, New York, NY

MATTHEW RITCHIE
http://www.artnet.com/artist/14305/matthew-ritchie.html
I Heard We're All Coming Back 2003 *
felt tip pen and colored ink on transparentized paper
12 x 48
Courtesy of The Museum of Modern Art, New York, NY
The Judith Rothschild Foundation Contemporary Drawings Collection Gift, 2005

DOROTHEA ROCKBURNE
http://www.dorothearockburne.com
Particle and Wave 1994
flashe black and colored pencil on handmade paper, mounted on rag board
24 ¼ x 28
Courtesy of Green Van Doren, New York, NY and Rockburne Studio, New York, NY

Magellanic Magnification II 1994-98 *
colored pencil, charcoal, labels, conservator's glue and papyrus on handmade paper, mounted on rag board
50 x 41
Courtesy of Green Van Doren, New York, NY and Rockburne Studio, New York, NY

Copper, Paper Pulp and Dieu Donne #2 2003
paper pulp and paint on copper foil
36 x 28 ½
Courtesy of Green Van Doren, New York, NY and Rockburne Studio, New York, NY

TODD SILER
http://www.toddsilerart.com
Fractal Reactor: Re-Creating the Sun
An Alternative Nuclear Fusion Energy System Based on Nature's Fractal Geometry 2000 *
mixed media
10 x 10 x 8
Courtesy of the Artist and Ronald Feldman Fine Arts, New York, NY

Plasma Fusion Profile #1 2006
mixed media on paper
18 x 24
Courtesy of the Artist and Ronald Feldman Fine Arts, New York, NY

Plasma Fusion Profile #2 2006
mixed media on paper
18 x 24
Courtesy of the Artist and Ronald Feldman Fine Arts, New York, NY

The Art of Simplicity? The Science of Complexity? Balancing the Plasmas Generated by the Fields Pressure from the Fractal Magnets 2006
mixed media on paper
36 x 56
Courtesy of the Artist and Ronald Feldman Fine Arts, New York, NY

Fractal Reactor Nuclear Fusion Energy System (Artist Conception) 2009
Giclée print on Arches paper, mounted on compressed board
17 x 23
Courtesy of the Artist and Ronald Feldman Fine Arts, New York, NY

BARBARA TAKENAGA
http://www.barbaratakenaga.com
Last Blue Wheel 2008 *
acrylic on canvas
70 x 60
Courtesy of DC Moore Gallery, New York

JOHN TORREANO
http://johntorreano.com/John_Torreano/Home.html
A Star(s) Is Born 2007 *
acrylic, Krylon spray paint, acrylic gems, glass gems, wood and silicon on plywood, mounted on aluminum frames
90 x 90 x 2 ¾
Courtesy of the Artist and Feature Inc., New York, NY

Orion's Edge 2009
acrylic, Krylon spray paint, acrylic gems, glass gems, wood and silicon on plywood, mounted on aluminum frames
108 x 108 x 4 ¼
Courtesy of the Artist and Feature Inc., New York, NY

Dark Matters - pink 2010
acrylic, Krylon spray paint, acrylic gems, glass gems, wood and silicon on plywood, mounted on wood frames
45 x 45 x 4 ½
Courtesy of the Artist and Feature Inc., New York, NY

SARAH WALKER
http://www.sarahwalker.org
Continental Drift 2010 *
acrylic on panel
36 x 38
Courtesy of the Artist and Pierogi Gallery, New York, NY

MARLENE TSENG YU
http://www.marlenetsengyu.com
Whirlpool 1 1996 *
from the *Galaxy and Milky Way* series
acrylic on canvas
96 x 168
Courtesy of the Artist

Forest Moss 1998
from Rain Forest series
acrylic on paper
36 x 46
Courtesy of the Artist

HISTORIC OBJECTS

Armillary Sphere early to mid-19th century *
wood, steel, brass, papier-mâché and paper
17 x 10 ¾
Courtesy of the E. Buk Collection, New York, NY

Barritt-Serviss Star and Planet Finder 1906
US patent October 2, 1906 by Leon Barritt,
Publisher, New York, NY
papier-mâché, paper, metal binding eyelets and string
15 x 15
Courtesy of the E. Buk Collection, New York, NY

Tellurion c. early 20th century
steel, brass, wood, papier-mâché and paper
20 ¾ x 29 x 12
Courtesy of the E. Buk Collection, New York, NY

Bailey's Astral Lantern 1881
Franklin H. Bailey patent 1881
manufactured by New England School Furnishing Company, Boston, MA
sheet steel, wire, glass, paper star maps and scrolls
20 x 17 x 17
Courtesy of the E. Buk Collection, New York, NY

SPACE IMAGES

Young Stars Sculpt Gas with Powerful Outflows in the Small Magellanic Cloud July 2004
digital print
Courtesy of the National Aeronautics and Space Administration (NASA), the Hubble European Space Agency (ESA) and A. Nota (STScI/ESA)
http://hubblesite.org/gallery/album/pr2005035a/npp/all/

Hubble Captures View of "Mystic Mountain" Feb. 1-2, 2010 *
digital print
Courtesy of the National Aeronautics and Space Administration (NASA), the Hubble European Space Agency (ESA) and M. Livio and the Hubble 20th Anniversary Team (STScI)
http://hubblesite.org/gallery/album/entire/pr2010013a/from/show/

The Core of Star Cluster Omega Centauri nd
digital print
Courtesy of the National Aeronautics and Space Administration (NASA), the Hubble European Space Agency (ESA) and the Hubble Heritage Team (STScI/AURA)
Acknowledgements to A. Cool (San Francisco State University) and J. Anderson (STScI)
http://hubblesite.org/gallery/album/pr2008014a/from/show/

The Majestic Sombrero Galaxy (M104) May-June, 2003
digital print
Courtesy of the National Aeronautics and Space Administration (NASA) and the Hubble Heritage Team (STScI/AURA)
http://hubblesite.org/gallery/album/pr2003028a/from/show/

A Grazing Encounter Between Two Spiral Galaxies (NGC 2207 and IC2163) nd
digital print
Courtesy of the National Aeronautics and Space Administration (NASA) and the Hubble Heritage Team (STScI/AURA)
http://hubblesite.org/gallery/album/entire/pr2004045a/from/show/

Close-Up of Galaxies from the Hubble Deep Field Image nd
digital print
Courtesy of the National Aeronautics and Space Administration (NASA), the Hubble European Space Agency (ESA), S. Beckwith (STScI) and the HUDF Team
http://hubblesite.org/gallery/album/pr2004007h/

Saturn Aurora January 28, 2004
digital print
Courtesy of the National Aeronautics and Space Administration (NASA), the Hubble European Space Agency (ESA), J. Clarke (Boston University) and Z. Levay (STScI)
http://hubblesite.org/gallery/album/pr2005006d/

SARA LYNN HENRY

Guest Curator

Sara Lynn Henry is an independent curator, art writer, and Emerita Professor of Art History and N.E.H. Distinguished Teaching Professor of Humanities, Emerita, Drew University. She has curated major thematic exhibitions: As If Alive: Animate Sculpture *for the Visual Arts Center of New Jersey. (2000),* Brave New Worlds: from Natural to Techno Universes *for the Dorsky Gallery Curatorial Projects, Long Island City, Queens, New York (2005), and* Midnight Full of Stars *for the Visual Arts Center of New Jersey (2008). She also has curated several one-person and collection shows at Drew, including those of Joyce Scott, Lila Katzen, Hsu Dan, George Grosz Prints, and the Nancy Graves Donation. Her art writing includes essays on Robert Kushner, Ellen K. Levy, Suejin Jo, Alice Neel and Grace Bakst Wapner. As a scholar, she has published extensively on Paul Klee.*

NEW JERSEY STATE MUSEUM

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Janet Field, *Technical Assistant I, Administration*
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Lynda Younger, *Technical Assistant III, Administration*

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