



## EUROPEAN SOCIETY FOR MATHEMATICS AND ART NEWSLETTER

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Dear Colleagues,

*Apollo may be the god that watches carefully over one of his extended progeny, Dame Mathematics. Apollo was the god of arts. Art has played a significant role in the coming out of our glorious Lady, in particular in architecture and music.*

*By architecture, I mean its larger embodiment, from conception, design and decoration in temples, palaces and more practical constructions. In that sense, architecture, including as well the architecture of the universe studied further by astrologers and astronomers, is the forbearer of geometry.*

*The part of music in the genesis of Mathematics first came to public awareness through the work of Pythagoras and the development of harmonic analysis. Armand Machabey's article on the teaching of math & music in the 17th "[Quelques savants-musiciens de l'époque de Mersenne](#)" reminds us that for centuries, included in the quadrivium, the teaching of music was part of the maths and astronomy curriculum. Till the end of the 17th century, most scientists were musicians or wrote on music. Eulers' treatise on music, published a century later, was a significant work in that field. Henri Cartan and Jean Dieudonné were known to enjoy playing piano together. Hassler Whitney was an accomplished viola and violin player of the Princeton orchestra as well as one of its mathematical luminaries.*

*The link between mathematics and music is still present in today's environment. Yves Hellegouarch presented an in-depth analysis of the construction of the scale at the 2000 Maubeuge conference and his paper was part of the conference proceedings published by Springer.*

*ESMA, as a Society promoting Mathematics and the Arts, has been supportive of the musical world from the very beginning. It has made available valuable information on various subject relating to mathematics and music in its site's Resource Center.*

*There is today quite a renewed interest for musicians and mathematical composers collaboration: The Journal of Mathematics and Music, the official publication of the Society for Mathematics and Computation in Music ([SMCM](#)) is good example of this trend. One may notice that in its present form, this collaboration focus mainly on the structural description of musical works in algebraic terms and in its broadest understanding. We are still very far from the colorful and subjective components that filled the classical musical scene.*

*Robert Pascal's paper: "Structure mathématique de groupe dans la composition musicale" is an interesting introduction to this approach. His lecture was given at a 1986 ADERMHM conference and published in the conference proceedings in 1991.*

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Regarding more recent publication, I would recommend reading "[La recherche mathématique et ses interactions avec les autres disciplines](#)" by Moreno Andreatta. Moreno is working at the IRCAM, a unique European institution dedicated to scientific research on all aspects of acoustic and musical expression. His paper gives a first look at some mathematical tools used by modern musical scientists, and poses important mathematical issues to investigate.

The next ESMA conference will be organized in Berlin in 2012 by Konrad Polthier. It will provide better opportunities to showcase music as a full time partner for maths & art collaboration.

Also, in regard of the 2012 conference, preliminary contacts have been made with György Darvas and the [International Symmetry Association](#) to coordinate the annual Symmetry Festival with this event.

ARPAM has already 10 specific projects ready to be built. The objective at this stage is to identify an appropriate and convenient location where the projects can be erected and hosted. Dmitri Kozlov, of the Russian Academy of Architecture, is overseeing the production of a 3-D multimedia animation to help gain the support of sponsors and local authorities. IRCAM might participate in this project and enrich the overall presentation with individual musical environments for each folly.

I wonder sometimes if musicians would be inspired by the attractive collections of mathematical objects that are found in mathematical libraries and use those models to create new instruments. Experiments such as that should be encouraged.

The IHP Math-Library has a collection of 500 objects. I suppose it will take time for François Apéry, curator of the collection, to put together a marvellous book describing the most interesting and beautiful objects. A nice gift idea for a future Christmas... That may come later, but first, let's enjoy this coming Holiday's season!

And last, welcome to the new addition of the ESMA executive team: Lan Hoang ([LanHoang@mathart.eu](mailto:LanHoang@mathart.eu)) treasurer and Denise Chemla ([Denise.Chemla@orange.fr](mailto:Denise.Chemla@orange.fr)) administrative assistant. Thanks to both of them for joining us.

With my best wishes,

Claude P. Bruter  
12-1-2010

P.S. The Holiday season is coming fast. The Society always appreciate your end-of-the year donation or early payment of your 2011 membership dues: (BIC or SWIFT : CEPAFRPP751, IBAN: FR76/1751/5006/000 8/0001/8634/606). ESMA, c/o IHP, 11, rue Pierre et Marie Curie, 75005 Paris Cedex 5.

## ACTIVITIES

Posted this month on the ESMA website, activities page. For information, listing of upcoming events: [info@mathart.eu](mailto:info@mathart.eu)

**November 9 December 17, 2010. IMAGINARY.** Library "mathématiques informatique recherche". Jussieu Campus, UPMC (Sorbonne Universités). Open to the public. 9:00 AM - 7:00 PM, Monday -Friday. More information at <http://paris.imaginary-exhibition.com>

**November - December 15, 2010.** Picture competition using the program **SURFER**. Website: "**Images des Mathématiques**" in conjunction with the IMAGINARY exhibition in Paris. More information at <http://paris.imaginary-exhibition.com>

**January 6- 9, 2011. Joint Mathematics Meetings Exhibition.** New Orleans. ESMA members participating in the exhibit: **Cristina Besa, Francesco de Comit , George Hart, Vi Hart, Slavik Jablan.**

**Jan 14, 2011. Maths & Perspectives.** [Universit  du Temps Libre](#) Es-sonne. France. Lecture by **Claude Bruter.**

## RESOURCE CENTER

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

- Moreno ANDREATTA. Mathematica est exercitium musicae. Mathematical musical research and its interaction with other disciplines. FR. ([Resource](#), [Music](#). FR)

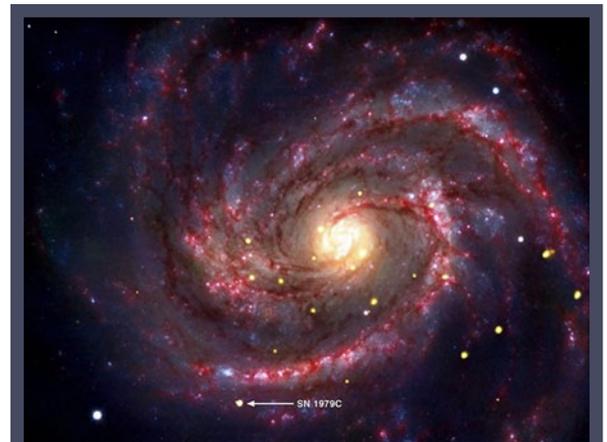
## GALLERY

### Space Math @ NASA

[SpaceMath@NASA](#) introduces students to the use of mathematics in today's scientific discoveries: how is mathematics used in science, how does simple math help students to understand recent discoveries, where can educators find examples of worked problems in science and engineering?



**Problem 389:** Estimating the Diameter of the SN1979c Black Hole Students use simple equations to learn about the various definitions for the sizes of black holes in terms of their event horizons, last photon orbit, and last stable particle orbit radii, and apply this to the recently discovered 'baby' black hole in the galaxy M-100.



**Problem 388:** Hubble Detects More Dark Matter! Students learn about how astronomers estimate the amount of invisible dark matter in a cluster of galaxies by comparing its visible mass against the speeds of the galaxies to 'weigh' the cluster.

## MATHEMATICS & FILM

On this *Holiday season* two lighthearted and entertaining little math-films, courtesy of the department of Mathematics at Harvard, now available on the ESMA site:



Donald learns the Math of Billiards. 1959. (ESMA Gallery, Films)



Bart Simpson solves a math problem at the learning center. 1989. (ESMA Gallery, Films)

