

Letter from the Associate Director:

In this issue of the ATC newsletter, I'm pleased to be reporting about the progress of the LodeStar artists projects supported by the Ford Foundation.

The Theater of Pattern Formation, by Jim Crutchfield and David Dunn, is an exciting breakthrough in the area of art and science collaboration. It's my feeling that this project lives up to the expectations and possibilities born from technology, for art and science to converge and form a new way of understanding and meaning. We hope to be announcing the premiere of this very important work in the fall of 2003.

As always, please feel free to call, email or stop by ATC to learn more about all the artists projects happening at LodeStar.

Best wishes for a great summer,

Danae Falliers

Pattern Formation at the Crossroads of Art and Science

Last fall, ATC received funding from the Ford Foundation to build an infrastructure for artists interested in doing projects for the digital dome at the LodeStar Astronomy Center. Included was funding for the Santa Fe's Art and Science Laboratory to co-sponsor an art/science collaborative project for LodeStar. This art project is an outgrowth of the on-going collaborative research efforts of physicist James P. Crutchfield and composer David Dunn.

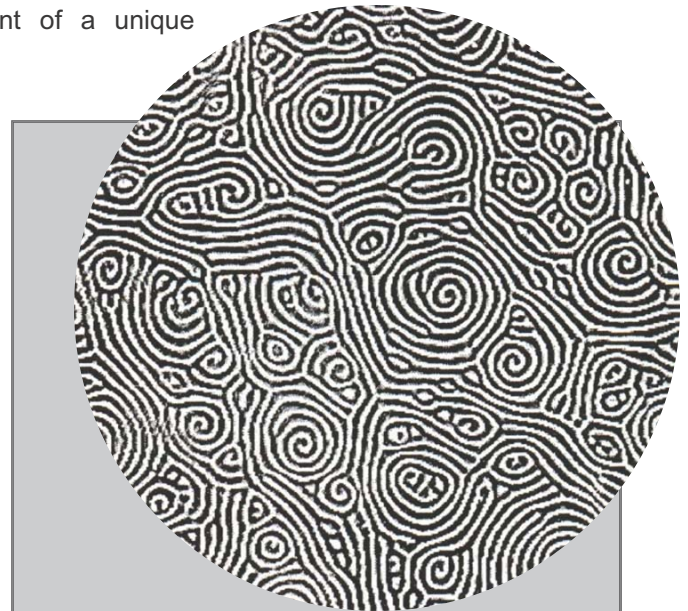
James Crutchfield is a Research Professor at the Santa Fe Institute. His current research interests center on computational mechanics, the physics of complexity, statistical inference for nonlinear processes, genetic algorithms, evolutionary theory, machine learning, and distributed intelligence. David Dunn is an independent composer and audio engineer and is currently the President and Program Director of the Art and Science Laboratory and a Fellow of the Institute for Conservation Studies. His current research involves the sonification of complex systems, the sounds of underwater invertebrates, and the design of bioacoustic recording systems to monitor Jaguars in Arizona and New Mexico.

This collaborative team began discussing their common interests in articulating natural phenomena from the time of their first meeting at the Chaos and Order Symposium in Styrian Autumn Festival in Graz, Austria in 1989. This led to the development of a unique

and on-going artist/scientist collaboration project known as *The Theatre of Pattern Formation*.

The Theatre of Pattern Formation is a comprehensive strategy for the visual and auditory articulation of scientific and mathematical research in the fields of complex systems and nonlinear dynamics or "chaos." It explores naturally occurring patterns in nature and mathematics and how they can be seen within the aesthetic traditions of the arts. By presenting complexity as wonderfully rendered abstract patterns that are experienced as art, it also provides lay audiences with a non-technical introduction to the world of pattern formation, complexity and chaos.

Abstractionist artists in both the visual and music arts have rigorously explored the visualization of pattern formation. In music, composers, musicians and engineers have produced a rich body of scientific research in bioacoustics and scientific sonification. A number of modern and contemporary composers have also included these auralizations in electronic music compositions. In the visual arts artists like Jackson Pollack have explored developing pattern and form from random "chaotic" processes.



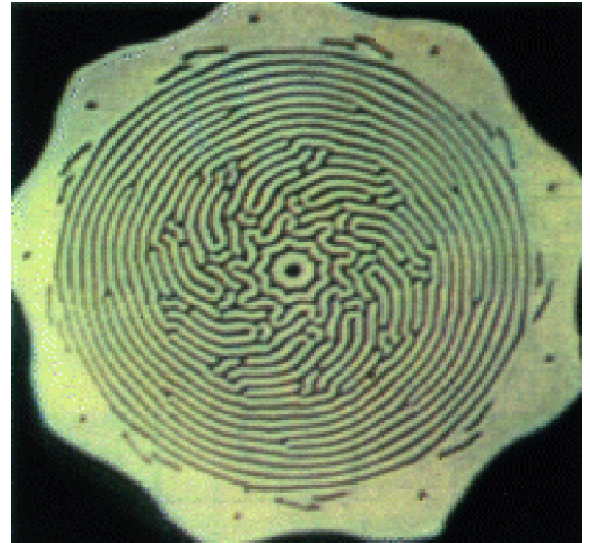
Sample pattern in the form of a dome master for the LodeStar dome.

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It has also been part of popular culture's aesthetic vocabulary for a number of years. Printed on notebooks and posters, computer generated models of irregular patterns and structures in nature, called fractals, are popular for their bright colors and intricate geometric designs.

Yet, there is has been very little done to couple acoustic and visual pattern formation. By placing these aural and visualizations in an immersive space such as LodeStar, with its fifty-five foot hemispheric dome screen that spans the audience's peripheral vision, complimented by Dolby 5.1 surround sound, Crutchfield and Dunn are creating a dynamic and novel media work that plays on our innate abilities to perceive novel patterns in space and in time.

To complete the piece, Dunn has started with a selection of specific auralizations of natural and artificial systems that will form the sequence of action for this piece. While these auralizations can differ in pitch, timbre and rhythm, they share overall thematic similarities that allow them to compliment each other as overlapping textures in a composition.



Crutchfield will then match these auralizations to complimentary pattern visualizations. These visualizations will cover the dome with a kaleidoscope of geometric shapes of different colors and in different pattern sequences. As the visual articulation moves forward in time, these patterns emerge from a horizon point at the zenith and cascade down the sides of dome. The geometric forms that make up the patterns often rotate as well as change color, density and frequency, enveloping the audience in a waterfall of shapes and colors. The patterns are able to operate as both captivating abstract visual imagery and technically correct visualizations of complex systems.

The viewer has the flexibility to view this piece either on a pure aesthetic level, as a non-narrative, large format animation, or to interact with it on a more scientific plane, learning what these patterns are depicting. Contextual material will be available to the audience, but it is optional to enjoy the overall aesthetic nature of the piece.

While this early realization of *The Theatre of Pattern Formation* will have a fixed content, that is the patterns are pre-recorded, Crutchfield and Dunn eventually hope to create a live, ever-unfolding program for this environment. This will allow each audience's experience of the piece to be unique and the consequent visual and auralizations to be unscripted as they occur naturally.

ATC is in the process of planning a debut of this and other dome animations created by its artists-in-residence, CFA faculty and visiting artists from other universities this fall. Please contact Sally Bowler-Hill, Program Coordinator, for more information.

DON'T MISS OUT!

SPRING STUDENT ANIMATION SHOW!

FRIDAY, MAY 16, 2003
6:30PM

LODESTAR ASTRONOMY CENTER

1801 Mountain Rd. NW, Albuquerque. Please use museum's Mountain Rd. side entrance.



Digital Pueblo Project, Lightwave class dome animation.

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