

Meeting of the Minds by Jean Constant

Images courtesy of Jean Constant

## The art of Mathematics

When a Los Alamos artist has a chance meeting with a Boston mathematician, anything can happen

By DIANA HEIL  
The New Mexican



Jean Constant

mathematician Chou-lian Terng.

She wanted to see certain concepts mapped into three-dimensional space, to help her with her research.

For centuries, mathematicians have made vague pictures of abstract objects and processes in their minds. Palais brought those murky images to life with 3D computer graphics.

By 1997, Palais had posted his software, 3D-XplorMath, on the Internet to share with the world.

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Constant's Ascending Stairways

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## CONSTANT

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Anyone with a Macintosh computer could download the software free of charge — and it was catching on.

Far from Boston was a man in transition named Jean Constant. Paris-born Constant had been a muralist and photographer in San Francisco, a gallery director in Phoenix and a member of a Los Angeles artist colony. But now he had moved to an utterly different setting: Los Alamos, birthplace of the atomic bomb.

With technology surrounding him, Constant decided to lay down his paintbrushes and take up digital art.

About this time, Palais' software had become fairly sophisticated, and Constant found it by accident on the Internet. "Mathematics may be a language of a few, yet its rhythm, musicality and elegance (reach) out to many," Constant wrote in an artist's statement.

Now, because of how this software has influenced his art — and the relationship he struck up with Palais — Constant finds himself part of international efforts to elevate mathematical art. "He's one of the few artists who works strongly in mathematical themes," Palais said in a recent telephone interview.

Meanwhile, presenting math concepts in graphic form keeps Palais busy. In a geometry course, he teaches students to write their own computer-graphics programs as a way to understand the curves and surfaces that theorems prove exist. It's an effective teaching tool, he said. He and his wife co-teach the class at the University of California, Irvine.

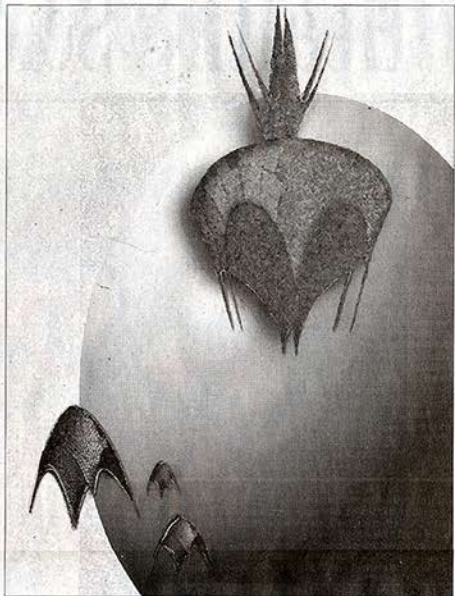
What's more, Palais has launched a virtual gallery of mathematical art, with the ambition of turning it into an online, interactive museum one day. "People wonder why mathematical objects are pretty," he said. "Mathematicians are very interested in symmetry. Artists, too, are interested in symmetry."

E-mail conversations with Constant also inspired Palais to make his software more suitable for artists. As one of 50 testers of new software versions, Constant helps shake out the bugs. "I'm doing the most foolish things that no mathematician would think of doing!" Constant said.

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If Constant hadn't written Palais a thank-you note eight years ago, none of this would have happened.

He immediately liked 3D-XplorMath, which creates oddly shaped, black-and-white mesh structures. The shapes were fresh to him. A paraboloid, for instance,



Constant's Paraboloid

Image courtesy of Jean Constant

### Visualizing math on the Web

One of the best-known artists who made the world of mathematics his subject matter is Dutch graphic artist M.C. Escher, 1898-1972. Russian mathematician and artist Anatoli Pomenko is another big name. More recently, sculptors Helman Ferguson, Charles Perry and Brent Collins have joined the scene.

To learn more, check out these sites on the Web.

Los Alamos artist Jean Constant: [www.hertms.org/jconstant.html](http://www.hertms.org/jconstant.html)

3D-XplorMath Surface Gallery: [csp.math.bryandennis.edu/3D-XplorMath/Surface/gallery.html](http://csp.math.bryandennis.edu/3D-XplorMath/Surface/gallery.html)

Visual Mathematics gallery tours: [members.tripod.com/vismath/mart.htm](http://members.tripod.com/vismath/mart.htm)

Artists Using Science and Technology: [www.ylan.org/](http://www.ylan.org/)

Harriet E. Brisson: [www.bryandennis.com/artsource/veberis/son.html](http://www.bryandennis.com/artsource/veberis/son.html)

George W. Hart: [www.georgehart.com/](http://www.georgehart.com/)

Kenneth Snelson: [www.grunch.net/snelson/](http://www.grunch.net/snelson/)

The Optiverse — a 6.5-minute video showing a new way to turn a sphere inside out: [forums.math.uiuc.edu/optiverse/](http://forums.math.uiuc.edu/optiverse/)

reminded him of an ancient Greek helmet. Constant saw these shapes as silhouettes he could use in artistic compositions.

He had so much fun that he wrote the software's creator a note and sent samples of how he turned the math shapes into art.

Surprisingly, Palais wrote back. "I never thought of any one using it as a background

for art," Palais recalled. "I just had no idea. They're beautiful, of course. It's a beautiful application. Totally unexpected."

Constant said. "It allows me to go further in what I'm doing."

The connection is leading him back to Paris.

From Jan. 22 through June 30, Constant's digital creations will hang in the Library of the Institute Henri Poincaré as part of the Mathématiques et Art exhibit.

The exhibitors are an unusual lot. More than half of them are professors coming from math or computer science departments at Brown University, Stony Brook University, Rutgers University, University of Illinois at Urbana-Champaign, University of New York at Albany, Imperial College of London, University of Sydney in Australia, University of British Columbia in Canada and Institut de Recherche Mathématique Avancée in France.

Their works span from computer animation to sculpture to copper engravings. "We cannot be all things to everyone," Constant said, "but if we work together, we can get much farther."

One exhibitor is Nat Friedman, a mathematician and sculptor from the University of New York at Albany. He makes fractal stone prints. He breaks a slab of granite, arranges the broken pieces into an interesting pattern and makes an ink print.

"Visual thinking leads to seeing that mathematical forms also generate art forms," Friedman said in an article about his work.

The exhibit is part of a larger mission conceived in 1989 by the mathematicians and artists Constant met through the listserve, The Association for the Realization and the Management of a Mathematical Park, the group's formal name, has been hosting exhibits and loves in various places around the world to fuel a dream.

Headed by professor Claude Bruter of Paris University, the nonprofit group wants to create a mathematical park in a suburb of Paris — where gardens, sculptures and 10 small buildings would express mathematical concepts. Park visitors would be able to familiarize themselves with many concepts of physics and do hands-on experiments in the open air. But the project needs financial backers.

Although Constant was born in Paris, he said he doesn't mind if such a park opened in Santa Fe instead. "It could be in France, or it could be anywhere in the world," he said.

Despite all that has developed since Constant wrote to Palais eight years ago, one obvious detail is missing. "We've never met in person," Palais said.