EUROPEAN SOCIETY FOR MATHEMATICS AND ART
NEWSLETTER

Volume 002. Issue 06 *June 2011*

Dear Colleagues,

ESMA will be involved in two event this month. One in Aime – La Plagne in the French Alps: an exhibit and series of lecture organized by the local cultural center; the other, in Paris. I briefly commented on it in the past November issue of the Newsletter.

The French Institut de Recherche et de Coordination Acoustique/Musique (IRCAM) put together with several institutions and cultural centers a two week long program on the theme of Mathematics and Music, named AGora. ESMA was invited to participate to a forum on maths and music to be held on June 18. 11 works from the ESMA collection will be on display all summer in one of the event's location, at the Palais de la Decouverte. Participating in this exhibit are Austin, Casselman & Wright, Colonna, Constant, Farkas, Field, Johnson, Razdanovic and Tard.

In addition two multimedia animations by Vi Hart and Jos Leys will be on display during the exhibit. They both emphasize the theme of symmetry.

Common symmetry with respect to a mirror plane is also called reflection. Running up and down a musical scale is the simplest musical reflection. There are similarities in a rocket trajectory, its energy, the sound it makes.

A larger symmetry may use mirrors with non zero curvature. The circle inversion is one example of it. Some musical inversions can also be understood as symmetries. A symmetry on a general mirror is viewed as an anamorphosis. While a standard symmetry creates an isometry, it is often not the case with general symmetry. General symmetries on general mirrors and their singularities and caustics have not yet been studied.

It seems to me that some musical arrangments belong to the field of symmetry. A general characteristic of a score is the presence of a main theme repeated several times. A good example of a score made with a quasi unique theme is Ravel's Bolero.

Continued on page 2

CONTENTS

FOREWORDS P. 1
ACTIVITIES P. 2
RESOURCE UPDATE P. 3
GALLERY P. 3
TECHNOLOGY P. 4

Continued from Page 1

While on this topic, I would like to make some remark about fractals. Mathematical fractals are an ideal extension of a natural process: Nature tends to repeat and use as far as it can any stable object or process that has been created.

As far as it can - for example a given bounded potential of energy, such as an amount of money X used to produce an object. The object become smaller and smaller as far as the value of the potential is dismin-ishing. The production stops when there is no more cash. The writing of a musical score seems to follows this pattern of activity, littered here and there with bursts of energy.

The origin of the Pythagorean theory could possibly be found in the Egyptian or Babylonian temples. They seemed to have had a good under-standing of the physical significance of an ordinary mean (a + b)/2.

The general idea of conservation of proportion is a concept of frac-talization. This mathematical formulation is found in Euclid's work: let us share a given segment into two parts such that the ratio between the giv-en segment and its larger part is the same as the ratio between the larger and the shorter part. The division creates the harmonic mean. Repeating this process leads to a fractalization of segments.

The original mathematical formula for the comparison of sounds comes from these simple and deep simultaneous means where a = 6, b = 12, creating the sequence 6, 8, 9,12 , the octave (12/6), the fifth (12/8), the fourth.

Symmetry in general and fractalization in its physical dimension are useful to understand the creations of musical scores.

With my best wishes,

Claude P. Bruter

ANNOUNCEMENT

June 22, 2011. Princes Teaching Institute London UK. Royal In-stitute of British Architects. Maths & Art A day devoted to Mathemat-ics and Art, focussing on exploring the ways in which Art can not only en-hance and engage students in the pursuit of Mathematics, but also how Art has been used throughout history to convey mathematical meaning and support mathematical thinking.

June 30, 2010. **Project Heracles**. Can infrastructure be used as a medium to articulate the complexity of our present spatial condition? **Domus** is calling on architects, designers, artists, urbanists, and theo-rists to reexamine the relationship between geographically adjacent yet politically and socially distant continents.

ON-GOING. M.C. ESCHER - Infinite Universe. Granada, Spain. Parque de las Ciencias and the Patronato of the Alhambra. 135 works from the Escher Foundation.

ACTIVITIES

- May 30 - June 10. IMAGINARY in Warsaw. In collaboration of the German Embassy in Warsaw, the Polytechnika in Warsaw and the Pedagogical University of Krakow.

June 1 - September 4, 2011. **"Mathematics and Art"**. ESMA exhibition, in collaboration with IRCAM. Palais de la Decouverte. Paris. FR.

June 7 - July 23, 2011. **"Mathematics and Art"** ESMA exhibition. Maison des Arts. Aime. FR

ESMA is now on the **LIMSI LISTSERV.** (The CNRS Computer Sciences Laboratory for Mechanics and Engineering Sciences)

RESOURCE CENTER

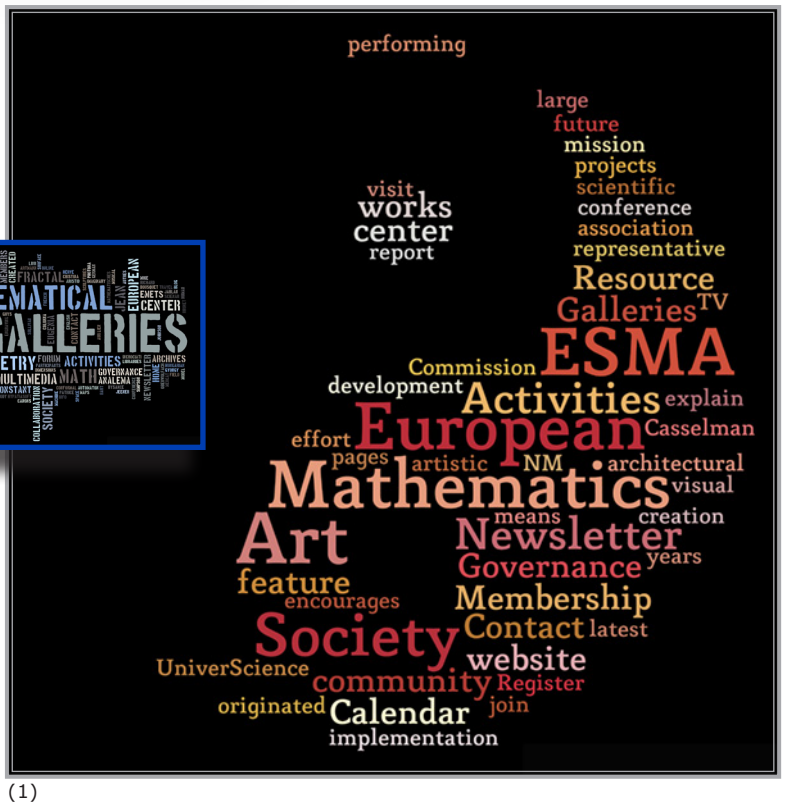
Posted this month on the ESMA website, resource center page. For suggestion, recommendation, comment on new posts: info@mathart.eu

- BRUTER, Claude. *Sur la Nature des Mathematiques.* Mathematics and methodology. FR. Archived publication. (Resource, Mathematics, archives)

- MOHR, Manfred: *A Programmed Esthetic*. Modern Art museum, Paris. 1971 exhibit catalogue. FR. (Resource, General Interest.)

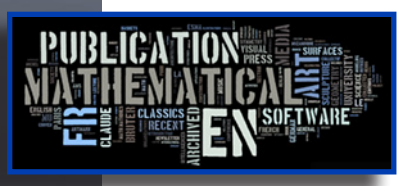
GALLERY

Algo-Graphic Art



(1)

(2)



(3)

*The ESMA website opening page (1), gallery page (2) and resource page (3) created with **Tagxedo**, a software by Hardy Leung, Computer Science Engineer graduate from Carnegie Mellon University and developer of Tagxedo, Coloroke, and Pegasus Analytics. (Edit. note: Algo-graphy is a contraption of algorithm and typography.)*

AGORA. ESMA at the Palais de la Decouverte.

June 18, 11:00 AM-01:00 PM. - Roundtable forum: "Creativity in Mathematics and Art". Including ESMA members Claude Bruter, Tom Johnson.

Jume 1st - August 27 *- Exhibit: David Austin-William Casselman-David Wright, Jean-François Colonna, Jean Constant, Támas Farkas, Tom Johnso, Mike Field, Jos Leys, Razdanovic, François Tard.*
- MultiMedia: Vi Hart, Jos Leys.