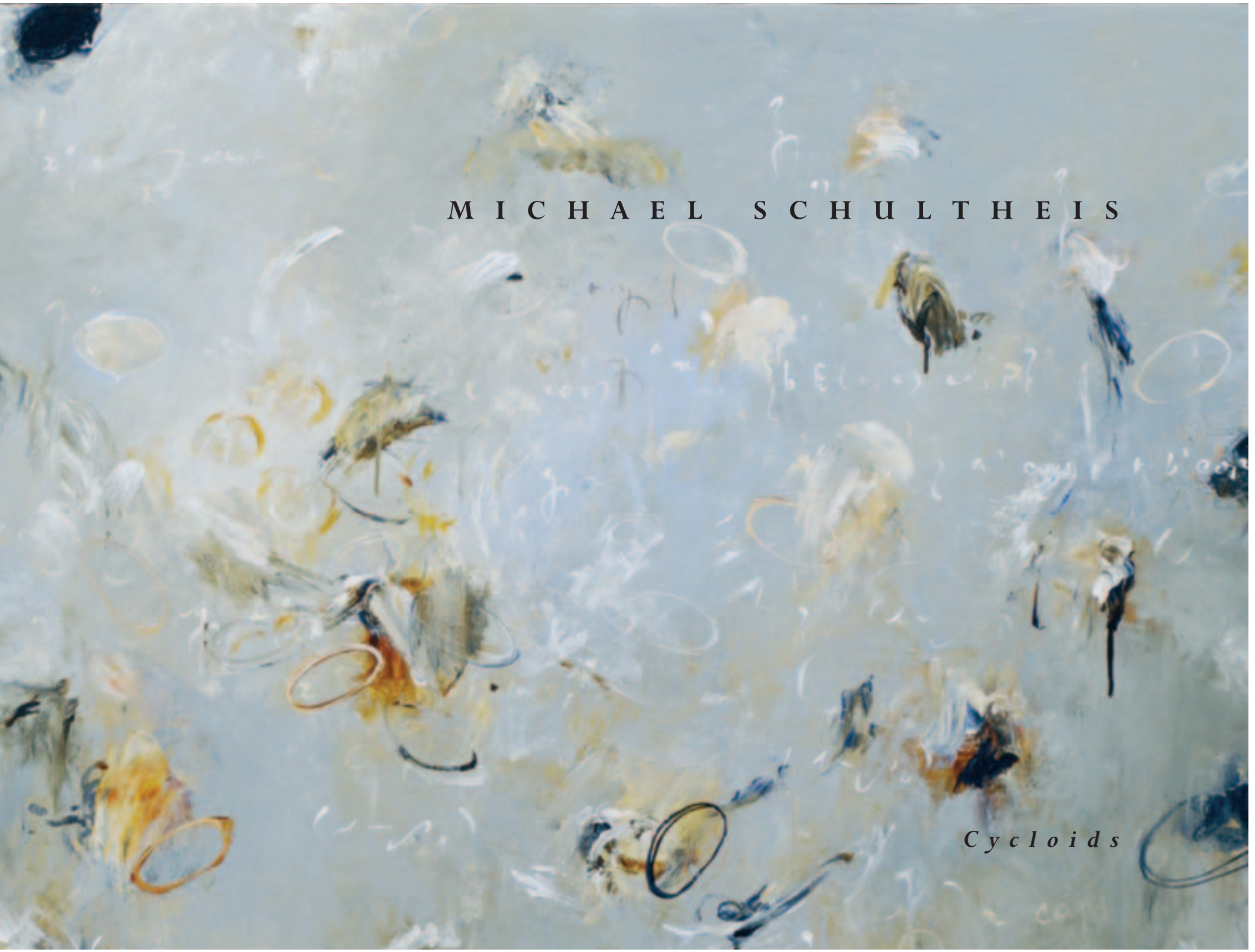
MICHAEL SCHULTHEIS
Cycloids

MICHAEL SCHULTHEIS

Cycloids

Keck Center Gallery The National Academies Washington, D.C.

MAY 19–OCTOBER 20, 2005

Rotunda Gallery National Academy of Sciences Washington, D.C.

NOVEMBER 1, 2005–FEBRUARY 1, 2006

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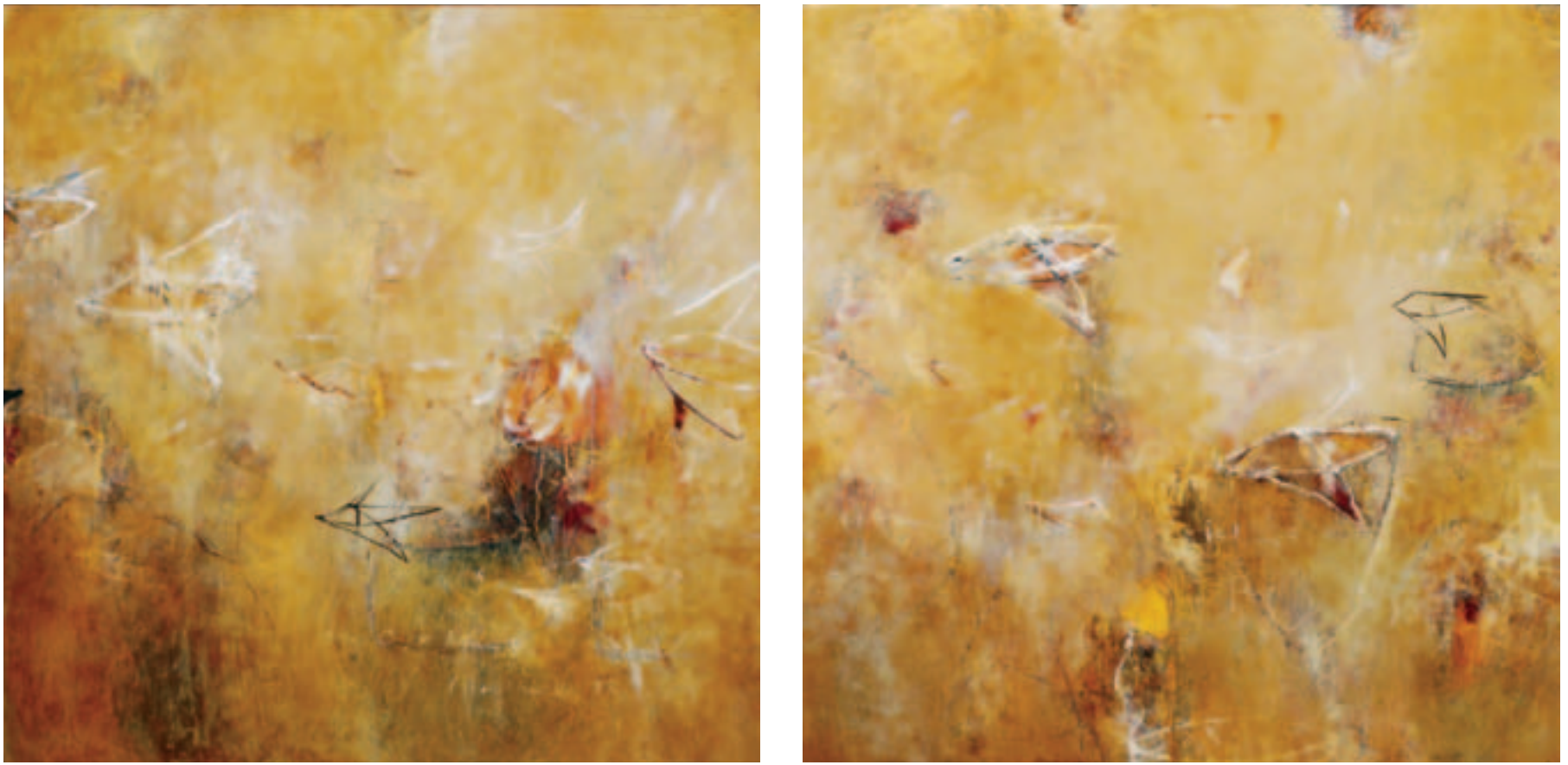
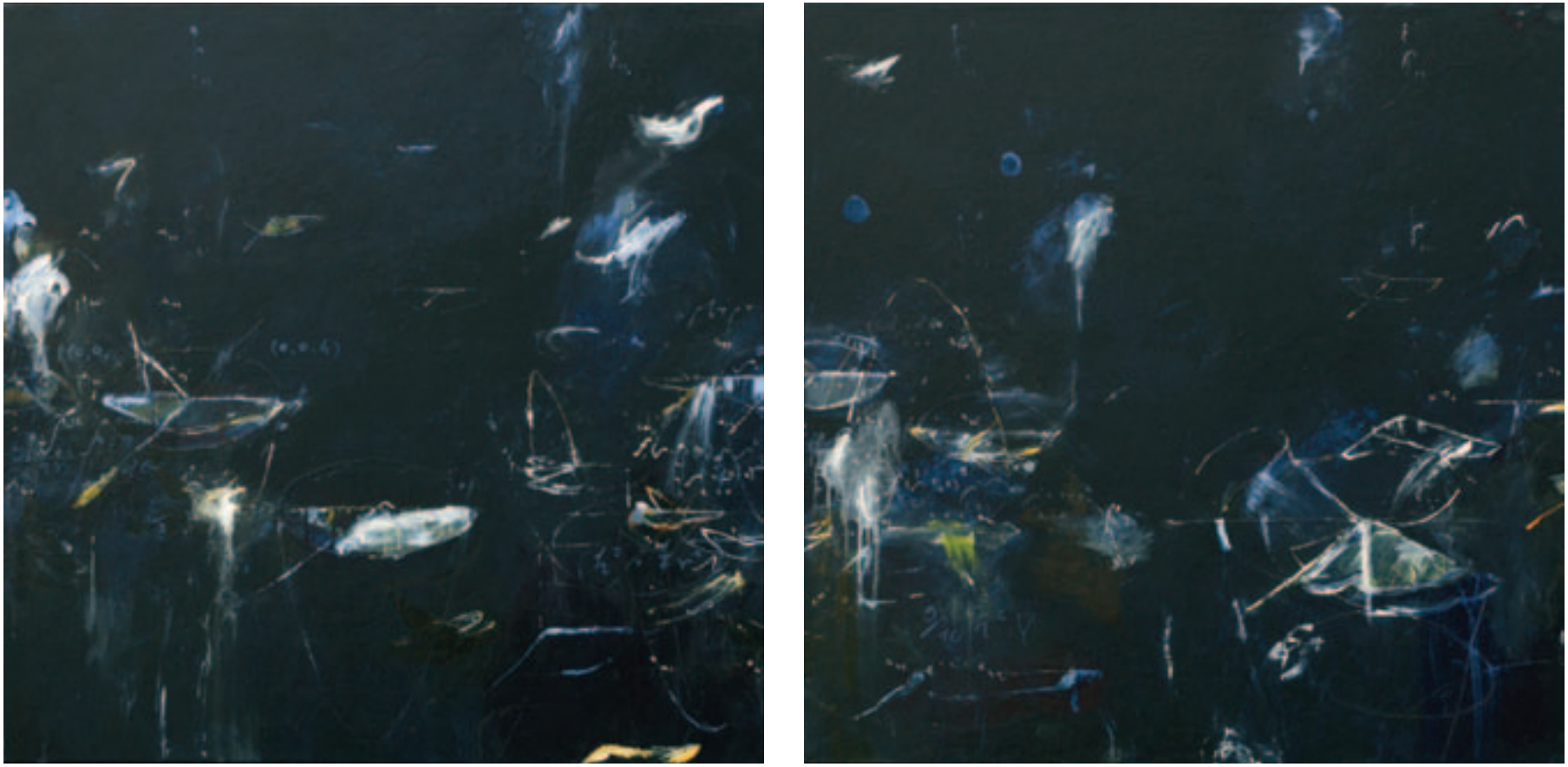


TEN EQUAL TANGENTS 01, 02, 03 Acrylic on canvas (triptych), 36 x 108 inches, 2004 *private collection*

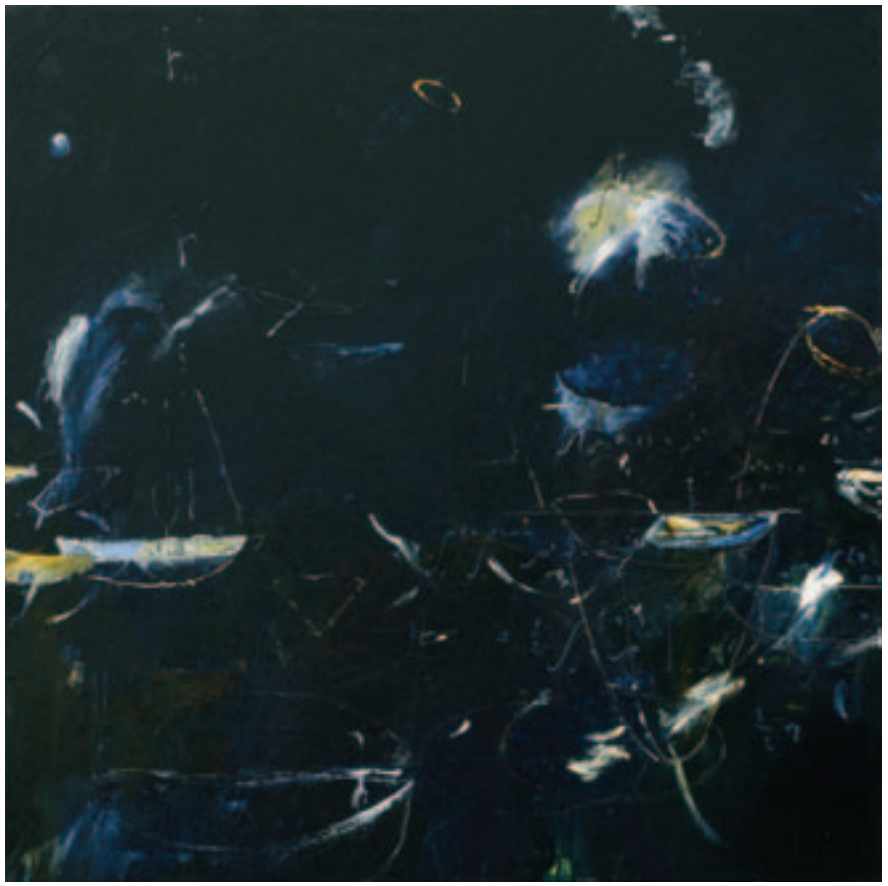
Foreword

IN HIS WELL KNOWN 1959 LECTURE *The Two Cultures*, C. P. Snow—who was educated as a physicist but whose vocation was as a novelist—worried about the divergence of the "science culture" from the more traditional humanistic one. Himself part of both cultures, he felt that their respective members were no longer able to communicate, and mused on the loss to society as a consequence. I have often thought that this failure of communication was, as often as not, about what the cultures share rather than how they differ. It is wonderful to present the work of Michael Schultheis that speaks so clearly to both cultures about what they share.

I look at this work as an engineer, of course, and the essence of engineering is design under constraint—that is, our designs are constrained by things like size, power consumption, safety, reliability, ergonomics, environmental impact, and hundreds of other things. Theodore von Karmen, a well known aerospace engineer from Caltech, said that engineering is about "creating what has never been." That is, every successful design differs in some way from its predecessors. Either it provides a new function to satisfy some human need, or it achieves existing functionality with a better optimization of the constraints.



PARABOLOIDS IN BLUE 01, 02, 03 Acrylic on canvas (triptych), 36 x 108 inches, 2004 *private collection*



If you listen to a conversation between engineers about a great design, you'll hear the word "elegance" used liberally; the focus of the conversation will be at least as much about aesthetics as about technical issues. The aesthetics will be partly about physical form, but also about a pleasing economy of concept and realization, about novel ways to satisfy a constraint, about intellectual cleanliness, or about simplicity and naturalness of use. What distinguishes truly great engineers is not superior mathematics or science skills, but their superior creativity—their ability to produce elegant designs.

On those rare occasions that I have been party to a conversation between artists, I have been bemused that they are often as much about the mechanics of their media and technique for manipulating it as about aesthetics. Isn't it odd? The common stereotype of artists and engineers—of themselves and each other—are poles apart, but there is a great deal they share. Both are about satisfying a human need. Both are creative and revere elegant expression. Both require manipulation of nature.

In Schultheis' work we see and feel the beauty and elegance of that shared space. It is hardly an answer to Snow's general concern, but it is not a bad place to start—so I am deeply pleased that our director of exhibitions, JD Talasek, has brought it to the Academies, which is not a bad place to start the conversation either.

Dr. Wm. A. Wulf
PRESIDENT
National Academy of Engineering

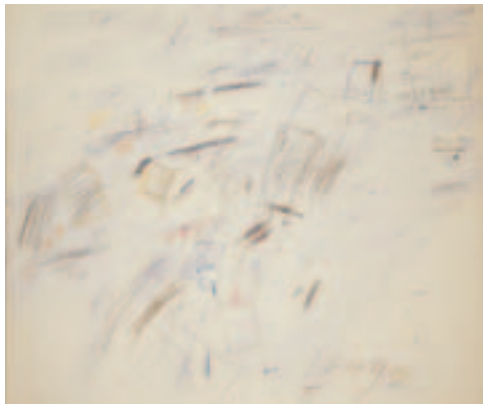
CYCLOIDS 01 Acrylic on canvas, 48 x 72 inches, 2004 *private collection*

BLENDING THE LANGUAGES OF MATHEMATICS AND PAINTING:
The Work of Michael Schultheis

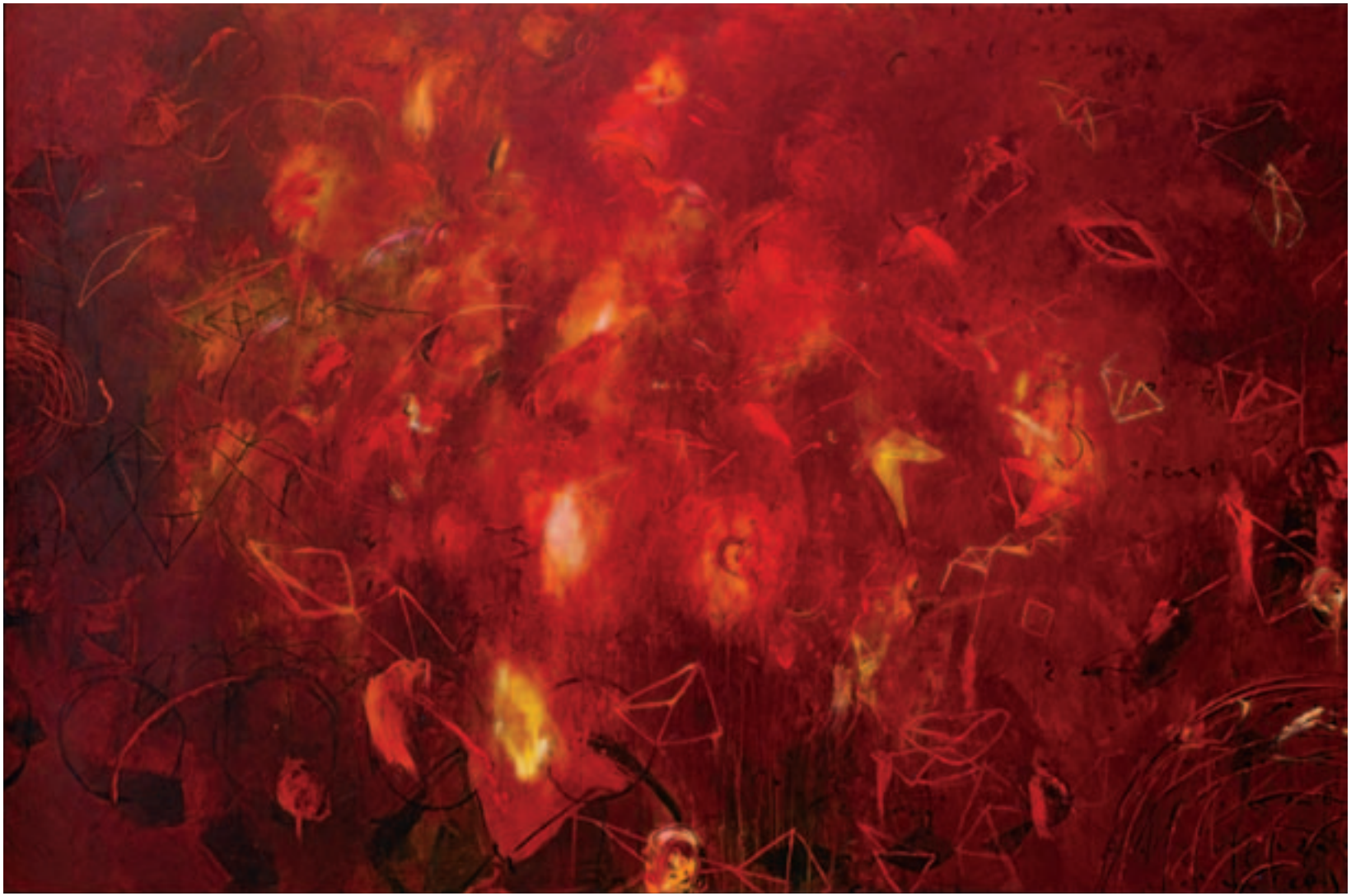
Both mathematics and painting, especially non-representational painting, invoke a mysterious language that, at times, seems comprehensible only to the initiated. If this is true, then Michael Schultheis is one of the initiated who uses his expertise to combine the esoteric elements of both disciplines, creating paintings that are as approachable and personal as they are unique. In his work, the languages of art and math offer insight into one another. The tactile and layered surfaces of Schultheis's paintings invite viewers to consider the archeological nature of the work, where the languages of artistic and mathematical traditions are buried.

Trained as an economist, Schultheis worked in computer software engineering for over seven years. He recalls long meetings where ideas were furiously debated for hours and noted on white boards until they were covered with layered marks. These encoded marks created a map of the engineers' thought processes. Representing hours of work, Schultheis photographed the white boards at the end of these meetings to document the hard-earned information. While doing this, he became fascinated with the beauty and elegance of the flowing marks, which reminded him of markings in the notebooks and scientific diagrams of Leonardo da Vinci. Both da Vinci's notes and the photographs of the white board illustrate how analytical ideas can develop visually, with the hand leading the mind. They provide us with an opportunity to discover the nature of analytical and creative thought processes through layers of handmade marks. This connection was the catalyst for Schultheis to begin his exploration in painting.

For this reason, Schultheis places particular emphasis on his own artistic process. The language of painting that he employs is rooted in the tradition and ideas of abstract expressionism. The abstract expressionists, those that became known as the New York School of painters during the 1950s, shared a Nietzschean view of art as a fusion of rational order and irrational impulses. The blending of rational and irrational thought was realized in the painting process itself, more so than in the finished piece. In fact, it could be said that the term "abstract expressionism" as it applies to these artists refers more to a process than a style or time period. Many incorporated a process of automatism, which allowed them to guide their marks with informed intuition. For example, Jackson Pollock's splattered paint technique relied on a practiced physical gesture. Later, in the 1960s, Cy Twombly, like his predecessors, continued using a process of automatic drawing but incorporated an iconography of everyday life consisting of quickly scrawled text and numbers, similar to the way mathematical equations are rendered in Schultheis's work.



Cy Twombly, *Untitled (Bolsena),* 1969, oil-based house paint, wax crayon, and graphite on canvas, 80 x 96.125 inches, gift of the Collectors Committee and Adriana and Robert Mnuchin, Image © 2005, Board of Trustees, National Gallery of Art, Washington, D.C.



CYCLOIDS 02 Acrylic on canvas, 48 x 72 inches, 2004 *private collection*

To understand Schultheis's connection with this tradition, it is relevant to consider his physical and mental process. He begins by applying a layer of paint with a very delicate Japanese calligraphy brush. Starting in the top left corner and progressing to the bottom right hand corner, he fills the blank canvas with equations relating to a specific topic, much like the practice familiar to him from his days as an engineer. The language of mathematics evoked by these equations forms a base of existing knowledge upon which he builds, providing the background, both physically on the canvas and intellectually in the artist's mind, for the ideas that the artist wants to explore. They are analogous to "rational order," and provide the artist with an opportunity to reacquaint himself with the basic concepts, historical context, and general notation of a given subject.

The notations that form the first layer lead Schultheis to consider visual models or illustrations, which he begins to develop in the second layer of his painting. Instead of revising parts of the equation with an eraser, the way one might on a chalkboard, he covers up segments of his notations with a large brush. Then, with a fine brush, he draws images into the areas that have been covered.

Schultheis describes the third layer of the process:

> *Then something happens that causes me to see a variation on the current form, or an extemporaneous relationship to the existing idea, and I follow this impulse to the canvas with whatever will most precisely manifest this new image. Using non-conventional tools, I draw this new idea with the edge of a palette knife, an X-Acto knife, or a large chisel to scrape into the surface and pull out the new image. I often use my hands and fingers to sculpt the paint into a prominent line, use a rag to rub away previous forms, and spray water onto the surface to wash away all the previous color except that which adheres to the limned outlines of a structure. For hours and hours I live in this third step. I constantly revise equations with the Japanese calligraphy brush, rubbing out an area and thus creating a window into the equations. I draw and re-draw new ideas. All of these ideas are analytical. But they also live in the realm of beauty.*

In these works, Schultheis blends the language of mathematics, movements from the history of painting, and his own experiences. For example, the impetus for the paintings *Cycloids 01* and *Cycloids 02* and the quadriptych *Hypocycloids* is the equation for a cycloid and the artist's knowledge of history and literature that are stimulated by that equation. A cycloid is a geometric curve formed by a point on the circumference of a circle that rolls along a straight line. If a circle has radius a, then the cycloid is described by the parametric equation:

$$x = a(t - \sin t)$$
$$y = a(1 - \cos t)$$

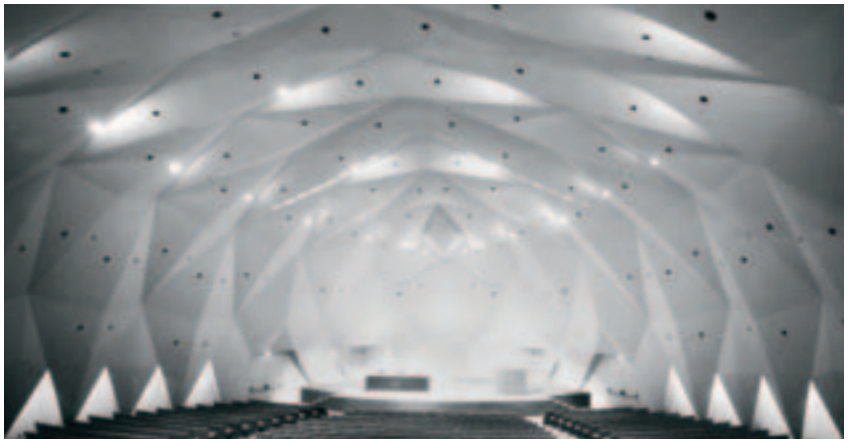
At approximately the same time that Galileo was studying the cycloid in 1599, the Chinese military strategist and inventor Qi Jiguang was defending the Great Wall of China during the Ming Dynasty. Employing his own inventions on the battlefield, Qi Jiguang invented a wheel and flint apparatus that produced sparks from the rim when rolled. The sparks from General Qi Jiguang's invention formed the locus of a cycloid, and are alluded to in red throughout these paintings. The orange and brown palette of these works echoes the colors used in the official portrait of General Qi Jiguang which resides in the permanent collection of the Shandong Provincial Museum in Jinan, China.

PARACYCLES 01 Acrylic on canvas, 36 x 60 inches, 2004 *private collection*

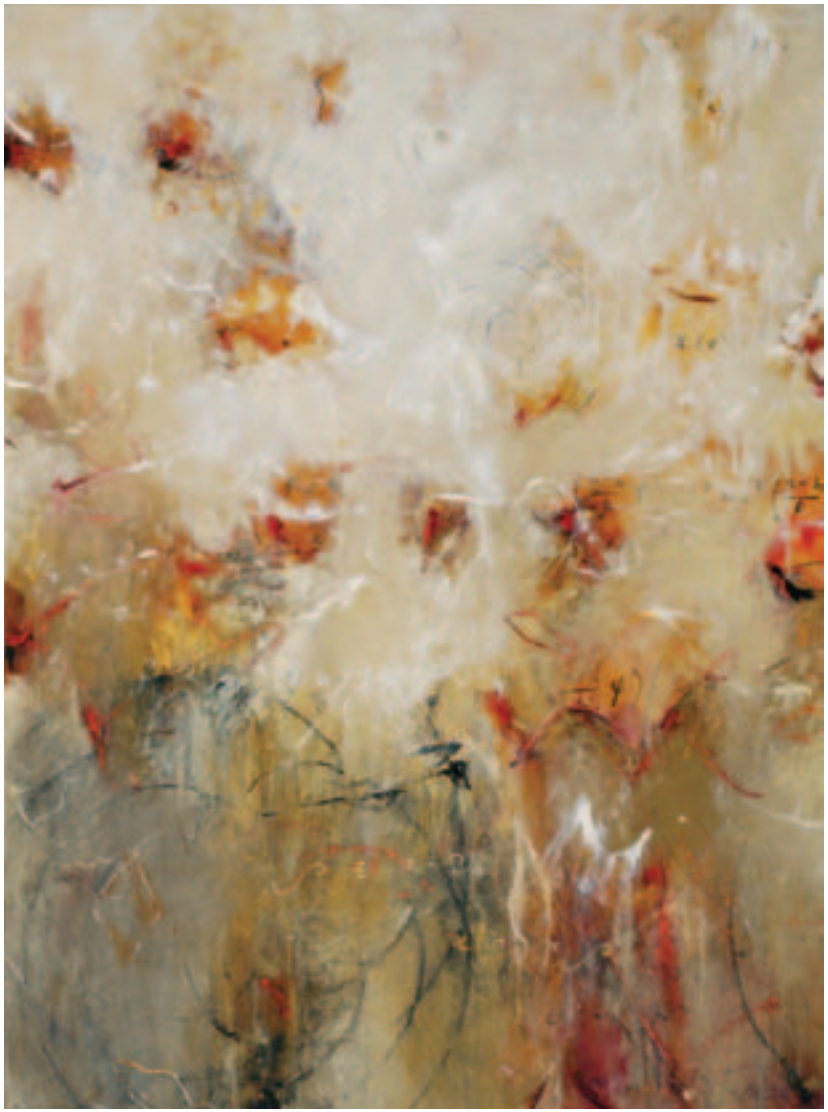
The primary catalyst for the *Cycloid* series, however, occurred when Schultheis visited the National Academy of Sciences auditorium. In 1970, Cyril M. Harris designed the auditorium using a cycloidal curve, which turns a coordinate system based on the cycloid into the acoustically perfect interior of this space. Recalling his visit to the auditorium, Schultheis wrote, "I felt like I had stepped into a three-dimensional rendering of my childhood Spirograph toy. This toy allowed me to create all kinds of shapes on paper by rolling a circle inside of another circle, and it provided me with endless hours of geometric discovery."

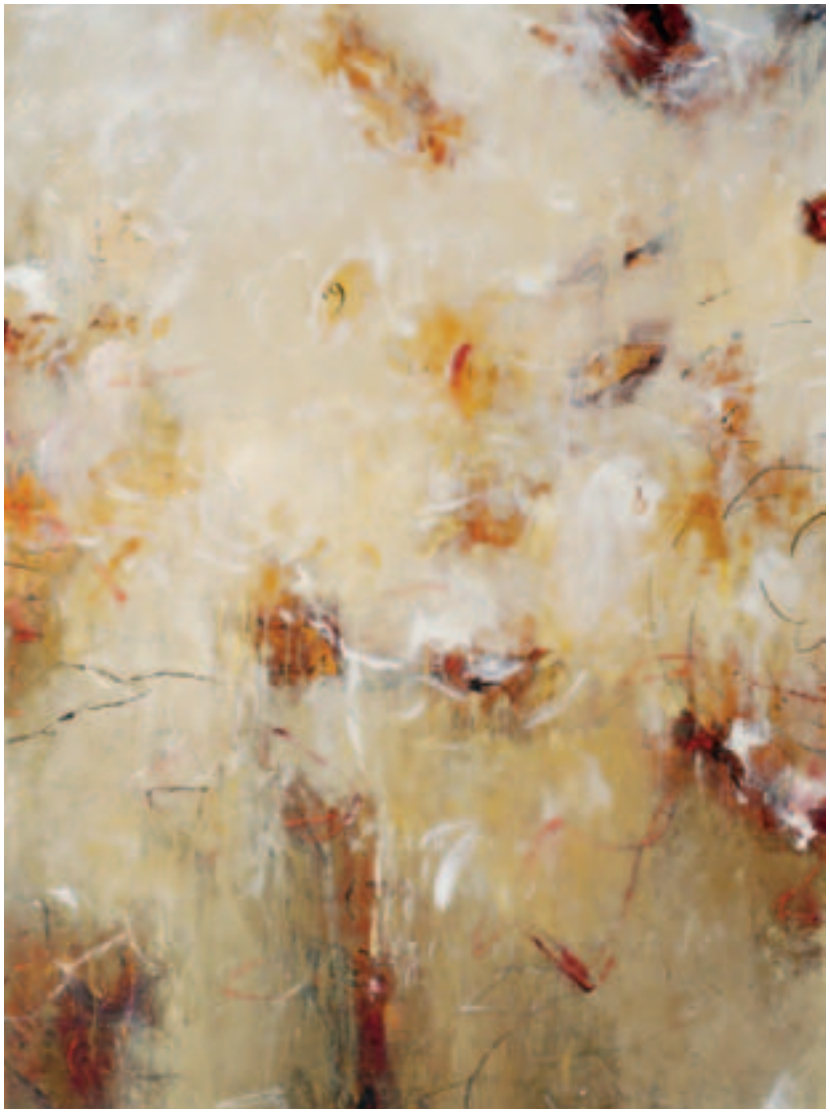
The language of mathematics provides Schultheis with a deeply personal way to understand and describe the world. These paintings serve as a portal into a realm where mathematical ideas become as poetic as they are rational, challenging us to sift through the layers of paint to discover a labyrinth of ideas and histories, both universal and personal, embedded within. The process used to create these paintings reminds us that art and math are not mysteries themselves but, rather, beautifully constructed languages through which we attempt to understand ineffable phenomena.

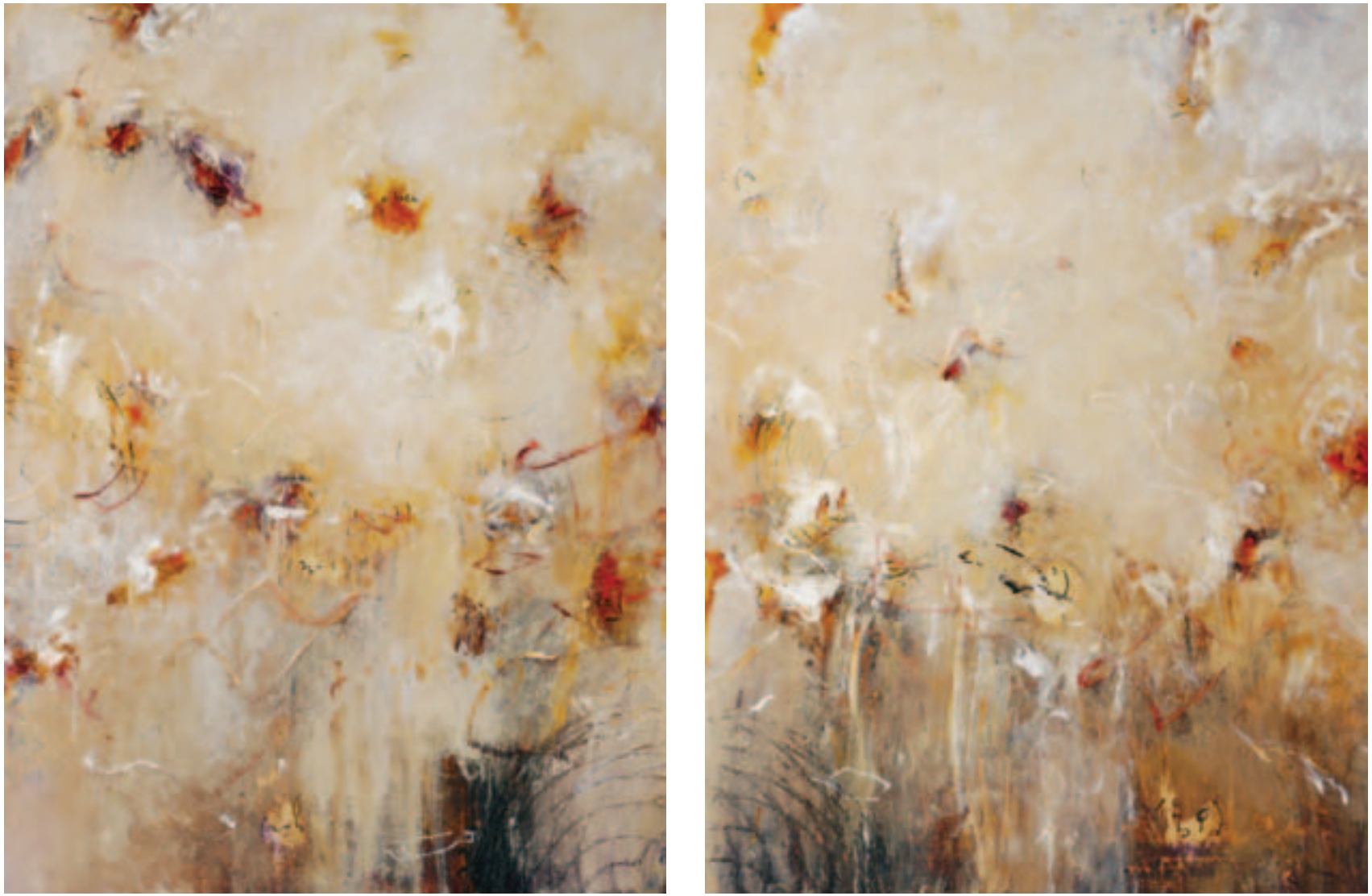
JD Talasek
DIRECTOR OF EXHIBITIONS AND CULTURAL PROGRAMS
National Academy of Sciences



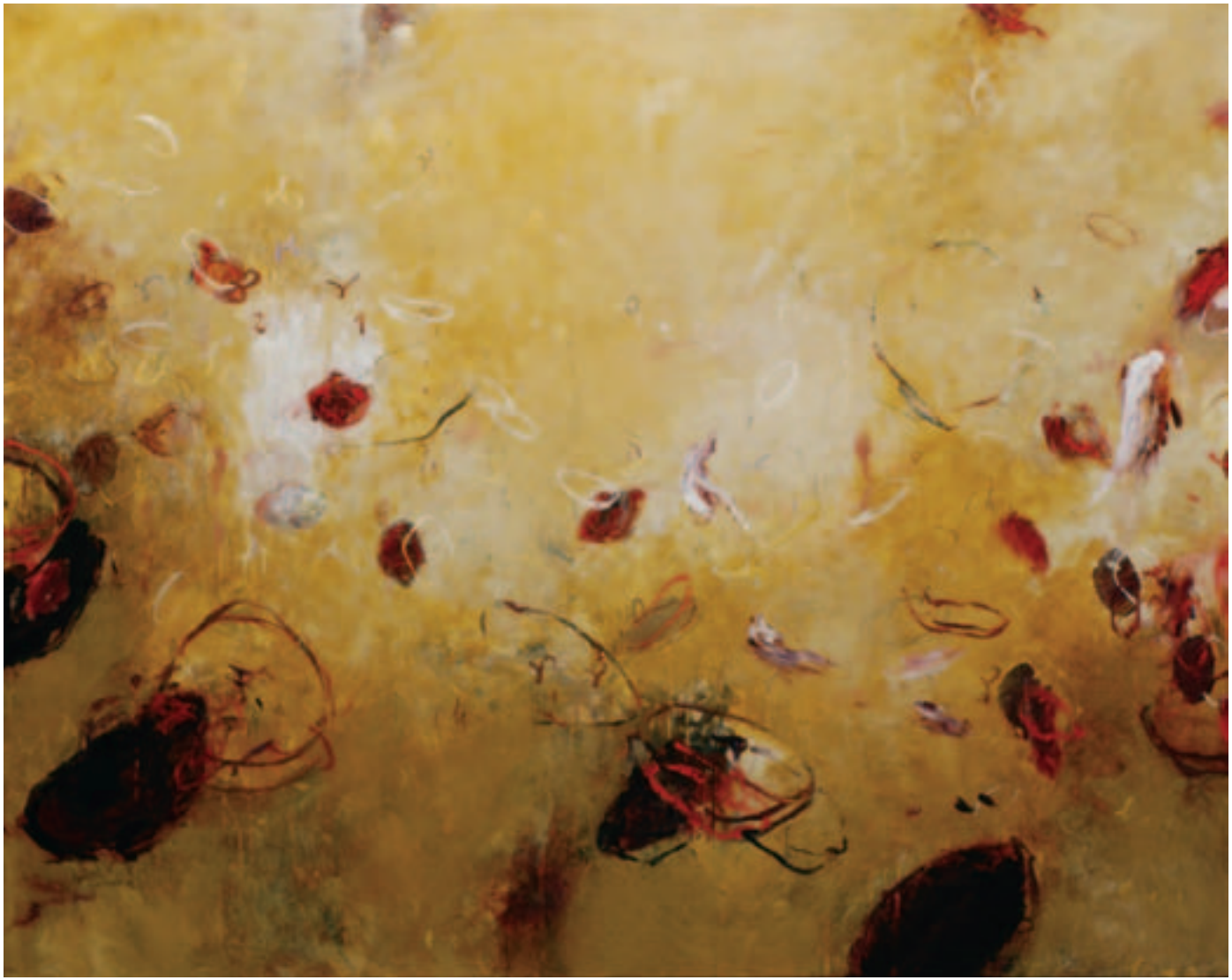
Auditorium at the National Academy of Sciences, 1972, National Academy of Sciences archives,







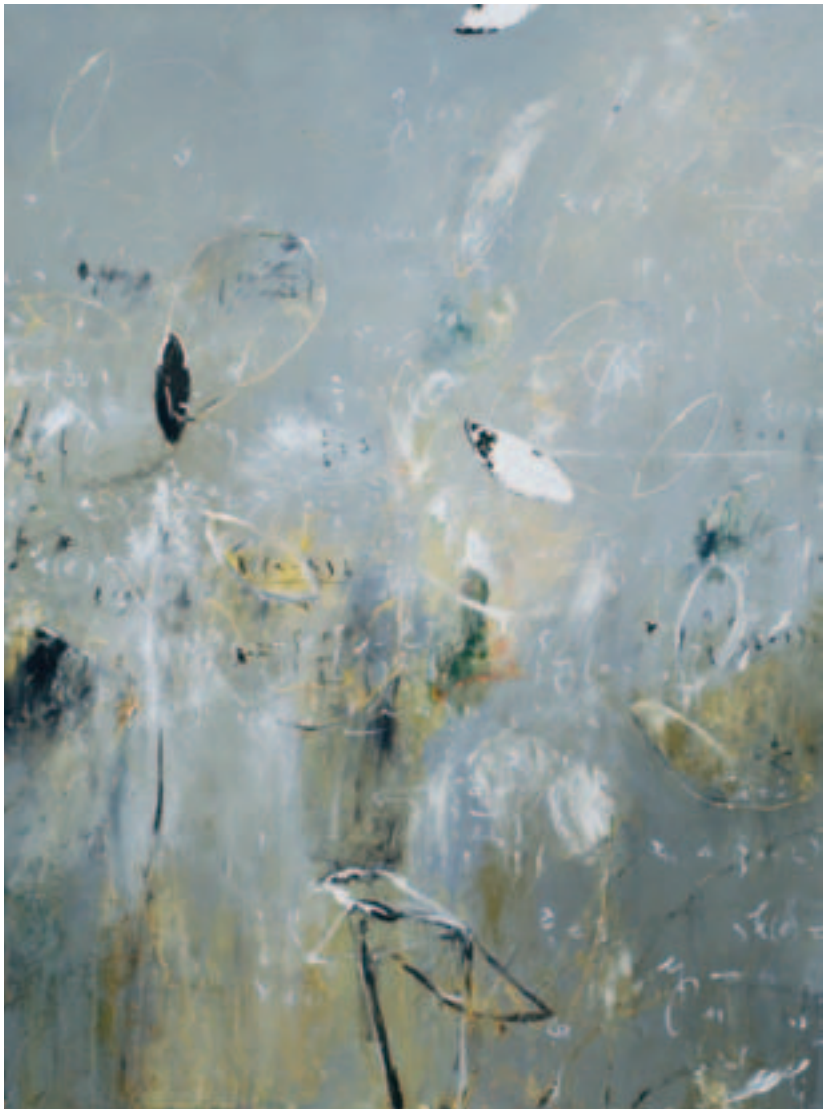
HYPOCYCLOIDS 01, 02, 03, 04 Acrylic on canvas (quadriptych), 48 x 144 inches, 2004



AUTOCORRELATION 02, 03 Acrylic on canvas (diptych), 48 x 60 inches, 2004

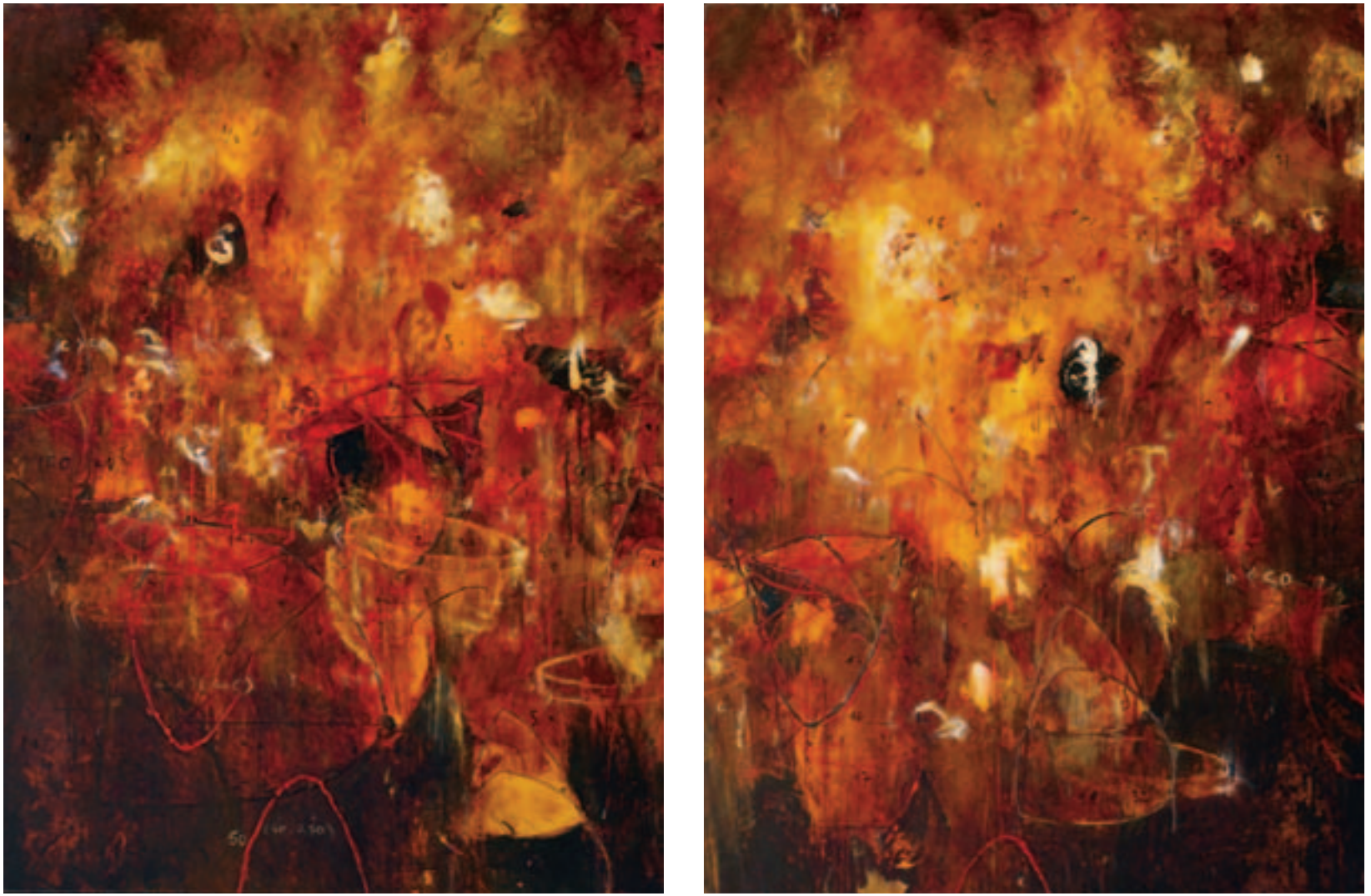
AUTOCORRELATION 06 Acrylic on canvas, 72 x 60 inches, 2004 *private collection*

PARABOLIC SYMMETRIES 04 Acrylic on canvas, 72 x 60 inches, 2004



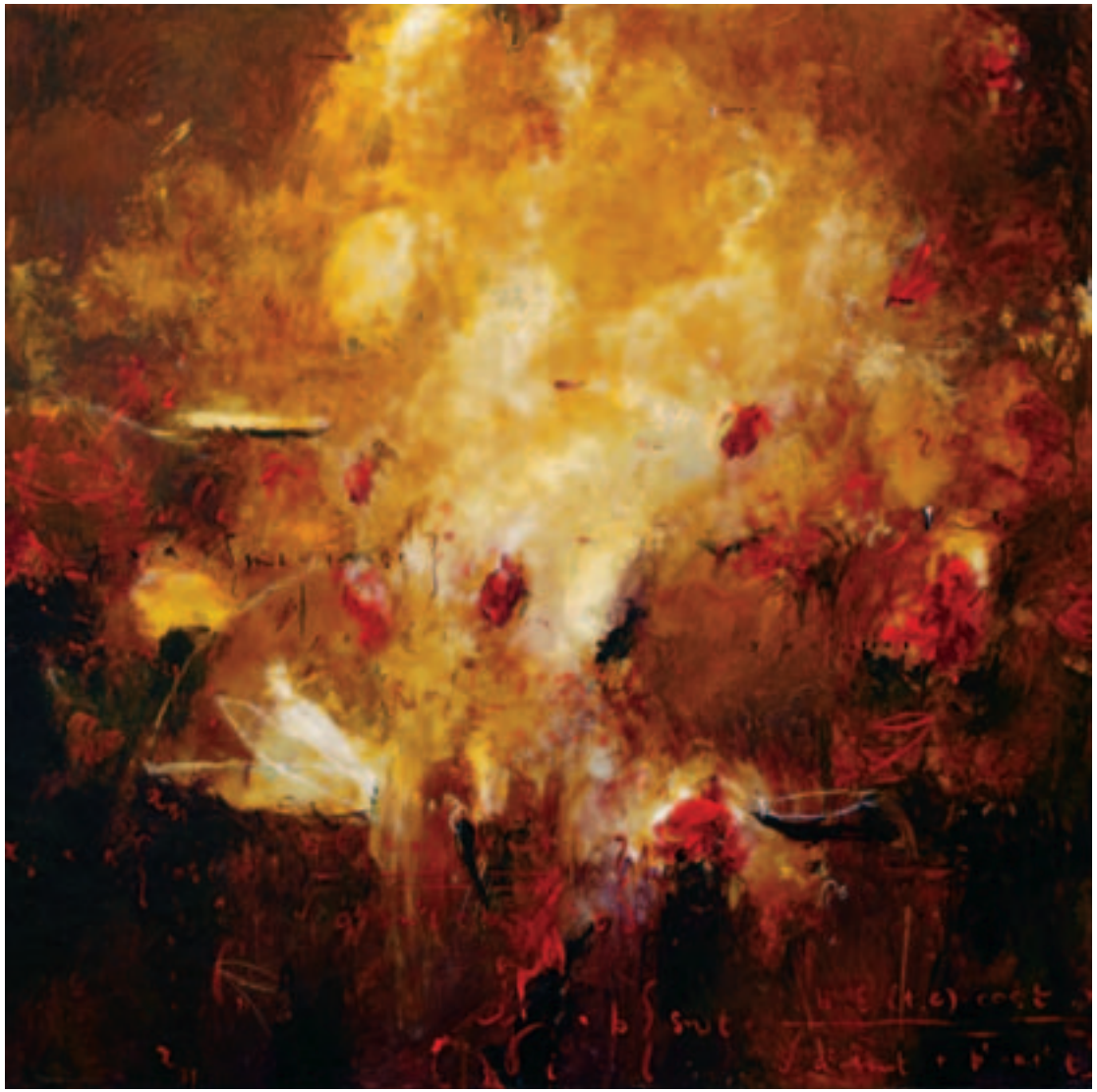
CURVATURES 01 Acrylic on canvas, 48 x 36 inches, 2004

CURVATURES 02 Acrylic on canvas, 48 x 36 inches, 2004



RIDDLE IN GOLD 01, 02 Acrylic on canvas (diptych), 48 x 72 inches, 2004

HYPERBOLOIDS 02 Acrylic on canvas, 48 x 60 inches, 2004



CENTROIDS INVOLUTUS 01 Acrylic on canvas, 36 x 36 inches, 2004 *private collection*

MICHAEL SCHULTHEIS

EDUCATION

1993 M.S., Labor Economics, Cornell University, Ithaca, New York
1990 B.A., Economics, Washington State University, Pullman, Washington
1989 History and Italian, Scuola Per Stranieri, Siena, Italy

SOLO EXHIBITIONS

2005 *Cycloids,* Rotunda Gallery, National Academy of Sciences, Washington, D.C.
Cycloids, Keck Center, The National Academies, Washington, D.C.
Harmonic Oscillations Paintings, Fairbanks Gallery, Oregon State University, Corvallis, Oregon
2004 *Harmonic Quadrants,* Cervini Haas Gallery, Scottsdale, Arizona
Writing on the Wall, Ballard Fetherston Gallery, Seattle, Washington
Parabolic Symmetries, Davis and Cline Gallery, Ashland, Oregon
Harmonic Oscillations, Froelick Gallery, Portland, Oregon
Geometric Progressions, Soren Christensen Gallery, New Orleans, Louisiana
2003 *Correlations,* Ballard Fetherston Gallery, Seattle, Washington
Elasticity, Margo Jacobsen Gallery, Portland, Oregon
2002 *Equilibria,* Soren Christensen, New Orleans, Louisiana
Open Systems, Ballard Fetherston Gallery, Seattle, Washington
White Math, Margo Jacobsen Gallery, Portland, Oregon
2001 *White Matrix,* Patricia Cameron Fine Art, Seattle, Washington
2000 *Outliers,* Patricia Cameron Fine Art, Seattle, Washington
1999 *Griot,* Patricia Cameron Fine Art, Seattle, Washington

SELECTED GROUP EXHIBITIONS

2005 *Gallery Artists,* Froelick Gallery, Portland, Oregon
2004 *Blue Waters,* Ballard Fetherston Gallery, Seattle, Washington
Gallery Artists, Froelick Gallery, Portland, Oregon
2003 *Invitational Group Show*, Cervini Haas Gallery, Scottsdale, Arizona
Grand Opening, Rental Sales Gallery, Seattle Art Museum, Seattle, Washington
14.15.Art Exhibit, Washington State Convention & Trade Center, Seattle, Washington
Poncho Invitational Auction, Seattle, Washington
2002 *Gallery Artists,* Margo Jacobsen Gallery, Portland, Oregon
Best of Show, Juried Benefit Auction, Bellevue Art Museum, Bellevue, Washington
Members Exhibit, Northwest Print Council, Portland, Oregon
14.15.Art Exhibit, Phinney Ridge Center, Seattle, Washington
2001 *Gallery Artists,* Patricia Cameron Fine Art, Seattle, Washington
1995 *Pacific Northwest Annual,* Bellevue Art Museum, Bellevue, Washington

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Swedish Medical Center, Seattle, Washington
Tacoma Art Museum, Tacoma, Washington
University of Washington Medical Center, Seattle, Washington

AWARDS AND HONORS

2004 Artist Trust Grants for Artist Projects, Seattle, Washington
Carnegie Library Project Finalist, Seattle, Washington

THE ARTIST THANKS his family, Bret Nelson, Charles Froelick, Shelly Scarborough, Betsy Fetherston, Dr. Wm. A. Wulf, JD Talasek, Barbara Shaiman, Deborah Bell, Frank Huster, Gordon Brown, Galen Garwood, Erik Madsen and Dan Goldhaber for all of their support.

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Lenders to the exhibition:

Ten Equal Tangents 01, 02, 03—Mimi Jerdes Warner and Scott Mimi Warner, Seattle, Washington

Paraboloids in Blue 01, 02, 03—Dr. Garry J. Naseth and Diane M. Naseth, Klamath Falls, Oregon

Cycloids 01—Sharon and Ken Coleman, Seattle, Washington

Cycloids 02—Bob Kumar, Seattle, Washington

Paracycles 01—Heather Robinson, San Francisco, California

Autocorrelation 06—Ronald Smith and Brent Haberman, San Fransisco, California

Riddle in Gold 01, 02—David Hewitt, Tokyo, Japan

Centroids Involutus 01—Steve Hamilton, Seattle, Washington

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CONVEXITY INVOLUTUS 01
Acrylic on canvas, 36 x 72 inches, 2004