

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Proceedings of the 4th Biennial Symposium of  
the International Quilt Museum

International Quilt Museum

---

6-4-2009

## Fractal Geometry in African American Quilt Traditions

Judy Bales

balesjudy@yahoo.com

Follow this and additional works at: <https://digitalcommons.unl.edu/iqsc4symp>



Part of the [Social and Cultural Anthropology Commons](#)

---

Bales, Judy, "Fractal Geometry in African American Quilt Traditions" (2009). *Proceedings of the 4th Biennial Symposium of the International Quilt Museum*. 4.  
<https://digitalcommons.unl.edu/iqsc4symp/4>

This Article is brought to you for free and open access by the International Quilt Museum at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Proceedings of the 4th Biennial Symposium of the International Quilt Museum by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

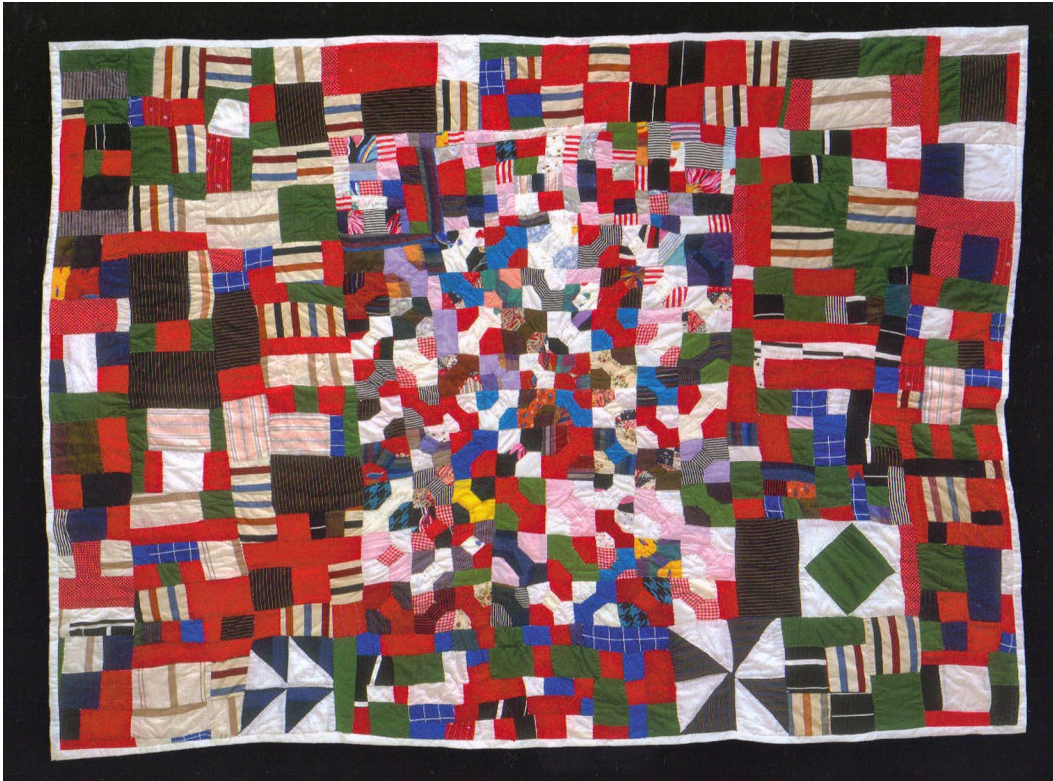
## Fractal Geometry in African American Quilt Traditions

Judy Bales

My first encounter with African American quilts was in the early 1980's in Madison, Georgia. I have a distant memory of an exhibition at the Madison Cultural Center--I do not remember whose collection it was. But I felt an immediate kinship with the way these particular quilters worked, and the experience planted a seed for future interest in similar works. I had always rebelled against the precision and tidy stitches of traditional quilting, and these quilters seemed to favor improvisation, color, texture and "punch" over precision of stitches and precise repetition of pattern. The quilts seemed as much paintings as quilts, and I was a painter turned fiber artist.

Over the years the memory of these quilts often inspired directions in my own fiber work, and gave me a sense of validation of my own working methods. A decade later I came across the writings and collections of Eli Leon, who has collected African American quilts chiefly from California, Texas, Arkansas and Louisiana for many years. His interviews with the quilters expanded my understanding of this particular quilting style that focused on improvisation, variation on a theme, and a welcoming attitude toward irregularities and accidentals. Eli Leon and other researchers had found the following characteristics to be common in one style of African American quilts:

- Improvisation
- Flexible Patterning
- Multiple Patterning
- Strip Construction
- Percussive color



**Opposite:** Image 01 and Image 02 show examples of the *types* of quilts I remember from the exhibition.

### Image 01. Bow Tie Medallion

Pieced by Katie Pennington, Center, Texas, ca. 1985

Quilted by Irene Bankhead, Oakland, California, 1990

Collected by Eli Leon

Photo credit: Sharon Risedorph Photography

**Image 02. Web of Diamonds/Wishing Ring.**

c. 1950's

Collected by Eli Leon

Photo credit: Geoffry Johnson

## What are fractals?

Fractals are patterns that repeat themselves  
in ever diminishing scales.

Fractals are patterns that repeat themselves  
in ever diminishing scales.

Fractals are patterns that repeat themselves  
in ever diminishing scales.

Fractals are patterns that repeat themselves  
in ever diminishing scales.

Fractals are patterns that repeat themselves  
in ever diminishing scales.

Fractals are patterns that repeat themselves  
in ever diminishing scales.

Fractals are patterns that repeat themselves  
in ever diminishing scales.

Fractals are patterns that repeat themselves in ever diminishing scales.

Fractals are patterns that repeat themselves in ever diminishing scales.

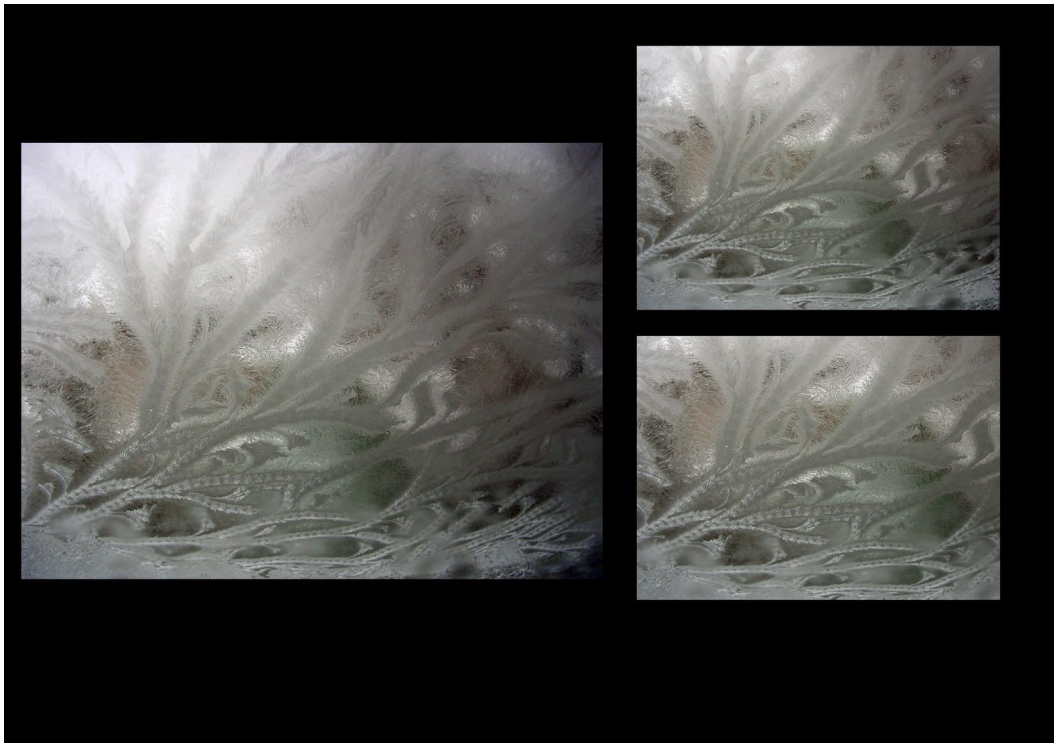
Fractals are patterns that repeat themselves in ever diminishing scales.

Another decade passed and I came across a book about fractals at a book sale. Fractals are self-similar patterns that repeat themselves at ever diminishing scales.



They are found throughout nature and in design and artworks of many cultures. The book's illustrations were intriguing from an artistic standpoint and the images opened a new world for me. The images were visually compelling and the idea of shapes and patterns repeating themselves into infinity, which they could do theoretically, touched me deeply.

I began to see fractals everywhere:



**Image 04.** Frost on a window—each detail is very similar to the whole



**Image 05.** Clouds: self-similar patterns at different scales



**Image 06.** Un-ironed sheet—wrinkles within wrinkles within wrinkles.....

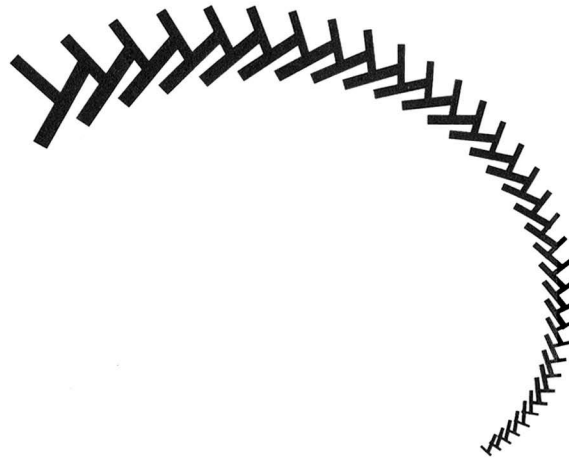
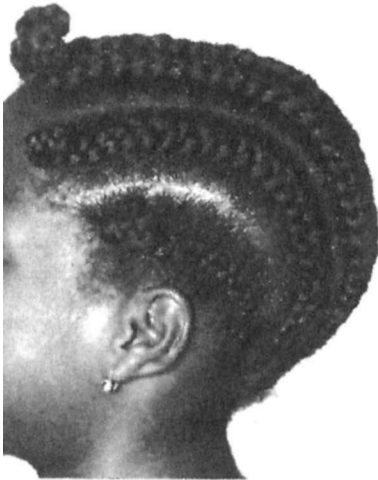


Image 07.

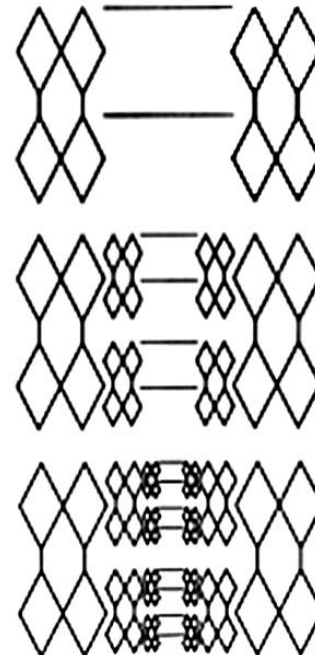
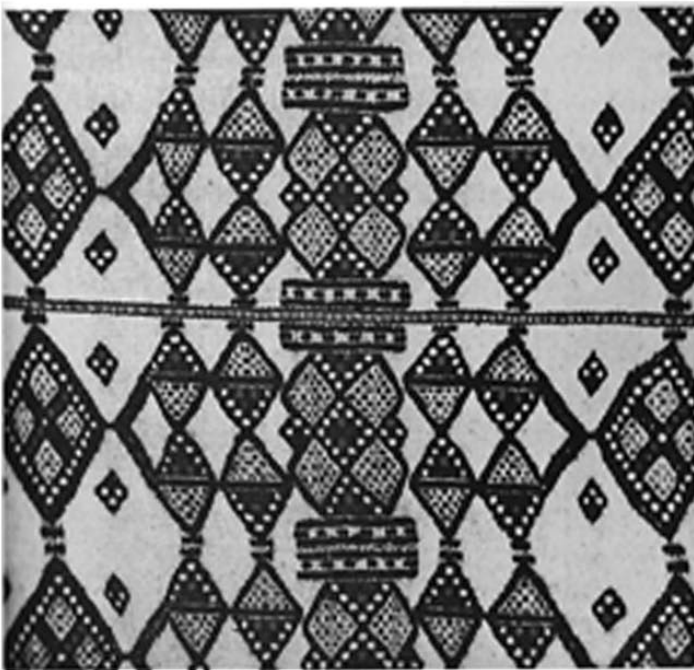
While I was reading the book, the thought came “I wonder if that is part of what I love about those quilts—maybe they are fractal.”

This experience led me to research fractals further and I found lectures and writings by Dr. Ron Eglash, who is an ethnomathematician. He found that African cultures have a high prevalence of use of fractal geometry while western cultures tend to use Euclidean geometry. Euclidean geometry is what we all grew up learning. For instance, many of our cities and property lines are laid out in grid patterns that are Euclidian.





Fractal model for middle Ipako Elede braid.



Images 08 and 09 show two examples of fractals in African design

**Image 08. Corn Row Hairstyle**

Egash, Ron; *African Fractals: Modern Computing and Indigenous Design*, 1999, pg. 82

**Image 09. Fulani Wedding Blanket**

Mali

Egash, Ron; *African Fractals: Modern Computing and Indigenous Design*, 1999, pg. 119



I began to wonder if fractal geometry might sometimes carry through generations to African *American* artists such as the quilters whose work I enjoyed so much.

Now nature gives us examples of both kinds of geometry. Certainly there are just as many examples of Euclidian geometry in nature as there are fractals. So in no way are fractals more natural than Euclidean geometry, or better--both are found throughout the natural world and throughout cultures, but sometimes a culture may prefer one over the other.

Eventually I contacted both Eli Leon and Dr. Eglash. Both researchers, located on opposite coasts were extremely helpful in explaining their work in greater detail. Mr. Leon gave me more in depth information about his collections and the interviews he has conducted, but had not been thinking of fractals when he interviewed the quilters so could not address this particular issue. Dr. Eglash looked at some examples of the quilts and agreed that there might be a case to be made for fractal components. He suggested using computer software to measure this, and directed me in how to convert the images for analysis, and I have begun a time consuming process of analyzing a large number of quilts.

**Image 10. Medallion**

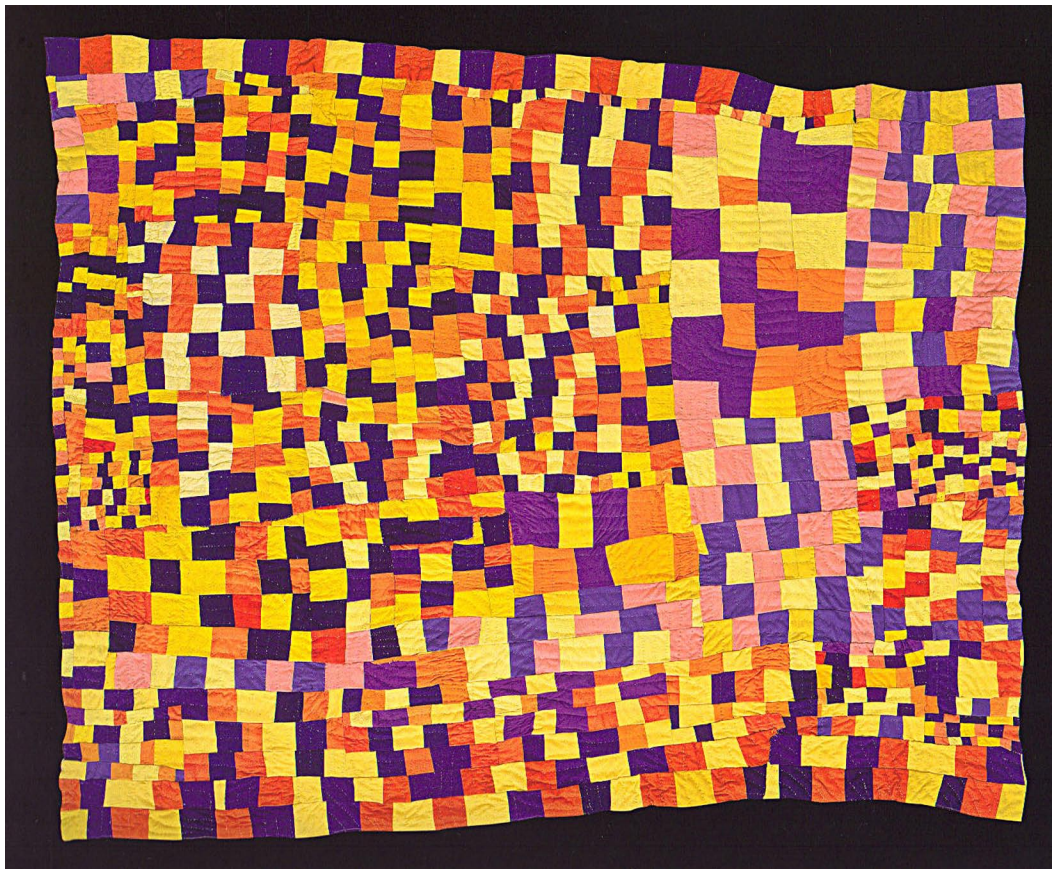
Pieced by Laura Jackson Culp, Richmond, California, circa 1970

Quilted by Irene Bankhead, Oakland, California, 1990

Collected by Eli Leon

Photo credit: Sharon Risedorph Photography

This quilt (Image 10) for me seemed a fairly straightforward and systematic example of fractal scaling. As you see, rectangles at the center of the quilt increase in scale as they move toward the border of the quilt. This is not a precise progression, but the similar shapes do increase in scale as they move outward (or decrease from the outer edges of the quilt toward the center, depending on how one chooses to look at it.)



**Image 11. Three Sixes**

Rosie Lee Tompkins, Richmond, California, 1987

Quilted by Willia Ette Graham and Johnnie Wade, Oakland, California, 1996

Collected by Eli Leon

Photo credit: Sharon Risedorph Photography

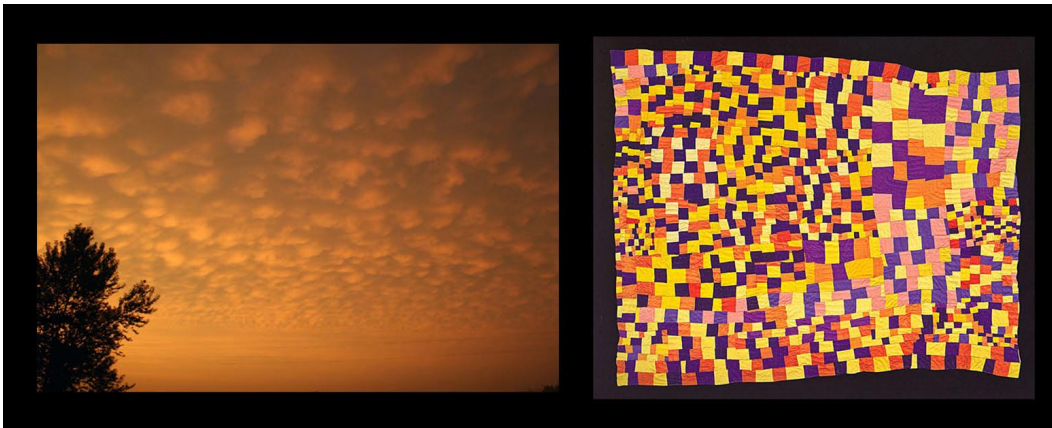
In this example by Rosie Lee Tompkins (Image 11), the rectangles also scale from large to small, but it is not as systematic, so it might not be as obvious.

To be fractal, the scaling does not have to be symmetrical, or I should say does not have to have reflection or mirror symmetry. In fractals, the aspect of symmetry comes from the part being similar to the whole rather than one side being similar to the opposite side.

Now I juxtapose this quilt with another photograph of fractal clouds to show the visual relationship that I see between the two (Image 12).

I have found Rosie Lee Tompkins quilts to be particularly fascinating to analyze for fractals. Her quilts appear to have multiple geometries happening at once, and are quite tantalizing (Image 13).





**Image 12.**



**Image 13. Half-Squares Put-Together**

Pieced by Rosie Lee Tompkins, Richmond, California, 1988

Quilted by Irene Bankhead, Oakland, California, 1992

Collected by Eli Leon

Photo credit: Sharon Risedorph Photography

This example (Images 14–17), while exhibiting multiple patterning, seems to not only have self-similar patterns repeating at different scales, but it seems that she was creating entire quilt designs at different scales. You can imagine that each of the varied rectangles, if enlarged, could be yet another quilt.



**Image 14. Half-Squares Medallion**

Pieced by Rosie Lee Tompkins, Richmond, California, 1986

Quilted by Willia Ette Grahma, Oakland, California, 1986

Collected by Eli Leon

Photo credit: Sharon Risedorph Photography



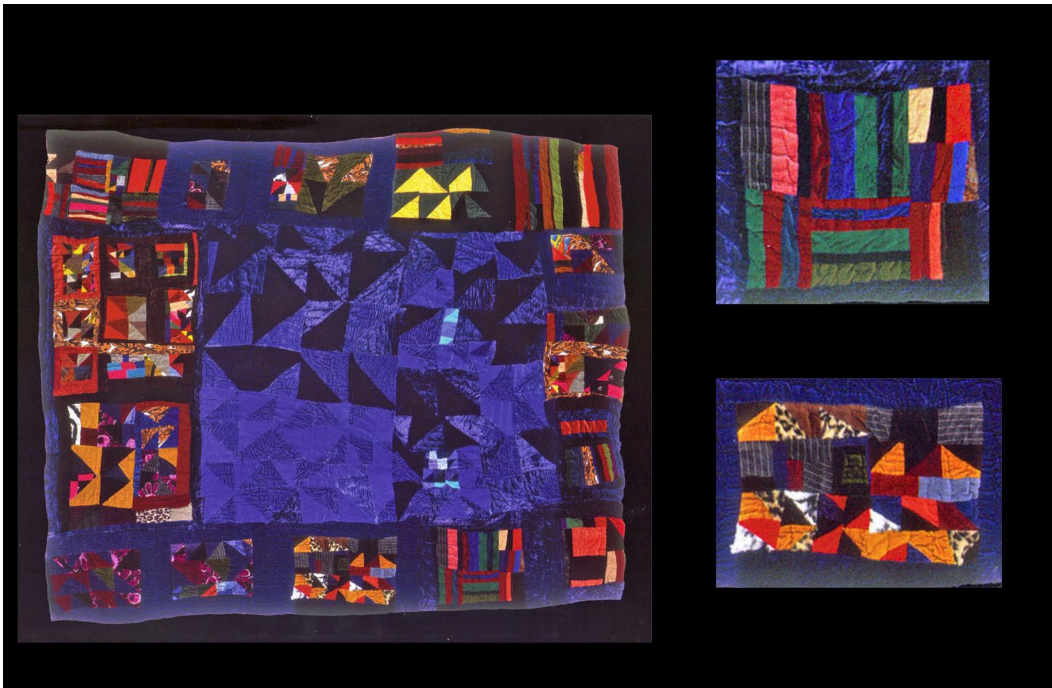


Image 15. Two blocks cropped from lower area of quilt



Image 16. Block cropped from left portion of quilt





**Image 17.** Blocks cropped from that design---there appears to be an endless number of quilt designs that are created by the artist.

At this stage in my research I am not prepared to give detailed explanations of mathematical systems, even if there were time in this presentation. So I must give a very basic definition, and I include references to materials by Dr. Eglash that will give excellent explanations of the many aspects of fractal geometry.

I invite the viewer to observe and reach his or her own conclusions about fractals in the last two examples of quilts by Rosie Lee Tomkins.

**Image 18. Half-squares Four-patch**

Pieced by Rosie Lee Tompkins, Richmond, California, 1986

Quilted by Willia Ette Graham, Oakland, California, 1986

Collected by Eli Leon

Photo credit: Sharon Risedorph Photography

**Image 19. Put Together with Letter "F"**

Rosie Lee Tompkins, Richmond, California, 1985

Quilted by Willia Ette Graham, Oakland, California, 1985

Collected by Eli Leon

Photo credit: Sharon Risedorph Photography





As I began researching fractals and looking even more carefully at the quilts collected by Eli Leon and others, my questions have come tumbling far faster than the answers. I have barely scratched the surface in terms of investigating what the “Fractal Dimension” of these quilts are using computer analysis. But I believe this is extremely fertile ground for future research and a deeper understanding of this particular art form.

Credits and recommended reading:

**By Ron Eglash:**

*African Fractals: Modern Computing and Indigenous Design*  
Rutgers University Press, 1999

[www.ted.com/index.php/talks/ron\\_eglash\\_on\\_african\\_fractals.html](http://www.ted.com/index.php/talks/ron_eglash_on_african_fractals.html)

This is a 15 minute, excellent introduction to fractals and to the research by Dr. Eglash on fractals and African cultures.

**Publications by Eli Leon:**

*Accidentally on Purpose, The Management of Irregularities in African Textiles and African-American Quilts* (exhibition catalogue), Davenport, Iowa: Figge Museum of Art, 2006

*Something Else to See: Improvisational Bordering Styles in African-American Quilts* (exhibition catalogue)  
University of Massachusetts at Amherst, 1997

*Something Pertaining to God: The Patchwork Art of Rosie Lee Tompkins*, Shelburne Museum 2007

*Who'd a Thought It: Improvisation in African-American Quiltmaking* (exhibition catalogue.)  
San Francisco: San Francisco craft and Folk Art Museum, 1987

The above materials can be obtained by contacting Mr. Leon directly:  
510 652 9486  
eli leon [elileon1@yahoo.com](mailto:elileon1@yahoo.com)  
[www.elileon.com](http://www.elileon.com)