

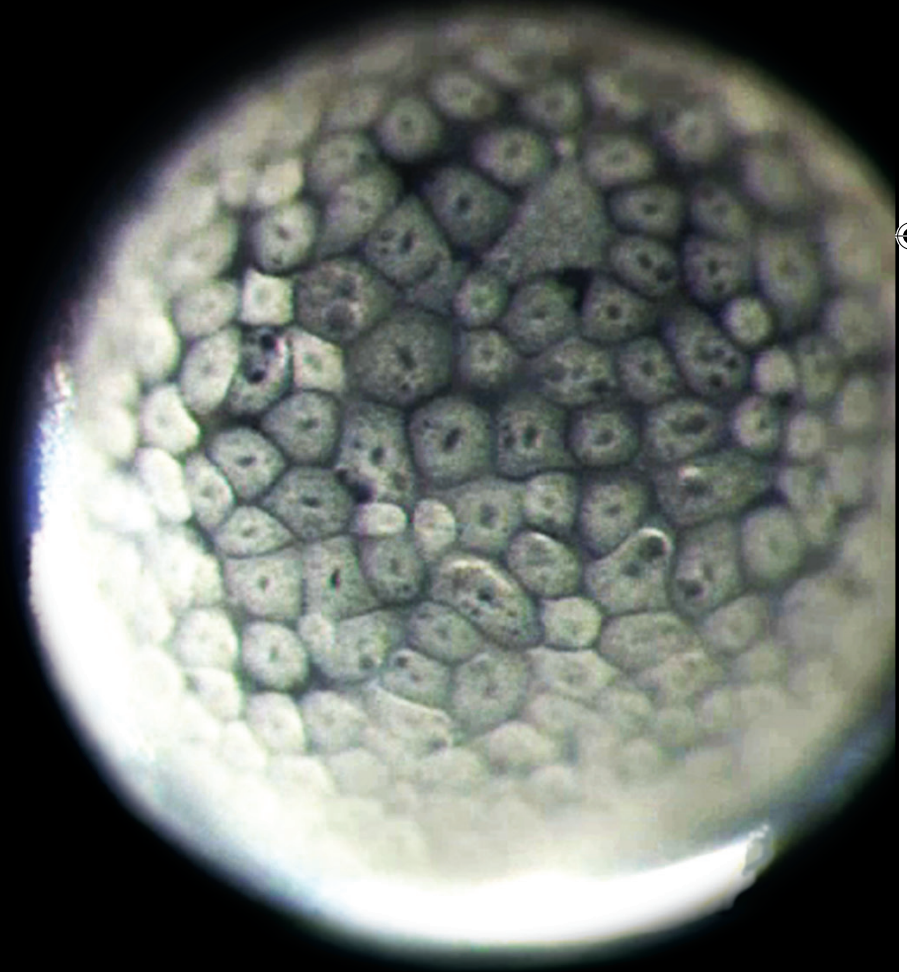


INNER SPACE, GLOBAL MATTER: RECORDING FROM THE STRUCTURES WITHIN **Ondrizek**

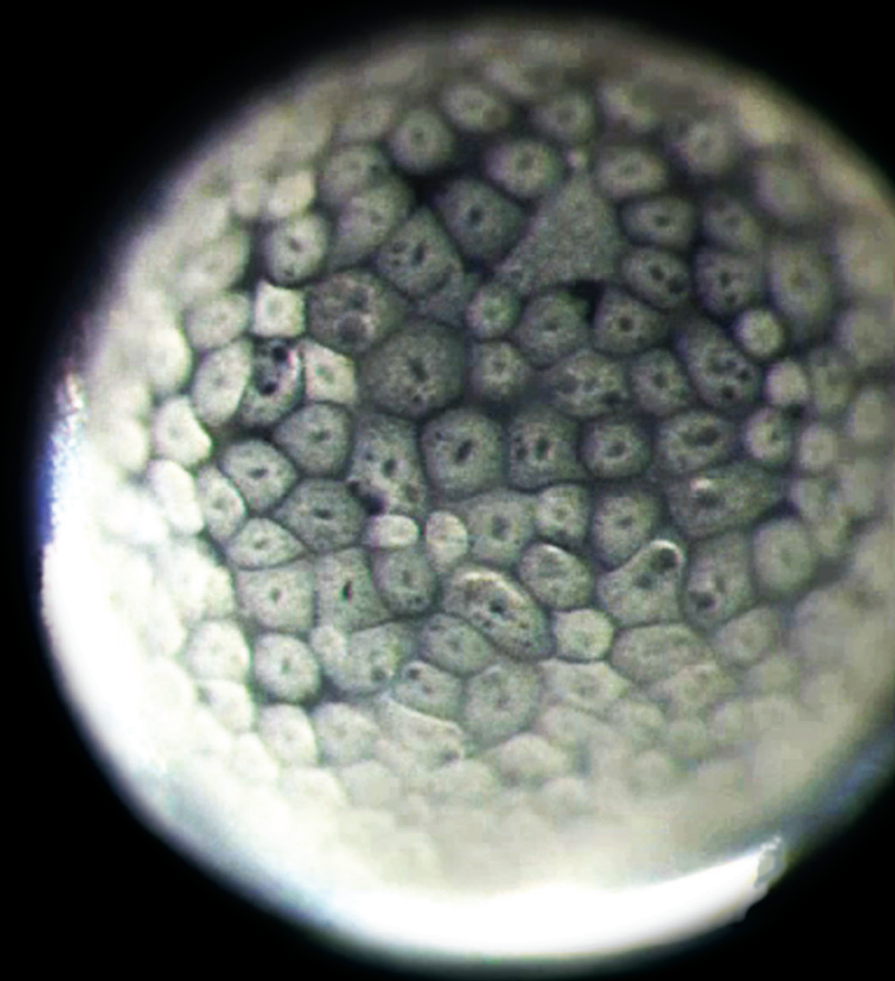
INNER SPACE, GLOBAL MATTER: RECORDING FROM THE STRUCTURES WITHIN

Geraldine Ondrizek

Works from 2009 Through 2012









INNER SPACE, GLOBAL MATTER: RECORDING FROM THE STRUCTURES WITHIN

Geraldine Ondrizek

Works from 2009 Through 2012

Jane Chin Davidson

University of Houston-Clear Lake Art Gallery



CONTENTS

Published on the occasion of the exhibition *Inner Space, Global Matter: Recording from the Structures Within*, Geraldine Ondrizek - Works from 2008 through 2012, curated by Jane Chin Davidson

University of Houston–Clear Lake Art Gallery and Alfred R. Neumann Library, November 19, 2012–February 1, 2013

Space Center Houston, NASA’s Johnson Space Center, November 19, 2012 – February 1, 2013

Miami Beach Urban Studios (MBUS), Florida International University, November 2 - January 1, 2013

This project is funded by the Houston Endowment

Copyright © 2012 by Jane Chin Davidson.
All rights reserved. Published by the University of Houston-Clear Lake Art Gallery

No part of the contents of this book may be reproduced without the written permission of the publisher

First Edition, 2012

Editor, Jane Chin Davidson
Designer, Rebecca García-Franco
Photographer, Leo Chan

Inner Space, Global Matter: Recording from the Structures Within
Geraldine Ondrizek - Works from 2008 through 2012

Edited by Jane Chin Davidson
Essays by Jane Chin Davidson and Alpesh Kantilal Patel

Front and back covers, frontispiece: *Cellular*© Geraldine Ondrizek, 2009, (detail)

Printed in the United States of America
Printed in Houston by Southwest Precision Printers
ISBN 978-0-578-11426-2

FORWARD

Jane Chin Davidson ix

Nick J. de Vries xiii

CELLULAR

Geraldine Ondrizek 7

CHROMOSOME PAINTING

Genevieve Gaiser Tremblay, Robin Bennett, Geraldine Ondrizek 15

INNER SPACE, GLOBAL MATTER

Jane Chin Davidson 21

TOWARDS AN INTERCORPOREAL ‘BODY’

Alpesh Kantilal Patel 38

WORKS IN THE EXHIBITION

ARTIST’S BIOGRAPHY 49

APPENDIX 54

PHOTO CREDITS 58

ACKNOWLEDGEMENTS 60



FORWARD

Jane Chin Davidson

Curator of Inner Space, Global Matter

One of the most important developments in the practice of exhibiting art is the concept of “sitedness” which has transformed the way in which art produces meaning. Not only does the “place” and location play an integral role in the artistic expression but the engagement with the community and populace who reside there is central to the significance of the exhibition. The opportunity to present *Inner Space, Global Matter: Recording from the Structures Within* for audiences in the NASA community was made possible when artist Geraldine Ondrizek accepted the invitation to exhibit her science-art-works at the three locations of the University of Houston at Clear Lake, the Space Center Houston of Johnson Space Center, and the Florida International University.

Cellular installation and Chromosome Painting at University of Houston-Clear Lake Art Gallery



From top: *Cellular Film Stills* and still from *Cellular* video at University of Houston-Clear Lake Art Gallery

Ondrizek's scientific subject, however, consists of the biological genetic image that appears at first glance unrelated to "rocket science." Her signature multi-media artwork *Cellular* re-imagines the universal "self" of science by incorporating the sound of human cells dividing with the film of the embryonic stages of the development of spider eggs. The video installation projects the actual recording of the vibration of cells through the AMF (atomic force microscope) and this aural expression is integrated with the gastrulation of blastophores captured on film. Magnified by thousands of times in a moving projection, the enormous cellular installation resembles a planet in rotation, a suspended orbiting sphere. Of course, viewers of *Cellular* at the Houston Space Center are easily deceived until they read the associating information.

The aesthetic imagination provides a clear objective for developing the new art and science relationship. Whether focusing on planets or cells, the practice of science is discovery, which is compelled by stirrings of the human imagination. The major difference from science, however, as given through Ondrizek's interpretation, is the contemplative perspective that is unique to the artistic expectation. The viewer is made to "look" with aesthetic appreciation rather than focus the usual scientific gaze toward molecular material observed under the microscope. Artistic and scientific imagination can therefore be integrated in the acceptance of the aesthetic likeness of cells and planets, in which the shared affinity is absolutely more than just appearances. Molecular and subatomic matter all connect as they comprise the compositional elements that perpetuate life itself.

Ultimately, the primary concept of this exhibition is the notion that the grand scale of humanity is con-

nected on the cellular level. In its visual and poetic language, a key function of art is to present a portrait of the "self" in relation to the time and place in which we live. The planetary vantage point changes the perspective toward "community," and to focus on the community of NASA would be ideal since it is befitting to think of a "universe" of astrophysicists and engineers. In this way, the distinctions of the community and the universe become cohesive; notwithstanding the fact that they are conceived as different environments determined by scale. *Cellular* at the Space Center intimates the metaphor of the microscopic cell and the macroscopic planet. Still, a community presumes a peopled constituency whereas a universe is left open to the imagination – one that is inhabited with Martians and microbial life.

The artistic expression provides the opportunity to reconceptualize genetics beyond the disciplinary domains of medical and astronomical science, foregrounding instead the social and cultural contexts for bodies and environments. The NASA science community has already extended into the growth and development of the medical institutions in the Houston area. The prominent question for both scientists and artists today involves the role of nature and culture in genetic identity – the biological "self" distinguished by DNA and genetic makeup can no longer be kept separate from a cultural identity based on gender, "race," and sexuality. On the popular culture front, several television shows have already dramatized genetic identity by tracing the ancestry of celebrities. But focusing on the scholarly / academic front, Ondrizek's exhibition exempli-

fies the intellectual approach to social and cultural issues raised by the new genomic identity. In this way, *Cellular* and *Chromosome Painting* exhibited at UHCL reveals more than individual identity but what's at stake for a biogenetic community. We look to the arts to comprehend what makes us human, especially as technology transforms the old definitions for a biological and cultural identity.



ART, SPACE, AND COMMUNITY AT THE UNIVERSITY OF HOUSTON AT CLEAR LAKE

Nick J. de Vries

Professor of Fine Arts

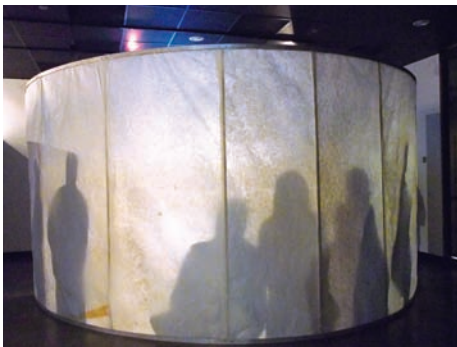
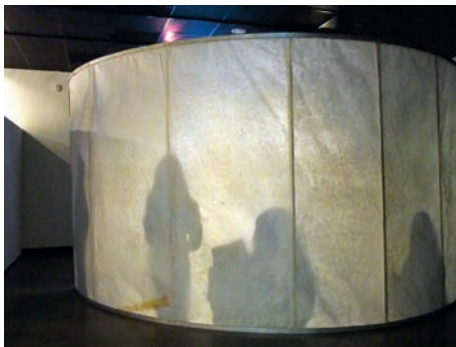
Regardless of one's occupation, living in the historically important NASA community of Clear Lake, every individual has been impacted in some way by the highly regarded Johnson Space Center. The space industry is about exploration, invention, and risk taking. The same is true for those of us who work in the discipline of the fine arts. The strong influence of NASA's scientifically-minded community has long been made visible in our local culture and especially in our educational institutions (in UHCL since its founding in 1971). Not only have our science programs blossomed in public and private schools, but space-related themes have increased, and be they of fiction or realism, space concepts occur regularly in classroom art. Art students and professional artists have at their disposal a "local lab" in JSC to research space-related themes. This has been especially useful for graphic artists. Working and teaching at UHCL has been made interesting and challenging by having numerous scientifically-minded students in our studio classes as well as astronauts and cosmonauts. The existing partnership between UHCL and JSC continues to provide a unique opportunity for our students both in art history and studio arts to collaborate scientifically and creatively.



Cellular installation at University of Houston-Clear Lake Art Gallery









CELLULAR

Geraldine Ondrizek



The exhibition *Cellular* includes two large-scale installations, *Sound Wall* and *Cellular*. These works, which refer to both architectural and biological cells, are my attempt to understand, represent and experience cellular formation. The forms, sound and images that make up this work are a result of working closely with several research scientists who have generously allowed me to observe and use their research. Both works rely on physical interaction; the installations are performance spaces for the viewers to listen, touch and occupy in order to understand the relationship between our senses, internally and externally.



The cell, the smallest unit in a living organism, houses genetic code. Both an object and a vessel, it is a site of activity that is never static or complete. The term cell comes from the Latin “cellular,” a small room. Historically the architectural cell is duly a space for reverent solitude and meditation, or captivity, and confinement. The first to place the term within a biological context as a consequence of his use of microscopic magnification to study and render cellular structure, the British scholar

Robert Hooke noted that cork cells resembled the small rooms monks lived in. His etchings of magnified organic forms published in *Micrographia* of 1665 and 1667 by order of the Royal Society revolutionized the way in which biological organisms were understood. Optics and magnification have continued to give vision to the previously unseen and have changed our understanding of interior systems.

When I asked a colleague Steve Black, Professor of Developmental Biology and Zoology at Reed College, if he had any images of gastrulation he could share, an entirely new world was opened to me. Most images we see of biological specimens are flat and still, but the inventions of the stereomicroscope with film capture technology has enabled researchers to capture images akin to how our eyes see, in three dimensions and in motion. The stereomicroscope has made it possible to record the physical form and the inner workings of a cell. This is vital technology in the fields of embryology, fertilization and the understanding of cellular anomalies.

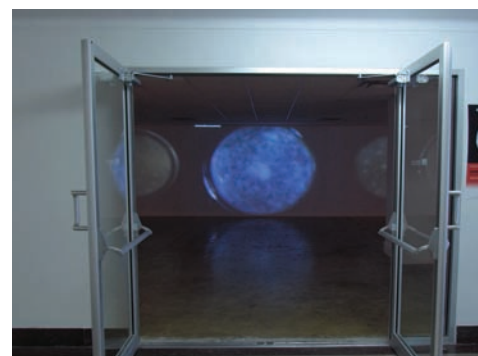
Steve’s lab uses three-dimensional photographs and film capture technology to understand the cellular mechanics of gastrulation, the process by which a spherically symmetrical egg is rearranged to have axes, such as an inside and an outside; a front and a back; a top and a bottom; a right side and a left side. From these films, they can compare different species and development as it occurs.

Cellular is a film of several blastopores, or a multiple cell embryo projected onto an 8 x

8’ semi translucent semi translucent screen occupying half of the smaller exhibition space at the Western Gallery. Each segment of the film is a result of more than 200 hours of still images of each embryo made with Atonics Micro fire digital cameras mounted on Olympus stereomicroscopes and made into a film using Astor IIDC imaging software. Steve Black and his research assistant Allison Egar provided me with films of the blastopore and allowed me to work with them to make a film of endless development. To make my film, I edited ten different films of gastrulation to overlap and repeat the phases of development just before a recognizable body is evident. Watching an endless loop of an egg development and cells dividing is meditative. It looks like we are witnessing the beginning of the earth’s formation or plate tectonics. The pacing is nervous and then fluid. Each egg’s gestation is unique, even though it is the same species. The blastopore, or a multiple cell embryo, is what all creatures begin as. The conditions and the health of the egg determined its survival. This extraordinary phenomenon happens continually and without us knowing.

A set of prints made from the film *Cellular* occupies the walls of a smaller space next to the film. To make this set of prints, I worked closely with Allison Egar to record the major stages of gestation, looking at the subtle but developmentally significant events in each. Throughout this process, it became increasingly clear to me that early embryonic development is flexible, with considerable variation observed even within a single genus.

From top: *Cellular* installation at University of Houston-Clear Lake Art Gallery



From top: *Cellular* at University of Houston-Clear Lake Art Gallery, *Cellular* at Space Center Houston, *Cellular* through doors of Miami Beach Urban Studios at Florida International University

Most recently, nanotechnology, particularly the AMF (atomic force microscope) pioneered by James Gimzewski, Professor of Chemistry at UCLA, and Andrew Pelling, Associate Professor of Biophysics at the University of Ottawa, have enabled researchers to touch and to listen to cells like the blind reading Braille or a hand touching a pulse, the needle of the AMF can touch and feel the vibrations of cell is less than half the diameter of a human hair. The new area of study is called sonocytology, which uses the atomic force microscope (AFM) to feel a cell in the same way a needle was used to feel the pattern of vibrations pressed into vinyl records. Gimzewski and Pelling have found that cells with cancer or other diseases emit a very low and strained frequency while healthy cells produce a more pleasant sound.

Sonocytology has proven to be a noninvasive way to detect disease. In 2007, Gimzewski used nanotechnology to demonstrate that metastasized cancer cells are softer than healthy cells. The study represented one of the first times researchers have been able to take living cells from human cancer patients and use nanotechnology to determine which were cancerous through touch. Through touching and hearing rather than only seeing, an entirely new way of studying a form – that of the multiple sensory knowledge – has been born. This ability to discern cellular soundings has ultimately revolutionized the understanding of cellular gestation, division and the relationships within the interior architecture of our body.

CELLULAR FILM STILL, 2009

Four rows of eight stills printed on an Epson 9000, Plexiglass, steel frames
(refer to images on next page)

Row 1:

- Early internalization of cells through the blastopore.
- Internalization continues through the blastopore to create an early lower layer.

Row 2:

- Internalization continues through the blastopore; the internalized cells begin to spread out from the center.

- The signaling center, the cumulus, is first apparent and begins its migration towards the prospective dorsal side of the embryo.

- Cumulus migration continues

- As the cumulus migrates and disperses, an area of cells under its migratory path

spreads out to form the “dorsal field”— basically, cells from the body will begin to

condense on the side of the cumulus and move away from it.

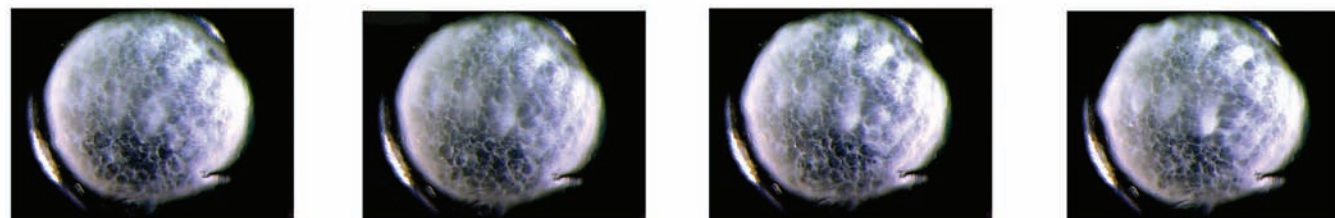
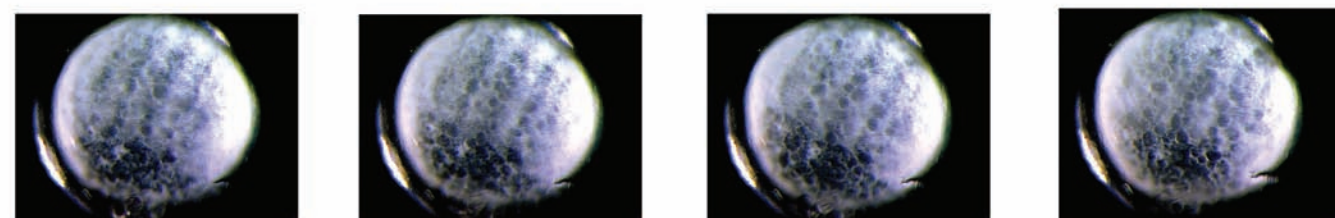
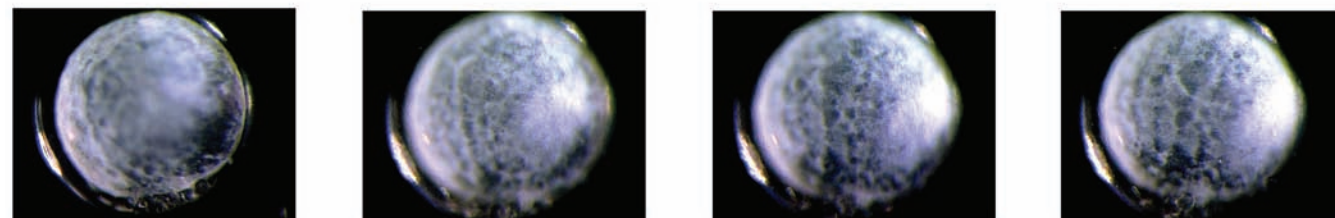
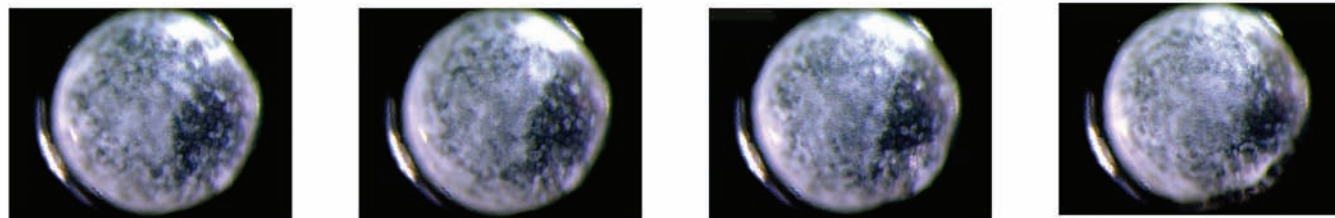
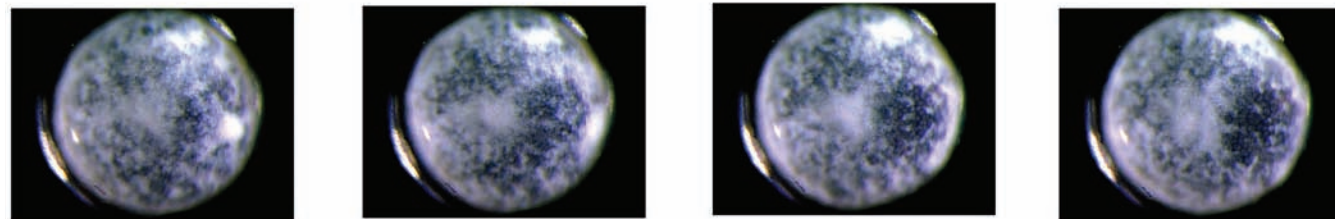
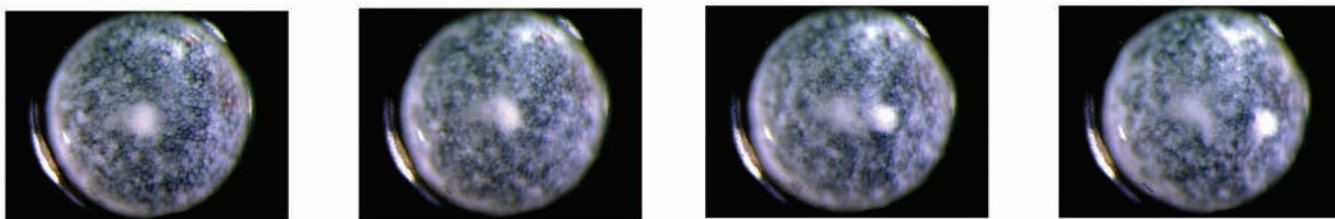
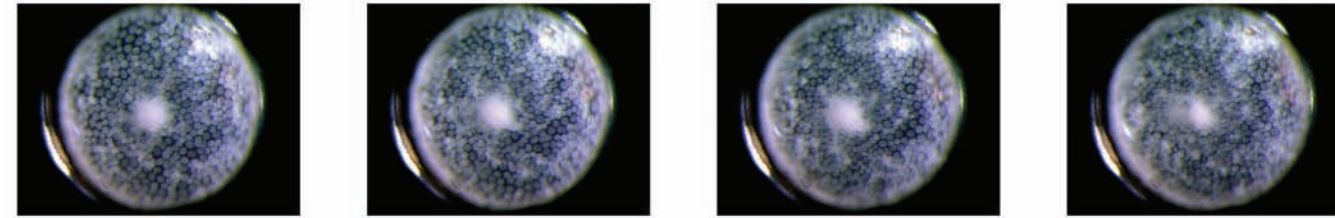
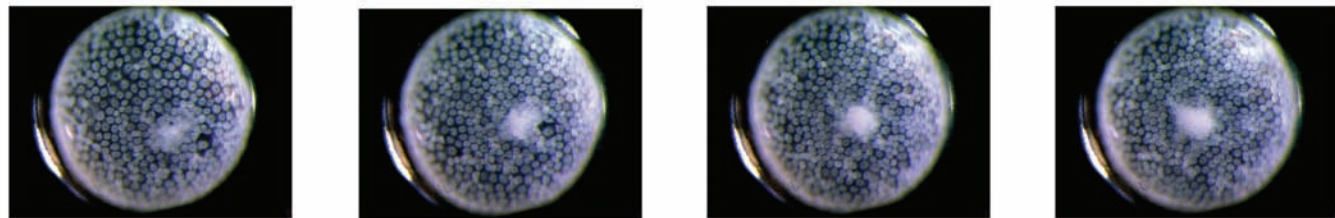
Row 3:

- The dorsal field continues to expand, changing the area of cells that form the body from a roughly circular shape to an elongated band, and very early segmentation becomes apparent in the anterior body.

- The posterior end of the body begins to form from one end of the germ band and segments are laid down as the growth zone (area with more cells) migrates.

Row 4:

- The posterior body continues to form and segments become more apparent.
- Segments continue to condense and legs begin to bud off of them.



Cellular Film Stills, 2009





CHROMOSOME PAINTING

Genevieve Gaiser Tremblay

In 2009, artist Geraldine Ondrizek, Senior Genetic Counselor and Co-Director of the University of Washington Genetic Medicine Clinic Robin Bennett, and Curator Genevieve Gaiser Tremblay collaborated to bring together art and medical science, which culminated in the 2011 public art commission for the UW Medical Center commemorating fifty years of medical genetics at UW.

Ondrizek’s research-based artwork ignites interest and inquiry about the influence of cancer and other diseases on both individuals and entire families. She relies heavily on scientific inquiry, focusing on documenting biological specimen and exploring systems of categorization. She works closely with genetic scientists to trace ethnic identities, portray life spans, and depict genetically inherited conditions. Robin Bennett, one of the most prominent genetic counselors in the nation, teaches human genetics at the UW Medical School. She pioneers genetic counseling practices that have become standard worldwide. As curator, Tremblay integrated the research, teaching, service, and public engagement since the team was compelled to work together across disciplines to make genetic information more accessible, more visible, and better understood. Bennett granted Ondrizek access to a team of groundbreaking genetic researchers, which inspired the artist to create new works that forged visual, scientific and metaphorical discoveries. The works featured in this exhibition

explore the nature of our bio-cultural differences and similarities. Ondrizek assembled a rich collection of images from research done by prominent medical geneticists, including, UW Medical Genetics founder Arno Motulsky and Peter Byers.

In the three bodies of artwork featured in this exhibition: *Chromosome 17*, *DNA Microarray*, and *Chromosome Painting*, Ondrizek enmeshes the material semiotics of cloth and culture with the complex and colorful language of genetic data. She leverages humble craft methods associated with domesticity to create textile portraits, color patterns and sequences that metaphorically portray what she calls “our coats of many colors.” Her deep inquiry into the more scientific realm of human identity invites us along and delivers not only exquisite aesthetic interpretations, but also a genetic literacy primer to inspire our own self-discoveries.

INHERITANCE

Robin Bennett, UW Senior Genetic Counselor

Genetics touches all of us. We all take pride in our heritage, and we may boast about characteristics that “run in the family.” Conversely, concerns about family diseases that may be inherited can also lead to feelings of anxiety, guilt, fear of the unknown, or even relief if we discover that a particular disease is not strongly inheritable or we feel empowered to take preventive actions against a disease. The collaboration between myself, Ondrizek, and the University

of Washington medical genetics physicians and researchers shows the beauty in our DNA and brings this art and genetic science to the public. This work provides an opportunity for dialogue between geneticists and the public to help allay fears and misconceptions related to genetics. Information about family history in conjunction with genetic testing can provide important information at many times throughout the lifespan: in planning pregnancies, in newborns and children, throughout adolescence and in adulthood. For families where DNA testing may not be as informative yet, the option of banking DNA (from blood or saliva) can be a gift to future generations.

WORKS FROM 2009-2012

Geraldine Ondrizek

The exhibition at the Kirkland Art Center allowed me to present three bodies of work generated from my two-year collaboration with Robin Bennett and the Division of Medical Genetics at the University of Washington. First are prototypes made for the 2011 UW commission *Chromosome 17* and the piece created for the Portland Art Museum, *Case Study*. Both works use the National Center for Biotechnical Information (NCBI) database of the human genome as a resource to artistically map scientifically-derived gene sequences. The second work, *DNA Microarray*, located on the balcony, is formed from several large silk panels imprinted with the image of a DNA microarray. A microarray is a set of tiny DNA “spots”: small chunks of DNA sequences known

as “probes” that fasten to a glass or silicone chip. The probes identify target sequences of DNA, which are easily seen via fluorescence or chemiluminescence as red, yellow, green and blue dots that glow like a grid of stars in the night sky.

The third body of work, *Chromosome Paintings*, which originally spanned the front window and wall, was made specifically for the Kirkland Arts Center. *Chromosome Paintings* is based on the image of a synteny map, a colorful, striped array that compares gene sequences and chromosomes between species. The long silk panels, each printed with human chromosome maps are arresting displays of fluorescent color arranged to stunningly depict chromosomal comparisons. Fuchsia neighbors chartreuse, purple sidles up to orange, soft grays mingle with blues. These juxtapositions spur the eye to dart between various color combinations and arrangements.

The origin of the word ‘chromosome’ comes from Greek khroma ‘color’ + soma ‘body.’ These panels, literally made up of different color combinations, physically manifest the ‘color bodies’ (or chromosomes). Chromosome paintings as representations of scientific data are optically stunning and will generate dialogues about vibrancy, complements, contrasts and tonal ranges of the color combinations, which parallel genetic variance, anomalies and similarities. The technique of chromosome painting, also known as “fluorescence in situ hybridization” can detect chromosomal abnormalities like translocations and structural alterations that are associated with



various diseases. For example, chromosome 19 carries a gene implicated in leukemia. With these disease associations in mind, each panel is labeled with a type of cancer correlated with a genetic marker present on the chromosome. The chromosome synteny map printed on white silk was originally displayed within a light box so the colors glow from within. These panels are marked with the genetic anomalies linked to different types of cancer found on each gene. The silk panels were also produced in a small edition of ten each, and are now sold to raise funds for the University of Washington Cancer Genetic Medicine Clinic for education and research, and specifically for those who have cancer and are unable to afford medical diagnosis and treatment. Additionally, the funds will benefit those who have cancer and want to preserve their DNA in a bank so their children and extended family can later benefit from the genetic testing.

The silk panels produced in a limited edition are sold to raise funds for the University of

Installation view of *Chromosome Paintings*, silk panels in limited edition at Alfred R. Neumann Library, UHCL.

Washington Cancer Genetic Medicine Clinic for education and research and for those who have cancer and are unable to afford medical diagnosis and treatment. Additionally, the funds will benefit those who have cancer and would like to bank their DNA so their children and extended family can benefit from genetic testing.

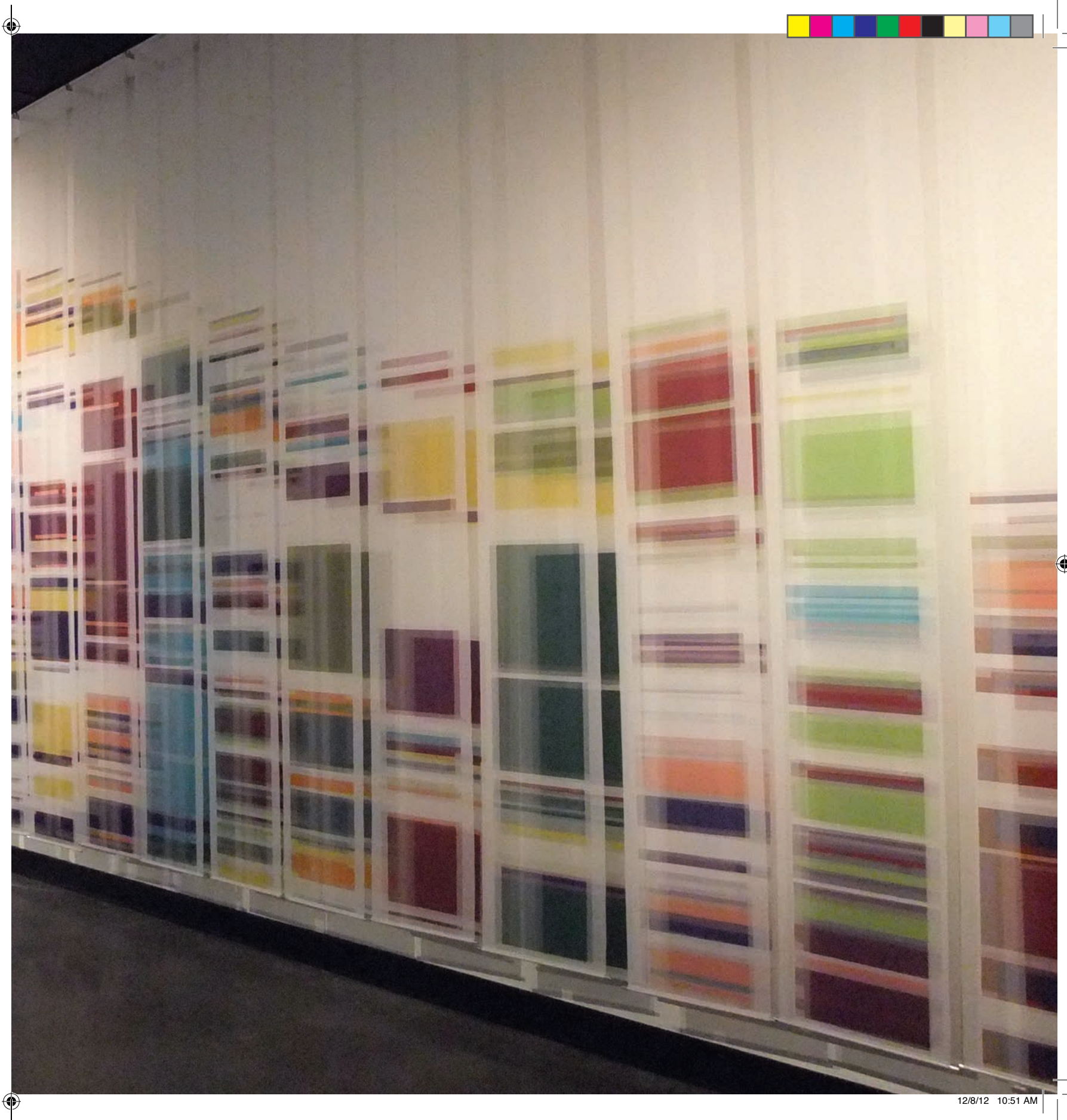
A version of this essay was first published for the *Chromosome Painting* exhibition at the Kirkland Arts Center, May 26 through July 6, 2012

Available at <http://www.goforwarddesign.com/2012/>

A list of Chromosome and the Cancer markers is listed below.

CHROMOSOME

1. Prostate Cancer
2. Ovarian Cancer
3. Colon Cancer
4. Leukemia
5. Gastric Cancer
6. Ovarian Cancer
7. Colon Cancer
8. Hepatocellular Cancer
9. Melanoma
10. Prostate Cancer
11. Bladder Cancer
12. Oral Cancer
13. Pancreatic Cancer
14. Lymphoma
15. Hodgkin's Lymphoma
16. Breast Cancer – Lobular
17. Breast Cancer
18. Pancreatic Cancer
19. Leukemia T-cell Acute
20. Breast Cancer
21. Leukemia
- X. Testicular Cancer







INNER SPACE, GLOBAL MATTER

Jane Chin Davidson

Mediated by a technologically enhanced gaze, bodily micro- and macroworlds, from cells to planets, are becoming an unquestioned part of our everyday life outlook.

Anneke Smelik and Nina Lykke, *Bits of Life: Feminism at the Intersections of Media, Bioscience, and Technology* (2008).¹

The new scopic regimes of the twenty-first century can be understood as either microscopic or macroscopic visions that are expressed through the endoscopic or telescopic gaze. These technological ways of seeing propose new questions in regard to representing and interpreting the human “self” in relation to the meaning of both nature and culture, amidst the recent interpolation of the two concepts. Most significant is the microscopic since medical technology ushered in the new era of the genetic perception of the body. But this is not to diminish the macro impact, especially in view of the photographic quest by the Mars rover vehicle, launched in 2012 to discern biological life-forms on the planet. Both micro/macro visions converge at the spectrometer’s focus on microscopic evidence conducted from the telescopic location of Mars. And, since both scopes fall in the domain of science under its

factual rather than expressive utility, the sense of the “real” is inherent in the scientific gaze, as distinguished from the “imaginary” of the artistic gaze. The Geraldine Ondrizek exhibition, entitled *Inner Space, Global Matter: Recording from the Structures Within*, problematizes these classificatory beliefs by challenging the notion that “seeing” is “believing” – her artworks illustrate the conflicted relationships among “self” and nature, biology and culture, bodies and environment. The ways in which these subjects are *represented* today determines the most important context for an artistic and scientific inquiry.

Ondrizek engages the viewer not only through the visual expression but also through affective sensibilities and aural aspects of the performative in her installations. The viewer of *Cellular/Sound Wall* (2008-09) experiences the intimacy of the sound of human cells dividing whilst watching the video of the embryonic stages of the development of a spider egg. The filmed process actually involves images of many eggs since Ondrizek had cut and spliced several loops to create the final video. Each embryonic development is unique, none are exactly the same, and the captured moving image represents the reproductive process which is the same for humans, acknowledging the shared process among species on the cellular level. The multi-media work involves the recording of the vibration of cells through the AMF (atomic force microscope) and this aural expression is integrated with three-dimensional photographs of the gastrulation of blastopores captured on film. Magnified by 2000 times in

projection, the moving cellular image appears to be suspended like an orbiting sphere, which bears remarkable likeness to the imagery of planetary systems of the macroscopic world. Key to this affinity of shared likenesses is the dependence on technology since neither cells nor planets are visible to the “naked” human eye. In this twenty-first century homage to the old sense of “wonder,” the mystery of the unseen is still frightening because the “unknown” of the inner space of the “self” is just as awe-filled as the outer space of the universe.

Cellular opens simultaneously at the three locations of Space Center Houston, the University of Houston, Clear Lake, and the Florida International University at Miami – the primary goal of presenting this signature work at all three places is to address the ways in which the site and space of the exhibitions concurrently generate meaning – especially in relation to the history of scientific displays of the natural world. The Space Center’s enormous 180,000 square feet of exhibition space showcases all types of models and simulators that share “the thrill and wonder of space exploration with visitors.”² The Space Center appears as a present-day version of the seventeenth-century *Wunderkammern* in which the futuristic “curiosity cabinet” functions to display the scientific spectacles of the present generation. In presenting one of the largest known samples of Mars meteorites (found in Antarctica in 1980), NASA’s “Touch a Piece of Mars” exhibition fits perfectly into the original schema of the *Wunder* collections.³ The Mars rock, however, was brought out to highlight the Space Center’s live broadcast of the August 6,

Installation view of Geraldine Ondrizek, *Cellular*, video projection of several blastopores, or multiple cell embryo projected onto screen at Space Center Houston



2012 landing of the aptly named Curiosity rover on Mars. Presenting *Cellular* in the context of “Touch a Piece of Mars” therefore provides a curatorial premise for asserting a conceptual - Earthworks analysis of biology’s relationship to geology as a particular development of the phenomenological engagements of contemporary art.

By transgressing the art-science boundary, the opportunity to assess the shift from the modernist scopic regime to the micro/macro technological gaze can be undertaken by tracking the *Wunderkammern*’s scientific distinction for displays of the terrestrial and the celestial. The previous scopic regime was explained by Martin Jay as the “optical premise for modern epistemology,” establishing the visual field for the normative *weltanschauung* “worldview.”⁴ Jay describes the impact of the “Cartesian perspectivalism” which historians and critics have “claimed to be the dominant, even totally hegemonic, visual model of the modern era.”⁵ By the nineteenth century, the *Wunder* focus had developed into an imperial gaze toward the “world-as-exhibition” as world’s fairs and colonial expositions competed with tourism and photography to visually “capture” and rule over the colonized subjects under the gaze of nationalism and empire.⁶ As Timothy Mitchell asserts, the “world-as-exhibition” was a means to reduce the “world to a system of objects” in order to “evoke some larger meaning, such as History or Empire or Progress.”⁷ In the current transformation of the optical focus toward the “*planet*-as-exhibition,” the larger meaning of the new scopic regimes of the twenty-first century compels the inquiry of this essay.

If indeed the micro – macro metaphor serves also to represent the scopophilic shift from world to planet, what are the new optical positions of power? Through the reprise of “wonder” for understanding “bodily micro- and macroworlds, from cells to planets,” the stage is set for a materialist analysis of the new “global icons” of the cell and the planet – as defined recently by Sarah Franklin, Celia Lury, and Jackie Stacey in their study of the new identities of “self” and “place.”⁸ The philosophy of materialism in the context of identity has long been a prominent inquiry of the feminist discourse – initially in the recognition that material conditions determine livelihoods not only by class but by gender and “race.” Karen Barad articulates the current reconceptualization of feminist materiality that pertains so well to Ondrizek’s bio-genetic expression: “All bodies, not merely ‘human bodies,’ come to matter through the world’s iterative intra-activity – performativity. This is true not only of the surface or contours of the body but also of the body in the fullness of its physicality, including the very ‘atoms’ of its being.”⁹ Indeed, the body of the planet shares an elemental relationship to the body of the human being. Barad’s exploration of matter as a stabilizing/destabilizing process of “iterative intra-activity” pays homage to Donna Haraway’s landmark re-configuration of the cyborg. The very term “cyborg” was originally conceived in the 1960s by NASA scientists Manfred E. Clynes and Nathan S.Kline who were the inventors of the “self-regulating man-machine,” the “homeostatic system” accommodating the “man in space.”¹⁰ But this historical cyborg, constructed for astronauts adapting to space

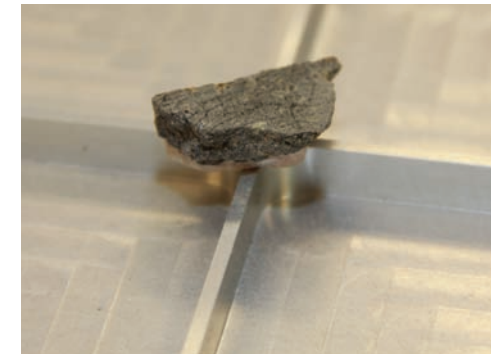
environments, is now a symbol, a relic, of NASA’s heyday in space exploration. Exhibiting *Inner Space, Global Matter* in the historic NASA communities in Texas and in Florida ultimately takes into account the complex signifier of the “global” as distinguished from the “local” beyond artistic and scientific abstractions.

The Gaze of Wonder – the Touch of Wonder

Here are these rovers up on Mars. You have robots up there looking for life, for water. Rovers are being trained to think like geologists, pick up a rock and crush it. One of the problems the JPL scientists are having is where the rock is and where the rover thinks the rock is. What is consciousness?

Laurie Anderson, NASA artist-in-residence, 2002-03¹¹

NASA’s objects of technology at the Space Center function as “mediations” of nature rather than as the *Wunderkammer*’s “curiosities” of natural science, but the overall task of the many spacecraft simulators is to test the limits of the astronauts’ human bodies against the most powerful forces of nature – of outer space. NASA’s 1960s program aligns with the same art historical era in which the return to wonder is traceable to Earthworks and Land Art, conceived as performative engagements with the “literal” or real space of the outdoors and nature (attributed now to Minimalism). The continuing development of these concepts into the twenty-first century can be viewed by *Inner Space, Global Matter*’s engagement of the new bio-genetic “self” in relation to NASA’s planetary landscapes. The Space Center’s mission is to offer to visitors a firsthand experience by allowing access to the



From top: Installation view of *Cellular*, at the University of Houston-Clear Lake Art Gallery, “Touch a Piece of Mars” exhibit at Space Center Houston, unveiled August 6, 2012. Part of the Antarctic meteorite collection at JSC, approximately 180 million years old believed to have been thrown into space 600,000 years ago.



working space stations and laboratories across the expanse of the sixteen-hundred- twenty-acre JSC campus. Visitors express their amazement at the monumental scale of aeronautic technology, and in the imagination of the viewer, the enormity of the space capsule emulates the vastness of outer space.

Presenting Ondrizek's installation in this backdrop, the verisimilitude in magnitude and scale of *Cellular's* microscopic cell instills the same subjective sense of astonishment in the "real" and "unreal" of the Space Center's imaginarium. Through the gaze of "wonder," the viewer becomes entranced by *Cellular's* experience, finding it hard to believe that our cells inside our body could look like this, much less sound like this – the idea that our cells make sounds at all is quite unbelievable. But as the viewer listens to the sound of *Cellular*, the sensory experience functions as further evidence of the cell's existence within the inner space of the "self." This performance of a sense-experience that heightens awareness of our own bodies is an aspect attributed to the 1960s-70s experiments of performance and conceptualism. The tactile quality of bodily-oriented artworks is the element that surpasses the limitations of painting and sculpture, offering an engagement that goes beyond vision, one that includes hearing, smell, and touch.

In following this model, the exhibition of *Cellular* in the Space Center provides an experience that is similar to the sensory connection of the "Touch a Piece of Mars" display. Promoted as the "only Martian sample the public can touch," NASA's press release states, incredibly, that the 17.4

pound rock was "thrown from Mars into space approximately 600,000 years ago."¹² The "official unveiling of the Martian touchstone" took place at the moment prior to the August 6th landing, precisely at 12:31 a.m. CDT, and it was billed as "Curiosity: Seven Minutes of Terror."¹³ Jeffrey Kluger of *Time* magazine describes Curiosity's "slam into the Martian atmosphere at a blazing 13,000 m.p.h" and its subsequent hover with parachute and retrorockets as the culmination of the theatrical landing watched by 23 million people on live web-stream. NASA engineer Allen Chen announced: "Touchdown confirmed! We're safe on Mars."¹⁴ For participants of the live broadcast at the Space Center, the focus on time in the dramatization of the precarious moments of landing "terror" instills the recognition that the event *on another planet* is really happening. And through the invitation to "touch" the planet of Mars by proxy of the meteorite, the reality of the experience is confirmed for the viewer on a sensory level.

The touch of "wonder" makes "real" the place called Mars, however imaginary a trip to the planet may seem – in similarity to the viewer's incredulity over *Cellular's* representation of the "self." An embodied engagement through hearing and touch is key to retaining the human connection when confronted with the image of the moving cell as much as when faced with the prosthetic mediations in the Space Center's enormous technological showcase. A continuing scientific curiosity compels the sensory contact with cells and planets, although, conceptual artists have long used the sensory potential to assert the connection between

the body and ontology (no longer Cartesian in the singular selfhood of the cognitive mind). In regard to conceptual practices, *Cellular* and the Martian meteorite reveals the artificiality of the separation between art and science – what better conceptual art expression of the Mars event could have been created for the viewer of the Mars Landing than the touch of the meteor associated with the rover touchdown? At the Space Center, the old logic of collecting and displaying scientific specimen is maintained from the origins of the *Kunstkammern*, but the museum-goer's interactive experience with spacecraft simulation has been impacted by the conceptual aims of site specificity and contemporary artworks, especially of the genre of Earthworks.

The Earthworks of Outer Space

The viewer's embodied reaction to the theatricalized elements of survival outside of the life-giving atmosphere of the Earth correlates to the response of viewers going out to wilderness areas to experience the awesome nature of Earthwork/Land Art's *earthly* space. For instance, visitors of Walter De Maria's *Lightning Field* continue to trek the high desert of New Mexico in order to witness the occurrence of lightning conducted across the 400 steel poles that De Maria installed as a sculptural installation in 1977. Ever since seventeenth-century landscape painting, the artist's view of nature was always considered as a scientific perspective. Nature can no longer be "captured" by the artist, so much as it needs to be respected and protected. The tradition of "wonder" renews the reverence to nature, and the sheer beauty of

Robert Smithson's *Spiral Getty* (1970), his 1500-foot coil of black basalt rocks emerging out of the translucent red water on the shores of Rozel Point, Utah, harkens back to the seventeenth-century era of integrating art and science. Smithson's decision to build the massive spiral at Utah's Great Salt Lake was based on the pink color of the bacteria and algae that could thrive in the salinity of the water. But this remote site of abandoned oil rigs and industrial waste was also chosen to monumentalize nature in reaction to its obvious destruction by pollution due to scientific development. In acknowledging the landscape at risk, the point of Land Art was to question the "self" of humanity in the face of awesome nature.

Before going outside to establish his artworks as environmental sites, Smithson initially brought boulders inside the space of the gallery in works such as *A Nonsite, Franklin, New Jersey* (1968). Smithson suggested that "[g]eologists always talk of the earth as 'a museum'; of the 'abyss of time' and treat it in terms of artifacts. The recovery of fragments of lost civilizations and the recovery of rocks makes the earth become a kind of artifice."¹⁵ The Mars rock display follows Smithson's logic precisely, but for a geology from outer space. The artistic concept is not unlike NASA's model of scientific simulation. As well, De Maria's *The New York Earth Room* (1977) offers viewers the simulation of nature through the embodied experience with a muddy field. The viewer's engagement with De Maria's "interior earth sculpture" comprised of 280,000 pounds of "real" dirt spanning across 3600 square feet of gallery space, continues the gaze of "wonder" after nature is lost to urban spaces.



From top: NASA Rocket Park, Sue Ruthstrom, *Beyond Primal Matter*, 2012, porcelain, white slip, saggar fired, 12.5" diameter, *Saturn V* building

Attributed to era of 1970s Minimalist exploration, Earthwork artists were questioning the meaning of the presence of humans in the landscape under the conventional wisdom that nature is the great but diminishing force of the wild.

By contrast, the exhibition of the Mars meteorite at the Space Center exemplifies the twenty-first century context for Earthworks, the promise for the forthcoming generations appears to be ascribed to space exploration rather than the diminishing hopes of Earthly preservation. The shift to envision Mars as the place where humans can “go out to nature” under the Land Art model could be viewed by the oncoming reality of privatized space travel. The vision was initiated by the NASA Authorization Act of 2010, eliminating the Constellation moon program and endorsing new technologies and innovative projects such as the launch of the Mars rover Curiosity in 2011 – the two-year project serves as the “precursor to NASA’s planned human missions to Mars in the 2030s.”¹⁶ And the success of the launch of the Falcon 9 rocket by Elon Musk’s private company Space X in its re-supply mission to the International Space Station reveals the end of the Kennedy era of nationalism in uniting the country around moon exploration. The death of Neil Armstrong on August 25, 2012 is symbolic of the passing of the ideal that the first steps of the astronaut on the moon could represent for all of mankind.

The increasing likelihood of a human presence in the landscape of Mars will pose the next phase of questioning for ontological engagements of Earth-Space-Works. Curiosity rover has already determined that the Gale Crater landing area

near the equator of Mars is the “most favorable for evidence of microbial life.”¹⁷ When discussed in the realm of astro-space, the concept of “life” is defined by expansive biological terms – what constitutes “life-forms” when leaving the proximity of the planet Earth? In the greater macroscopic search, the goal of finding the microscopic trace is the essential motivation of the Mars search.

The Micro-Macro Convergence of the Simulacrum

Ondrizek’s microscopic cell represents the definitive object of Curiosity’s pursuit, the very evidence of microbial life on Mars. The first task undertaken by Curiosity’s seventeen cameras was to beam photographs back to Earth. The images provide a visual means for understanding the planet considered as the one most similar to the Earth. However, Curiosity’s primary objective is to obtain extant material, “key ingredients for microbial life” for which visual documentation is used as specific type of confirmation.¹⁸ Curiosity is a rolling, multi-armed science lab with the visual acuity of 27 yards and megapixel capture of color images from multiple perspectives.¹⁹ By remote, the various spectrometers – xray, mass, and laser – along with the gas chromatograph, function to analyze the chemistry of Martian geology, scooped up in its search for chemicals, minerals, particles, compounds, and atmospheric traces, any or all materials showing compatibility to biological life on Earth.²⁰ The idea that this evidence is analyzed by scientists on earth who operate the robotic space lab from millions of miles away defies any comparison we can make in terms of the technological gaze.

The simulacral production of images, infinite pixels reproduced from outer space, functions as scientific proof for NASA. In our satellite age of saturated images, all photographic objects – jpegs, flash videos, online streams are assumed to be edited, manipulated and photo-shopped. Photographs can no longer be confirmed as evidence, they are considered as expressions. And yet scientific images are held to a different standard, to the degree that the NASA investigators base their findings of water on Mars, for instance, on the 13,000 raw images that Curiosity has captured in the vicinity of the Gale Crater. By inspecting the Mars rocks with spectrometers, the NASA team draws their conclusion from the look of their “round, smooth surfaces; many of them have been broken down into sizes smaller than one inch in diameter... shapes tell you they were transported and the sizes tell you they couldn’t be transported by wind....They were transported by water flow.”²¹ The actual material of the rocks have not undergone scientific analysis but NASA reports that the “photographs tell a story all their own.” Unlike the logic for viewers of the “Touch a Piece of Mars” display, the NASA investigator’s engagement with rocks on Mars is a mediated form of scientific analysis. Their assessments are made entirely through Curiosity’s prosthetic eye without the need to convince through first-hand investigation by touch of the material objects from Mars. No one would contest the robot’s scientific gaze.

If interpreted through the modern classificatory order for artistic images, the Mars images would be accorded an expressive status rather than one



of scientific-evidence by their observers. And in the artistic view, Ondrizek's video of the biological cell is treated as an aesthetic expression that is considered as a manipulated image rather than as a microbial record. Under this view, *Cellular* is not quite believable to our thinking – the blown-up image appears less likely a part of human anatomy because the viewer knows s/he is seeing a mere replica, not the actual thing itself – although, images streaming from Curiosity actually fall into the same category. Ondrizek raises Plato's timeless question regarding the way in which imitation/copies function to deceive, illustrating Gilles Deleuze's argument that the "simulacrum includes the differential point of view...the observer becomes a part of the simulacrum itself, which is transformed and deformed by this point of view."²² The Mars model for the combined telescopic and spectrometric image of astronomy presents the new simulacral reality. Linked by the technological gaze, the microscopic simulacrum appears as a "conquest of the infinite" – the regenerating cell caught in the ad infinitum of repetitious replay shares the sense of countlessness generated by the photographs sent back to earth via transmission through outer space. But in *Cellular's* ambiguity as an artistic-cum-scientific image, the viewer is deceived into thinking that this cell is not a part of our inner bodies at all but from an altogether different system of life. In the micro-world of images, *Cellular's* deceptive capture of the "real" genetic body complicates the old scopic regime with its classificatory order for the "real" of scientific images and the "unreal" of artistic expression.

As an artistic object, *Cellular* represents the microscopic world of cells, atoms and particles, the elements of biology and physics that are invisible to the human eye. As an individual culmination of the material real, *Cellular* constitutes the image of the actual unit of life at the top of the hierarchy of microscopic elements. The recent discovery of the particle thought to match the Higgs Boson (announced in July 2012) attests to the power of the imagination, the wonder that has inspired all important scientific ideas. The Higgs inspiration was described by journalist Dennis Overbye as "the rendezvous with destiny for a generation of physicists who have believed in the boson for half a century without ever seeing it."²³ In 1964, scientist Peter Higgs had theorized the existence of an energy field for a quantum field theory of interactions between particles, a concept pertaining to the Standard Model for physics. Overbye explains that the boson is "the only manifestation of an invisible force field, a cosmic molasses that permeates space and imbues elementary particles with mass."²⁴ Higgs was initially criticized for his ideas – "[m]y colleagues thought I was a bit of an idiot."²⁵ But forty years and billions of dollars later, the "Higgslike" particle was found by two teams of physicists, numbering 6000 scientists in total, led by Joe Incandela and Fabiola Gianotti.²⁶

But the scientific concepts confirmed by the discovery of the Higgslike boson are actually not new. They were originally conceived by philosophers who have long explored the unseen world of nature as they questioned the existence of cells, atoms and particles through the phenomenology of the senses. The remarkable

Epicurean philosophy of Lucretius's first century BCE poem "On the Nature of Things" ("De Rerum Natura") was premised on the scientific analysis of "multitudinous atoms that must rise up [out of space]."²⁷ Lucretius's two-thousand-year-old theory attributes to the "atom" the development of all life forms on earth and on heavenly bodies – the survival of animals, agricultural production, the replenishing sea, and the perpetuation of all astronomical phenomena – all can be connected to atomic force. The Higgs boson provides material proof of the force-field that enables the diversity of all living things, articulated by Overbye as the "key to understanding why there is diversity and life in the universe" – the same concept that Lucretius's wrote about in his philosophical theory.²⁸ The point was to show how human bodies, spiders, stars, and planets are all made of the same matter. The poet-philosopher inquired into the "indestructible particles of absolutely solid matter [that] fly about incessantly throughout eternity" in the space of a universe that is "not bounded in any direction."²⁹ He called this system of the movement of matter the "clinamen" or the "swerve," which constitutes the forces of the laws of nature. Lucretius's invisible world of particles, atoms and seed was essentially an illustrative and imaginative connection among the terrestrial and the celestial – they are the unpredictable forces and movements of atomic matter.

The Passion of the Icon, the Deception of the Simulacra

In Stephen Greenblatt's recent historiography of Lucretius's "De Rerum Natura" entitled *The Swerve: How the World Became Modern* (2011),

the author draws a straight line from the first century theorist to the modern understanding of the universe. The important contribution of Greenblatt's analysis is in the way in which the literary historian undertakes the artistic impact of the *poem*. Whilst his teleology is meant to bring comprehension to Lucretius's "core scientific vision," Greenblatt attributes the inspiration to the "poet's sense of wonder."³⁰ *The Swerve* reveals how "De Rerum Natura's" Epicurean philosophy of pleasure and beauty was lost throughout history to theology's antithetical position of pain and darkness. Amidst the unchanging polemics pitting Science against God, Greenblatt surmises that the "hatred of pleasure-seeking, a vision of God's providential rage, and an obsession with the afterlife: these were the death knells of everything Lucretius represented."³¹ His poem was banned, burned and forgotten during transitional periods of Christianity, beginning with Rome's decline in the fifth century and ending with the counter-reformation in fifteenth century Florence.

The counterpart to the "blasphemy" of Lucretius's poetry is the image-production of the medieval icon, with its prime example in the late-sixth / early seventh-century portrait personifying Saint Peter. The icon incited a religious frenzy, the object described by Jas Elsner was one that was "carried in liturgical processions, kissed and touched during ritual, worshipped as a visual embodiment of the divine being."³² The point of comparison to Lucretius's poem was in the way in which the reader was aroused by the passionate Epicurean sensibility. It was not so much the "pagan abomination of idolatry" that could be



attributed to the censorship of the icon as it was the disdain of passionate worship, since the emotional reaction signaled the deception of the simulacral object of worship. The love expressed for the fake copy of the “real” saint was based on deceit, confirming Plato’s suspicions that the image can lead viewers to worship a piece of wood panel rather than venerate the spiritual deity of the saint. According to Deleuze, Plato considered the entire domain of “images-idols” as either copies-icons or as further reproductions of simulacra-phantasms – in Platonism, icons are considered as less removed from the original than the simulacrum. Still, Deleuze asserts that the Nietzschean “task of the philosophy of the future” is to “reverse Platonism” in order to relinquish the fear of the passion over the copy.³³

Greenblatt affirms the poetic deception, the “notion of atoms was only a dazzling speculation; there was no way to get any empirical proof and wouldn’t be for more than two thousand years.”³⁴ Now that the Higgs-like boson provides the material “real” object of the subatomic particle of the universe, Lucretius’s imaginary atom can no longer be characterized as an image-idol. And in representing the structural and functional unit of all known living organisms, *Cellular* illustrates the pre-ordained object of Lucretius’s thought since Ondrizek’s microscopic copy of the “real” cell functions in a different way to exhibit the post-Platonic “icon.” The reversal of Platonism, however, can be attributed to the notion that the imaginary and the real today have little to do with the power of passion and pleasure, questioning the very danger of the *power of life itself* if indeed passion is the force to be reckon with. Deleuze

puts it in this way:

The problem no longer has to do with the distinction Essence-Appearance or Model-Copy. This distinction operates completely within the world of representation. Rather, it has to do with undertaking the subversion of this world – the ‘twilight of the idols.’ The simulacrum is not a degraded copy. It harbors a positive power which denies *the original and the copy, the model and the reproduction....*There is no longer any privileged point of view except that of the object common to all points of view.³⁵

The privileged perspective of the old scopic regime is attributed to Plato in this treatise on “The Simulacrum and Ancient Philosophy,” written by Deleuze to expound on “Lucretius and the Simulacrum.” Inextricable from the cognitive senses and the sensuous, the atom is unseen and had to be imagined as a sensible object, the concept has to be “thought” just as past worshippers of the icon conjured up Saint Peter in their imaginations. Deleuze invokes the power of the “phantasm” by which the effect of the simulacrum involves the “false as power,” defined by Nietzsche as the highest force in the “Dionysian machine.” The Epicurean formula for the atom exemplifying the diversity of diverse nature was imagined as reproduced copies of copies into supra-natural infinity. The power of this plenitude is also the power of the “false,” emanating from the imaginary, which is the subversive power that is no longer dictated by the privileged point of view, the Platonic moral norm for truth.

As the *Inner Space, Global Matter* exhibition aims to show, the power of the artistic imaginary

and its ability to arouse passion, deceive its participants, is the same power of scientific “wonder.” Greenblatt suggests that the “recovery of ‘On the Nature of Things’ is a story of how the world swerved in a new direction.”³⁶ By this, he means Lucretius’s impact on artists and scientists of the European world – from Machiavelli and Shakespeare to Darwin and Einstein – those who were influenced by passion of the “false as power.” The irony is in the fact that nearly every culture that came before the modern European telos relied on intricate cosmological principles for living, in the belief that planets, moon, stars are inextricably linked to the changing seasons of life on Earth – the seasons of human beings. The new micro/macro scopic regime is closer in spirit to the old perspective from agricultural systems for culture and society. In fact, the new scopic regime is linked to the ancient scopic fascination with the Aztec sun or the Confucian I Ching.

The “Becoming” Body: the Cell and the Planet

The modernist scopic regime is now surpassed by the new macro/microscopic vision by which the material “real” of cells and planets – the intra-extra-terrestrial perception of microbial life – transforms the weltanschauung “worldview.” When Franklin, Lury, and Stacey distinguished the cell, the blue planet, and the foetus as “global icons” in their study of *Global Nature, Global Culture*, they specularized the “spheres of life” by focusing on the basic micro/macro symbols that can no longer be confined within their biological or astronomical domains. Rather, the global understanding of contemporary social and

cultural life is recognized more and more through bio-genetic and bio-planetary information. In this way, the human body and the planet body converges in the focus of a new ontology.

When Gayatri Chakravorty Spivak proposed the concept of planetarity, her “imperative to re-imagine the planet” was a challenge to accepted notions of empire, nationalism, migration, hybridity, colonial and postcolonial territorializations at the end of the twentieth century. The planetary location of the Earth was meant to transform old territorial claims by taking the perspective from outer space. The global icons of the Cell and the Planet establish a new nature/culture model for understanding inner and outer space, as a development of material feminism. Haraway’s cyborg, her “integrated homeostatic organism,” would eventually be fulfilled by the genomic identity, and Cellular in the context of the planetary exemplifies Marsha Meskimmon’s description for art’s “agency in world-making” in which “the future, while absolutely intertwined with the material legacy of the past and present, is not predetermined by it.” The “false as power” model would be useful for feminists who could reconsider the old patriarchal order by envisioning identity through Lucretius’s diversity of “matter”– now incontrovertible since humans are defined by the microbial material of life. At the micro-macro convergence of Mars exploration, the hierarchy of sub-particles to cells determines the matter of existence. This twenty-first century model of material feminism is nonetheless seen as a continuing development of the 1970s version. Based on the old definition of labor in the context



of value and exchange, the choices that humans must make are still circumscribed by economic conditions, material existence.

Micro and Macro Materialisms

The strategy for exhibiting *Inner Space, Global Matter* at the institutional sites of Houston and the Florida space coast was to create a satellite of exhibitions in which the iconic NASA communities are integrally a part of the subject and object of display. The event is meant to turn a spotlight onto these urban spaces where both the material real and the simulacra of NASA's symbolic presence co- exist for the populace. Setting aside the artistic and scientific abstractions that comprise the principal study of this paper, the reality is that the space program of the 1960s has been transformed. The legacy projects spearheaded by the Constellation moon program have ended and the thirty-year-old Shuttle Program completed its last mission in 2012 after it was officially retired in 2004. The aerospace communities are in the midst of change, and as such, *Inner Space, Global Matter* draws attention to these monumental neighborhoods at a transitional moment. If Smithsonian recovered the fragments of lost civilizations, his rocks representing the Earth as a kind of material artifice, the actual place of the NASA neighborhood can seem like a similar kind of material artifact for the recent history of the institution.

The polemics of the old historical materialism are renewed as the next stage of space travel is premised on privatized explorations. As entrepreneurs talk about building colonies

on Mars, the territorialization of other planets besides Earth seems imminent. Opportunities for space flight are now discussed with a spectral gaze toward space travel as a form of entertainment. For instance, Bas Lansdorp's Mars One company has plans to create a reality show to spectacularize a Mars colony with the camera pointed at prospective residents in their Martian living quarters. Competing adventurers have already made news headlines with their announcements for space tourism such as "Richard Branson's Mars Colony: We Want 'Fun People, Beautiful People, Ugly People.'" His pitch for enlisting a cross section of the population to "start a community of humans on the Red Planet" articulates the stakes for social engineering in the race to Mars. Branson's over-determination of a potential populace for his Mars community is really a self-conscious response to old class critiques. Inevitably, the shift to a privatized industry, moving quickly into a moneyed-class tourist economy, changes the historical status of space travel and the collective sense of patriotism, heroism, and nationalism that began in the 1960s. The shift from worldview to planetary view, new and old scopic regimes, is not a utopic dream but a complex set of circumstances in which "wonder" will continue to compel humans to confront who they are through the perceptual and sensory imagination.

I wish to thank Emily Cuming, Sandra Esslinger, and Liliana Leopardi with the consortium of the Art Historians of Southern California for their advice and contributions to this essay.

1. Annette Smelik and Nina Lykke, *Bits of Life: Feminism at the Intersections of Media, Bioscience, and Technology* (Seattle: University of Washington Press, 2008).p.xi. Katrina M. Brown had questioned whether Christine Borland's The Aether Sea, a two-channel video projection of jellyfish, are in fact planets or micro-organisms. They suggest the micro and macro-scopic. Katrina M. Brown and Christine Borland, eds., *Christine Borland, Progressive Disorder* (London: Dundee Contemporary Arts, 1999)p.20.
2. <http://www.nasa.gov/centers/johnson/home/index.html>
3. Susan Anderson and Jack Moore, "Touch a Piece of Mars Beginning Aug. 5 at Space Center Houston" Press Release (August 2, 2012).
4. Martin Jay, "Scopic Regimes of Modernity," in Hal Foster, ed., *Vision and Visuality* (Seattle: Bay Press, 1988).p.5. Jay is paraphrasing from Richard Rorty, *Philosophy and the Mirror of Nature* (Princeton: Princeton University Press, 1979).p.45.
5. Ibid.p.4.
6. See Jane Chin Davidson, "The Global Art Fair and the Dialectical Image," *Third Text: Critical Perspectives on Contemporary Art and Culture*, Vol. 24, Issue 6 (November, 2010).
7. Timothy Mitchell, "Orientalism and the Exhibitionary Order," in *The Art of Art History: A Critical Anthology*, ed. Donald Preziosi (Oxford: Oxford University Press, 1998).p. 460.
8. Sarah Franklin, Celia Lury, and Jackie Stacey, *Global Nature, Global Culture* (London: Sage, 2000).p.26.
9. Karen Barad, "Posthumanist Performativity," *Material Feminisms*, eds. Stacy Alaimo and Susan Kekman (Bloomington and Indianapolis: Indiana University Press, 2008).p.141.
10. Manfred E. Clynes and Nathan S. Kline, "Cyborgs and Space," *Astronautics* (September, 1960).pp.26-27.
11. Anne Hull, "Moon and Stars Align for Performance Artist," *Washington Post* (Wednesday, June 30, 2004) p.A19.
12. Susan Anderson and Jack Moore, "Touch a Piece of Mars Beginning Aug. 5 at Space Center Houston," Press Release (<http://www.nasa.gov/centers/johnson/news/releases/2012/J12-013.txt>).

13. Ibid.
14. Jeffrey Kluger,"Live From Mars," *Time* (August 20, 2012).p.8.
15. William C. Lipke, ed., "Fragments of a Conversation, February 1969" *Robert Smithson: The Collected Writings, Jack Flam*, ed. (Berkeley and Los Angeles: University of California Press, 1996).p.168.
16. Anderson and Moore, "Touch a Piece of Mars Beginning Aug. 5 at Space Center Houston." See also Kenneth Chang, "Obama Calls for End to NASA's Moon Program," *The New York Times* (February 2, 2010).
17. Anderson and Moore, "Touch a Piece of Mars Beginning Aug. 5 at Space Center Houston."
18. Steve Gorman, "Mars Rover Curiosity Sends Back More Postcards from Red Planet," *Reuters* (August 9, 2012).
19. Kluger,"*Live From Mars*."p.24.
20. Ibid. See also NASA, "Mars Exploration Rover Launches," Press Kit (June 2003).
21. Bill Chappell, "Streams of Water Once Flowed on Mars; NASA Says Photos Prove It," *The Two-Way – NPR's News Blog* (September 27, 2012).
22. Gilles Deleuze, *The Logic of Sense*, ed. Constantin V. Boundas, tr. Mark Lester (New York: Columbia University Press, 1990).p.258.
23. Dennis Overbye, "Physicists Find Elusive Particle Seen as Key to Universe," *The New York Times* (July 4, 2012).
24. Ibid.
25. Roger Highfield, "Prof Peter Higgs Profile," *Telegraph* (April 7, 2008).
26. Overbye, "Physicists Find Elusive Particle Seen as Key to Universe." See also Ian Sample, "The Idea of a Lifetime," *New Scientist*, Vol.199, Issue 2673 (September 18, 2008).p.44-5.
27. Lucretius, *On the Nature of Things*, tr. Martin Ferguson Smith (Indianapolis: Hackett Publishing Company, 1969).p.31.
28. Overbye, "Physicists Find Elusive Particle Seen as Key to Universe."
29. Lucretius, *On the Nature of Things*. p.75.
30. Stephen Greenblatt, *The Swerve: How the World Became Modern* (New York: Norton, 2012).p.28.
31. Ibid.p.29.



32. Jas Elsner, *Imperial Rome and Christian Triumph*, Oxford: Oxford University Press, 1998.p.257.
33. Deleuze, *The Logic of Sense*.p.253.
34. Greenblatt, *The Swerve: How the World Became Modern*.p.31.
35. Deleuze, *The Logic of Sense*.p.262.
36. Greenblatt, *The Swerve: How the World Became Modern*.p 29.
37. Gayatri Chakravorty Spivak, *An Aesthetic Education in the Era of Globalization* (Cambridge: Harvard University Press, 2012).p.335.
38. Marsha Meskimmon, “Making Worlds, Making Subjects: Contemporary Art and the Affective Dimension of Global Ethics,” *World Art*, Vol.1, No.2 (September 2011).p.192.
39. “President Obama Signs NASA Budget Authorization,” CBS News (10/11/2010) <http://www.cbsnews.com/network/news/space/home/spacenews/files/ceb32821135eca04378b5a360ef0d46a-83.html>
40. Nate C. Hindman, “Richard Branson’s Mars Colony: We Want Beautiful People, Ugly People,” *Huffington Post* (09/21/2012).



Towards an Intercorporeal ‘Body’

Alpesh Kantilal Patel

Cellular exists in several physically different configurations across the three venues of the exhibition; in this sense, even the structure of the exhibition reinforces that the work will enact a plurality of meaning. Each site—Houston Space Center (as part of Johnson Space Center); University of Houston-Clear Lake (UHCL) Art Gallery; and Miami Beach Urban Studios, Florida International University (FIU)—provides a slightly different framework through which to view Geraldine Ondrizek’s work. I will focus on the installation at Florida International University as a starting point to consider the significance of this multi-sited iteration of her work.

At FIU, *Cellular* takes up the entire gallery space; in this sense, the darkened gallery becomes almost a metaphorical incubator for the three projections of a developing organism – the spider embryo. Each segment of the film is composed from over 200 hours of still images of ten eggs

—taken with Atonics Micro fire digital cameras and Olympus stereomicroscopes— spliced into a twelve-minute film.¹ Ondrizek explains that she edited ten different films of gastrulation “to overlap and repeat the phases of development just before a recognizable body is evident.”² Indeed, although the details of gastrulation vary among species, the mechanisms are surprisingly similar. Editing the films to show the moment right before the blastula becomes a distinct species renders the final video to show a potentially developing human as much as it could be evoking an embryonic arachnoid. The process is the same for both.

Cellular exemplifies the experiments in filming gastrulation enabled by technological advances; however, the project is not just a staging of *Cellular* as scientific document. Rather, one can conceive of the gallery space of FIU as an incubator—an updated contemporary “womb

Cellular film installation in three separate time lapses at Miami Beach Urban Studios, Florida International University



room,” if you will—in which *becoming* rather than *being* is of utmost importance. Ondrizek aligns her work with that of Mona Hatoum, who explores her body as a site of surveillance, exploration and exploitation as opposed to the early womb rooms of Faith Wilding, which could not have anticipated the pervasiveness of medical intervention in reproduction in contemporary Western society.

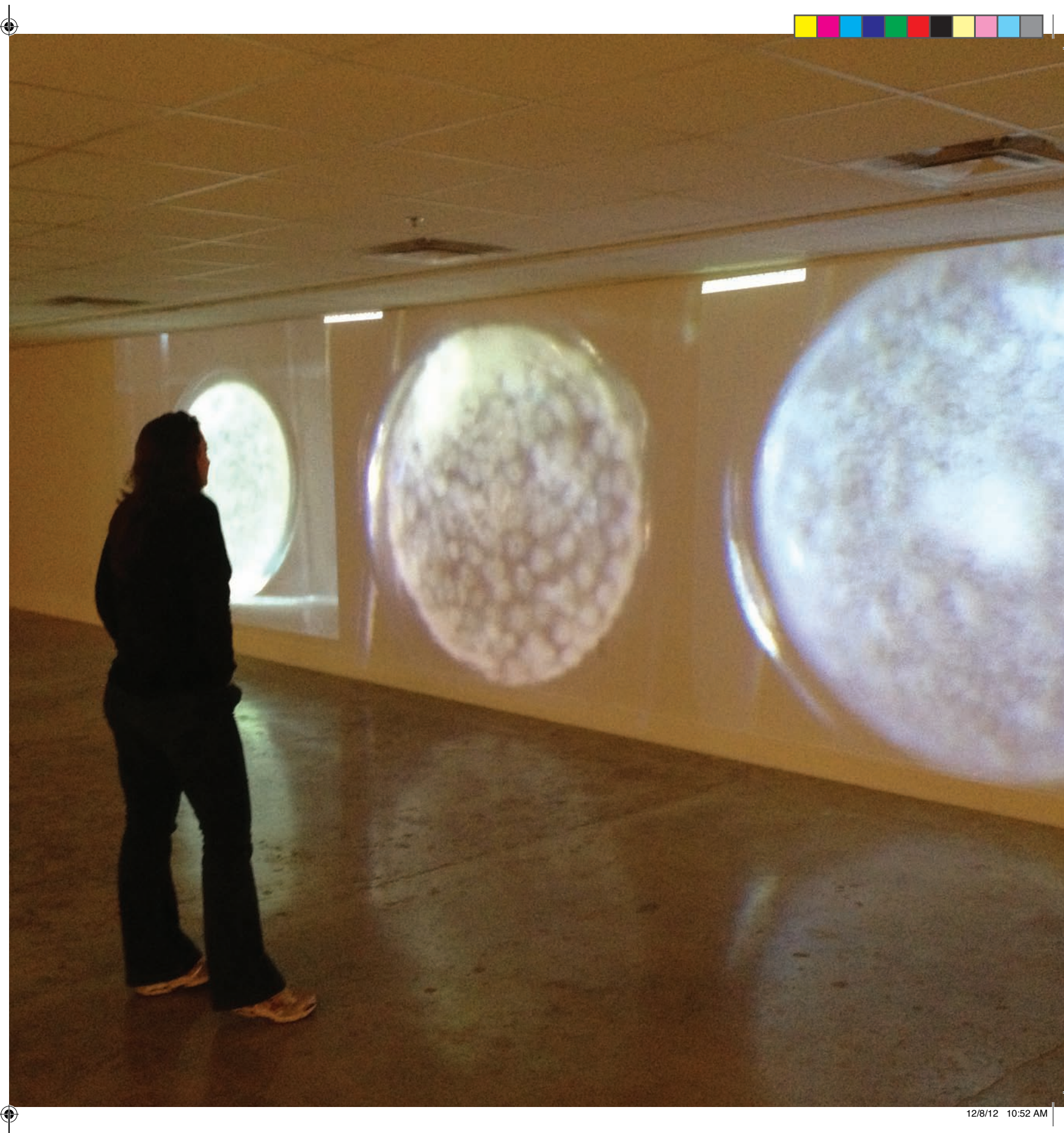
Projected, Viewing and Celestial Bodies

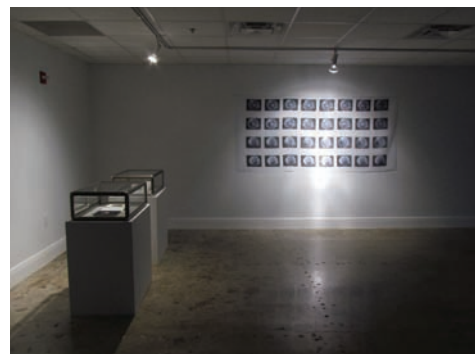
Cellular moves beyond the body as an object – or as a singular “self” trapped in its own skin – and towards the body as intercorporeal: the body is one that is connected with and through the bodies of individuals, discursive bodies of knowledge, and even celestial bodies. Indeed, Ondrizek’s *Cellular* does not appear only as an orb of rapidly dividing cells (healthy or not); the image also suggests the beginning stages of a planet in formation—perhaps even the initial moments of the creation of the universe—or a planet in the process of dying. *Cellular* presents an (inter)corporeal body in process and in flux, yet importantly still situated in space. Here, space refers to both the abstract concept of the specific discursive space of Florida and to outer space—all points to which I return shortly.

Cellular is not only about the projected body; the viewer watching these films is enveloped within the work. One does not watch *Cellular* with one’s eyes as much as experience it with the body. Ondrizek accomplishes this through the sophisticated use of sound incorporated with the visual. She has magnified the sound human cells make when dividing, drawing upon recent

advancements in science—in particular the development of the Atomic Force Microscope (ATM). The ATM allows researchers to touch a cell with the fine tip of a needle and thereby pick up its vibrational signature. Allowing for a multisensory scientific knowledge, its sound is then amplified into the range of human hearing. This revolutionary new area of study of the sounds that cells make is known as sonocrology.

One of the more exciting applications of this new technology is that one can feel/hear whether or not a cell is cancerous; cancerous cells produce a less sonorous sound than healthy ones. The audio of *Cellular* is a compilation of both healthy and cancerous cells. In this way, *Cellular* becomes a metaphorical engagement for viewing subjects to see, feel, and touch the beginning of human life; or, on the contrary, the proliferation of cancerous cells leading to the end of life. And in the signification of Florida’s space coast context, the artistic expression refers metaphorically to the stage right before a star dies, when it balloons in size.³ But ultimately, celestial death is the mirror reflection of the creation of the universe. The tension between the telescopic and microscopic, order and chaos, creation and destruction, life and death exists in a taut situation rather than become neatly resolved. And the tension is intensified by the sublimity of the artwork – the dualistic feelings of pleasure and displeasure that *Cellular* elicits in the viewer.





From top: *Ovum*, lithograph on mulberry paper, display of artist books, gallery view of *Cellular Film Stills*

Objective/Subjective Bodies

Directly opposite of the projections of *Cellular* is a silk panel onto which stills of *Cellular* have been printed. The panel is lit in such a way that the still two-dimensional images have a three-dimensional quality. Although the sounds of *Cellular* can still be heard, the stillness of the images allows for a moment of introspection. Displayed opposite the projections and to the side of the silk panel are several of Ondrizek's handmade books that also act as foils for *Cellular*.⁴ *Fertility Prayer Book* and *Ovum Dividing Over and Over* are two black-cloth bound books that include hand-drawn images of the blastocyst (which is also depicted in *Cellular*) on cotton rag paper. Each image is carefully drawn and like *Cellular* veers between the subjective (the personal) and the objective (the scientific). Here, it is worth noting that Ondrizek suffered the loss of a child to a genetic anomaly; I offer this information, though, not as a simplistic genealogical origin of the works, but as an opportunity to underscore the subjectivity of the scientific gaze. The scientific norm is predicated on the assumption that the personal is irrelevant to unaffected research. What more effective way to break the gaze then to produce the books in a Lilliputian size— *Fertility Prayer Book* is 4 x 3 inches and *Ovum Dividing Over and Over* is 4 x 6 inches, respectively. The power of the scientific gaze is at least partially based on an *objective* distance from that being *objectified*. The size of the books demands one to look closely and thereby breaks from the objectivity of the gaze.

The other two books on display are *Cell Tissue* and *Ovum*. The former includes hand-drawn

images of cell tissue and is also small in size, 4 x 3. The latter is slightly larger at 7 x 8 inches, and is a thirteen-print series documenting the development of the ovum through the blastocyst stage, in which each cell is identified as a particular part of the human anatomy. The original cells were magnified 900 times with an electron microscope. The images were scanned, enlarged, and altered on a computer, then transferred on to lithographic plates. Both of these books were placed in rectangular, glass vitrines with rounded corners edged in steel. The vitrines might be described as pod-like as they sit on plinths from which they could become detached—just like a space pod from its (mother) ship. Indeed, the word “pod” refers to a seed container in plants, but since the 1950s, the word has also been used to refer to “a detachable...compartment on [a]...spacecraft... often having a rounded shape”⁵ If only implicitly, *Ovum* seems to surface the micro-scopic human body as well as macro-scopic astronomic body, in particular Earth. In this way, the vulnerability and subjectivity infused in the aforementioned books could be said to suggest not just the frailty of life but the planet Earth as a vulnerable body, itself.

The metaphor of birth and death in human terms, extending to a subjective sense of the life of the planet, transforms the way in which we view the scientific realm. This may be the most significant contribution that emerges from Ondrizek's installation at FIU. The embodied experience looking closely and intimately at the handmade books can only be subjective; and at the same time, the three wall-size projections

of *Cellular* produces at times a disorienting, distancing effect in the viewer that more closely approximates the disembodied scientific gaze. Overall, it is the discursive space of NASA in Florida that casts the largest scientific shadow. One is more aware of the sense of living in a “scientific community” in which the frailty and vulnerability of human processes have historically been juxtaposed against the looming objectivity of the rocket, of Cape Canaveral. It is here that *Cellular* as a work of the aesthetic functions to remind us of the inter-connections between and among—indeed intertwining of—micro and macro bodies, human or otherwise.

1. Ondrizek's colleague Steve Black, professor of development biology and zoology, at Reed College provided the footage.
2. Geraldine Ondrizek, “Cellular,” artist website, accessed 17 September 2012, <http://academic.reed.edu/art/faculty/ondrizek/>
3. This is the case for stars that are similar to our sun; stars more massive than our sun do not get larger in size.
4. The books were produce in the summer and fall of 1998, while Ondrizek was on a junior paid leave from Reed College. The project was supported by the Stillman-Drake fund and the Levine funds. The prints were made at Mahaffey Fine Art in Portland; and the books were constructed and bound while Ondrizek was an artist-in-residence at the Women's Studio Workshop in New York.
5. *Oxford English Dictionary*, s.v. “pod,” <http://dictionary.oed.com/> (accessed 6 December 2012).





WORKS IN THE EXHIBITION

University of Houston-Clear Lake Art Gallery

Cellular, 2008-09
Video loop, 12 min film on DVD, wall projection of three-dimensional photographs, film capture of several blastopores of spiders – cellular mechanics of the gastrulation of a spider egg
Geraldine Ondrizek in collaboration with Steve Black, professor of Developmental Biology, Reed College, Portland, and Allison Eggar, research assistant

Sound loop, AMF (atomic force microscope) recording of the vibrations of human cells dividing
Geraldine Ondrizek in collaboration with Andrew E Pelling, assistant professor of Bio-Physics, Department of Physics, University of Ottawa
First exhibited at Western Gallery, Western Washington University, September 28 - November 25, 2009

Sound Wall, 2008
Installation, cellular spaces created with three walls of handmade Abaca paper embedded with tiny sound speakers emitting the AMF (atomic force microscope) recording of the vibrations of human cells dividing, 7x18x8, 6x12x8, 8x4x8
First exhibited at Western Gallery, Western Washington University, September 28 - November 25, 2009

Chromosome Painting, 2012
Window and wall installation, 32ft Jacquard dye and dye sublimation printed on ultra sheer and sheer silk individual panels, 14x108
First exhibited at Kirkland Arts Center, Kirkland, Washington, May 25 - July 6, 2012

Cellular Film Stills
Photo dye sublimation print on silk
45 1/2 X 94

University of Houston - Clear Lake, Alfred R Neumann Library, Special Collections Room

Chromosome Paintings, 2012
Series 1 through 22 and X
Silk Crepe de Chine, Jacquard dyed and printed
Individual panels, 13x69
First exhibited at Kirkland Arts Center, Kirkland, Washington, May 25 - July 6, 2012

Houston Space Center, NASA's Johnson Space Center

Cellular, 2008-09
Video loop, 12 min film on DVD, wall projection of three-dimensional photographs, film capture of several blastopores of spiders – cellular mechanics of the gastrulation of a spider egg

Geraldine Ondrizek in collaboration with Steve Black, professor of Developmental Biology, Reed College, Portland, and Allison Eggar, research assistant

Sound loop, AMF (atomic force microscope) recording of the vibrations of human cells dividing
Geraldine Ondrizek in collaboration with Andrew E Pelling, assistant professor of Bio-Physics, Department of Physics, University of Ottawa
First exhibited at Western Gallery, Western Washington University, September 28 - November 25, 2009

Cellular Film Stills, 2009
Four rows of eight stills printed on an Epson 9000, plexiglass, steel frames, 4ft x 8ft, each individual row 10in x8ft
First exhibited at the Portland Art Museum, February 12 - May 15, 2011

Miami Beach Urban Studios, Florida International University

Cellular, 2008-09
Video loop, 12 min film on DVD, wall projection of three-dimensional photographs, film capture of several blastopores of spiders – cellular mechanics of the gastrulation of a spider egg
Geraldine Ondrizek in collaboration with Steve Black, professor of Developmental Biology, Reed College, Portland, and Allison Eggar, research assistant

Sound loop, AMF (atomic force microscope) recording of the vibrations of human cells dividing

Geraldine Ondrizek in collaboration with Andrew E Pelling, assistant professor of Bio-Physics, Department of Physics, University of Ottawa
First exhibited at Western Gallery, Western Washington University, September 28 - November 25, 2009

Fertility Prayer Book, 1999
Hand drawn images of the blastocyst stage on cotton rag paper
Bound in black cloth, 4 X 3

Cell Tissue, 1999
Hand drawn images of the cell tissue on cotton rag paper
Bound in black cloth, 4 X 3

Cellular Film Stills, 2012
Photo dye sublimation print on silk, 45 1/2 X 94

Ovum Dividing Over and Over, 1999
Hand drawn images of the blastocyst dividing on cotton rag paper
Bound in black cloth, 4 X 6

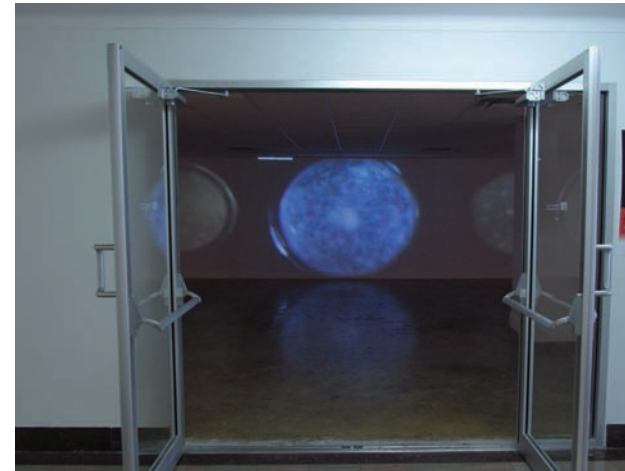
Ovum, 1999
This thirteen-print series documents the development of the ovum through the blastocyst stage, in which each cell is identified as a particular part of the human anatomy
The original cells were magnified 900 times with an electron microscope
The images were scanned, enlarged, and altered on a computer, then transferred on to lithographic plates
Lithograph on mulberry paper, 7 x 8 when closed and 8' long open
Each image is 3 x 3, the central image is 4 x 4



Page xi



Page 24



Page 9



Page 42



Page 9



Page 21



Page 42



Page 42

From top left: *Cellular Film Stills* at UHCL, *Cellular* installation at UHCL. Bottom: *Cellular* installation at Space Center Houston

From top left: *Cellular* installation through the doors of Miami Beach Urban Studios, gallery view of *Cellular Film Stills*, *Cell Tissue*, 1999, *Ovum Book* 1999



ARTIST’S BIOGRAPHY / EXHIBITIONS

Geraldine Ondrizek received her BFA from Carnegie-Mellon University and an MFA from the University of Washington. She is a Professor of Art at Reed College in Portland Oregon. Ondrizek was the recent recipient of an Oregon Council and Ford Foundation Professional Development Grant for the creation and exhibition of *Chromosome Painting*. She has received the Stillman Drake Fund, the Levine Fund and Mellon Foundation Faculty Research Awards; in 2006 Ondrizek won the Oregon Council on the Arts Fellowship. She has been an artist in residence at CAMAC in France, Gasworks in London, the Women’s Studio in New York, Kunstseminar in Schwäbisch Hall Germany, the Mattress Factory in Pennsylvania and the Anderson Arts Center in Colorado.

Commission

2011 University of Washington Medical Center, commissioned work for the front lobby of the University of Washington Hospital honoring Dr. Arno Motulsky and the 50th Anniversary of Medical Genetics.

Solo Exhibitions

2012 *Chromosome Painting, and work from 2009-12*. Curated by Genvieve Gaiser Trembley, Kirkland Arts Center, Kirkland, Washington. Funded by The Oregon Arts Commission and The Ford Foundation.

2011 *Cellular, Sound Wall* and Case Study, the Portland Art Museum Apex Award Exhibition

2009 *The Sound of Cells Dividing*, The Western Gallery, Western Washington University, Bellingham, Washington

2008 *Sound Walls*, CAMAC Art Center, Marnay sur Seine, France. *DNA Fingerprints*, The International Museum of Surgical Science, Chicago, Illinois

The Window Project, PDX Gallery, Portland, Oregon

2007 Geraldine Ondrizek: *M 168/ Repairing RNA*, Sheehan Gallery, Whitman College, Walla Walla, Washington

2006 *M168: Tracing the Y Chromosome*, Hoffman Gallery, Oregon College of Art and Craft, Portland, Oregon

DNA Fingerprints, The Portland Building, Portland, Oregon

2005 *Repairing RNA*, Mooney Exhibition Center, College of New Rochelle, New Rochelle, New York

2004 *Repairing RNA*, The Nine Gallery, Portland, Oregon

Obscured Elements, Solomon Fine Art, Seattle, Washington

2003 *RNA, DNA*, Gasworks, London

2002 *Family Photos*, Kunstseminar, Schwäbisch Hall, Germany

2001 *Recording Bird Songs*, Littman Gallery, Portland State University, Portland, Oregon

Stem Cells and Cellular Tissues, Fairbanks Gallery, Oregon State University, Corvallis, Oregon

1999 *Thin Sections*, West Gallery, Arizona State University, Phoenix, Arizona

Recent Work, Stem Cells and Cellular Tissues. Laura Russo Gallery, Portland, Oregon

1998 *De Viscerum Structura*, Autzen Gallery, Portland State University, Portland, Oregon

1997 *Springs Eternal*, Seafirst Gallery, Seattle, Washington

Libri, Douglas F. Cooley Memorial Art Gallery, Reed College, Portland, Oregon

Vera Icona, Frauenkirche, State Gallery for Contemporary Art, Erding, Germany

Vera Icona, Holter Museum of Art, Helena, Montana

1996 *Vera Icona*, Matrix Gallery, Sacramento, California

1995 *Collectors Chamber*, Art Gym, Marylhurst College [now Marylhurst University], Marylhurst, Oregon

1994 *Collectors Chamber*, Henry Art Gallery, University of Washington, Seattle, Washington

1989 *Osage Orange and Sumac*, Mattress Factory, Pittsburgh, Pennsylvania

Three Forms, AIR Gallery, New York, New York

Group Exhibitions

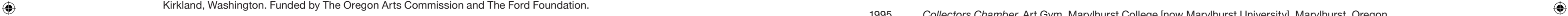
2012 *Color Mad*, Western Washington Gallery of Art, Bellingham, Washington

2011 *Art Meets Technology*, The Detroit Institute Of Arts. Detroit, Michigan

2010 *Mind and Matter: Technology, Science, Nature and Culture*, Textile Society of America Biennial, Shelton Museum, Lincoln, Nebraska

2009 *Book Ends*, Pyramid Atlantic, Alexandria, Virginia

2008 *4th edition of Fenêtre sur l’Art* *Donnemarie-Dontilly*, France





- The Mattress Factory 30th Anniversary Exhibition*, Pittsburgh, Pennsylvania

Speaking In Codes, Form + Content Gallery, Minneapolis, Minnesota, Curator: Diane Mullin, Associate Curator, Weisman Art Museum
- 2007

Fiber, Linfield Art Gallery, Linfield, Oregon, Curator: Cris Moss, Linfield College
- 2006

Body of Art: An Exhibition Exploring Biotechnology, Willoughby and Baltic Fine Arts, Cambridge, Massachusetts

Words to Live By, Solomon Fine Art, Seattle, Washington

100% Centennial: Wall-to-Wall CFA, Regina Gouger Miller Gallery, Carnegie-Mellon University, College of Fine Art, Pittsburgh, Pennsylvania
- 2005

AFFAIR @ the Jupiter Hotel, Portland, Oregon, represented by Solomon Fine Art, Seattle, Washington
- 2004

Drawing Conclusions 2004, Museum of Fine Arts, Baltimore, Maryland

New Directions 04, Barrett Art Center, Poughkeepsie, New York
- 2000

Anniversary Exhibition, Mattress Factory, Pittsburgh, Pennsylvania

Triennial of Prints, Association Mouvement d'Art Contemporain, Chamalières, France
- 1999

Portland Printmakers, Davidson Gallery, Seattle, Washington
- 1997

1997 Oregon Biennial, Portland Art Museum, Portland, Oregon

The exhibition traveled in Oregon to the Schneider Museum of Art, Southern Oregon University, Ashland; University of Oregon Museum of Art, Eugene; Hallie Ford Museum of Art, Willamette University, Salem.

Group Exhibition, Mattress Factory, Pittsburgh, Pennsylvania

Lifelines, Hillwood Art Museum, Long Island University, C. W. Post Campus, Brookville, New York



APPENDIX TO THE EXHIBITION

A Brief History

Geraldine Ondrizek

For the past fifteen years, I have been working with biologists and geneticists and looking closely at cellular anomalies, cell division, and early stages of egg development in the biological sciences. This research is included in the artworks presented in the three-site exhibition entitled *Inner Space, Global Matter: Recording from the Structures Within*, Geraldine Ondrizek – *Works from 2008 through 2012*, at the University of Houston-Clear Lake Art Gallery, at NASA’s Space Center Houston, and at Florida International University’s Miami Beach Urban Studios, the occasion for this exhibition catalogue. Included in the FIU exhibition are some earlier works completed in 1998-99, handmade books which detail the images of my investigation of cellular tissue and the blastocyst. In all, the most current technology at the time, such as the electron microscope, was used to obtain the images for my artistic exploration.

From 1999-2002, I continued to make works in graphic media that depict the stages of cell division, chromosome testing, and gestation. Completing forty textile works, the images were printed on cloth and embroidered by hand. From 2002-2012, I continued to develop my work in genetic research. *RNA Sample* (2003) is a printed and sewn work of installation that was exhibited at Gas Works in London. Other works included the installations entitled *Repairing RNA* (2005), *DNA Finger Prints* (2006), and *M168 Tracing the Y Chromosome*.

In 2007, I returned to my research on cellular anomalies, which led me to work with Andrew Pelling and his research using Nano technology which resulted in the recording of the sounds of cells and the construction of *Sound Walls*. In 2008, I began working with Steve Black at his laboratory at Reed College to complete the film for *Cellular*.

In 2008, I was commissioned to create a commemorative

and documentary work on behalf of the University of Washington Medical Genetics department, in honor of UW’s founding geneticist Arno Motulsky. This opportunity allowed me to gain access to genetic research and made me aware of testing formats and genetic issues. As a result I not only made the commissioned work, *Chromosome 17*, which is installed in the UW medical hospital, I was also able to obtain research for the *DNA Microarray* series and *Chromosome Painting*. I began working on *Chromosome Paintings* in 2009 and first exhibited the work in the summer of 2012 at the Kirkland Arts Center.

Artist Books 1998-1999

In this work, I focused on the magnification of organic forms and our cultural preoccupation with inspection. With the invention of the microscope in the seventeenth century, the interior of nature, once closed off to direct perception, was made accessible. This development spurred debates about realism and instrument-mediated knowledge, which are echoed today. Most recently the use of magnification has vastly expanded our knowledge of human reproduction, genetic coding, and fetal tissue. These new frontiers have changed our understanding of and ability to deal with disease and reproduction.

My preoccupation with inspection and collection naturally led me to investigate the magnification of organic matter. I began my first piece, *Tissues*, by directly scanning plant tissue into the computer and magnifying it ten to twenty times. Through this process I found that the tissues became so abstract they could be read as many types of organic matter. Simultaneously I researched the images made with an electron microscope. I accessed several resources of images of plant tissue and human fetal cell growth. The visual simplicity of these abstract calligraphic marks and the potent content of fetal cell tissue were of particular interest. The framing and diagrammatic display of these images in medical journals and scientific texts gave me a clear understanding of the process of division and formation. This didactic format in juxtaposition with the actual content of each cell further intrigued me: each cell carries an entire map of a human being, representing pure potential. In the book *Ovum* I focused on making



images of the blastogenesis stage, in which the cells are identified as a specific part of the body and divide, creating the mid-line or spinal column of the body. I then began looking at images of chromosomes actively dividing in cellular tissue. Each image in the book *Chromosomes* focuses on the various stages of mitosis. The books were produce in the summer and fall of 1998, while on a junior paid leave from Reed College. The project was supported by the Stillman-Drake fund and the Levine funds. The prints were produced at Mahaffey Fine Art in Portland. The books were constructed and bound while I was an artist-in-residence at the Women’s Studio Workshop in New York.

***Chromosome 17*, 2009-2010**

Cloth panels, sateen and cotton voile, hand embroidered with the genetic sequence for Chromosome 17 Hand-embroidered text describing genes on Chromosome 17, 9 x 36 x 6, University of Washington Medical Center Collection

A permanent work commissioned by the department of Medical Genetics at the University of Washington, in honor of the 50th Anniversary of Medical Genetics and its founder Dr. Arno Motulsky Location: The main entry hall of the University of Washington Medical Center

In 2009 the department of Medical Genetics at the University of Washington commissioned me to make a work that would both commemorate 50 years of Medical Genetics and honor the founder, Dr. Arno Motulsky. Dr. Arno Motulsky created the Medical Genetics department at the University of Washington in 1957, the first of its kind in the United States. Researchers there have since identified more than one thousand genes. The artwork entitled “Chromosome 17” uses the National Center for Biotechnical Information (NCBI)’s database to access the Human Genome master map of gene sequences. Each graphic in the work represents a marker and location of a gene that codes for significant characteristics or anomalies. Chromosome 17 was used for this work because it contains markers for Ovarian Cancer and Breast Cancer, which were discovered at the University of

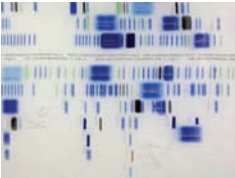
Washington, and Growth Hormone Deficiency, which has been studied specifically at the University of Washington’s Medical Genetic department.

The artwork is composed of two layers of cloth, printed, painted and embroidered with graphics that represent the genetic structure of chromosome 17. One sheer and one thick piece of cloth are layered to create depth in the space of the steel and Plexiglas box, which houses the work. The colors and marks on the chromosome were enlarged, the colors enhanced, and many were hand-embroidered to visually emphasize particular genetic qualities. The gene sequence thus appears as a mosaic of layered blue and green tones. Significant terms and graphics such as pedigree maps, pharmacogenetics, and ecogenetics are engraved on the plexiglass plate that protects the cloth. The commission was completed in consultation with Robin Bennett, M.S., C.G.C., Ph.D.,Senior Genetic Counselor & Co-Director of the Genetic Medicine Clinics at the University of Washington, and Peter H. Byers, M.D. Professor of Medicine and Pathology Adjunct Professor of Genome Sciences and Reed College alumnus from 1969. It was in Peter’s lab that I first discovered the Human Genome master map of a gene sequence graphic for *Chromosome 17*.

The work honors Arno G. Motulsky, M.D., active Professor Emeritus of Medicine and Genome Sciences. Motulsky was a founder of the field of pharmacogenetics, which concerns the interaction between genetic variation and drug responsively. He currently studies the role of genetic polymorphisms in resistance and susceptibility to disease caused by environmental agents at the Center of Ecogenetics.

DNA Microarray

A DNA microarray (also commonly known as DNA chip or biochip) is a collection of microscopic DNA spots attached to a solid surface. Scientists use DNA microarrays to measure the expression levels of large numbers of genes simultaneously or to genotype multiple regions of a genome.



***Chromosome 17*, 2009-2010**



***DNA Microarray*, 2011**



***Case Study 22 Chromosomes X & Y*, 2011**

***DNA Microarray*, 2012**
Cotton, silk with Jacquard dye
8 x 7 ft.

***DNA Microarray*, 2011**
3 small sample color tests
Silk laser printed
8 x 10 in.

***DNA Microarray*, 2010**
2 prototype boxes
Jacquard dye and dye sublimation, printed on ultra sheer and sheer silk
Wood box, engraved plexi
25 x 25 x 4 in.

***Case Study 22 Chromosomes X & Y*, 2011**
Front panel: Jacquard dye and hand embroidery on dye sublimation, printed ultra sheer
Back panel: Laser-printed linen, 20 x 108 in.
Portland art Museum Collection

24 scrolls of ultra sheer synthetic silk maps all of the human chromosomes: 22 human autosomal chromosomes, plus the X and Y sex chromosomes. Each scroll is printed with a graphic that represents the chromosome, and includes prominent genetic markers as well as a selection of genetically inherited diseases and genetic qualities known by the artist’s family lines. For example hair color as well as various diseases are marked with hand emboried markers highlighting various spots on the sequence. The work is meant to focus our attention on the fact that all of us inherit have numerous markers which are both negative and positive markers. In the genetic realm nobody is “ clearer than the other.

More information is available at:

<http://academic.reed.edu/art/faculty/ondrizek/>



IMAGE CREDITS

Leo Chan

Cellular installation at UHCL and at Space Center
Chromosome Painting
Sound Wall, *Cellular* Video Projection
NASA Rocket Park, *Beyond Primal Matter*
Saturn V building

ix, 1, 2, 3-4, 5-6, 7, 18, 21, 23, 47
ix
1-7
27
27

Howard Hardt

Cellular Film Stills
Still from *Cellular* video
Cellular installation
Chromosome Painting silk panels

x, 47
x
9
17

NASA Space Center Houston

Cellular at Space Center Houston
Touch a Piece of Mars

9, 19-20, 47
24

NASA Johnson Space Center

Mars Rock EETA 79001

24

Andrew Horton

Cellular at FIU
Artist Books, *Cell Tissue*, *Ovum Book*
Cellular Film Stills

37, 40, 48
41, 48
41, 48

Geraldine Ondrizek

Cellular still
Cellular Film Stills
Chromosome 17
DNA Microarray
Case Study 22, *Chromosome X & Y*

cover, frontispiece
11-12
56
56
56



ACKNOWLEDGEMENTS

Special thanks to the artist Geraldine Ondrizek

UHCL
President William A. Staples
Provost Carl A. Stockton
Dean Rick Short
Associate Dean Samuel Gladden
University Advancement, Dion McInnis, Andrea Dunn, Elbby Antony
Karen Wielhorski and Staff at the Alfred R. Neumann Library
Nick DeVries, Jeff Bowen and the Art and Design Department

NASA/JSC Houston Space Center
Paul Spana
Carmina Mortillaro

Leo Chan	Alpesh Kantilal Patel
Susanne Clark	Kevin Phillips
David Davidson	Amanda Prather
Karen Fiscus	Sue Ruthstrom
Rebecca García-Franco	Shreerekha Subramanian
Bryan Gardner	Genevieve Gaiser Tremblay
Michael Hamilton	Alisa Tutt
Howard Hardt	Dominic Walsh
Jacek Kolasinski	Dru Watkins
Amy Lampazzi	Students of UHCL
Darrin Leleux	

Special thanks to Linda Theung, editor



Inner Space, Global Matter: Recording from the Structures Within exhibition and associated programs at the University of Houston-Clear Lake were made possible through the generous donations of individuals, foundations, organizations, and the university.
We wish to thank all contributors.

HOUSTON ENDOWMENT

A PHILANTHROPY ENDOWED BY JESSE H. AND MARY GIBBS JONES





ART GALLERY

University of Houston  Clear Lake

Dominic Walsh Dance Theater



MIAMI BEACH



