

## The art of an algebraic surface

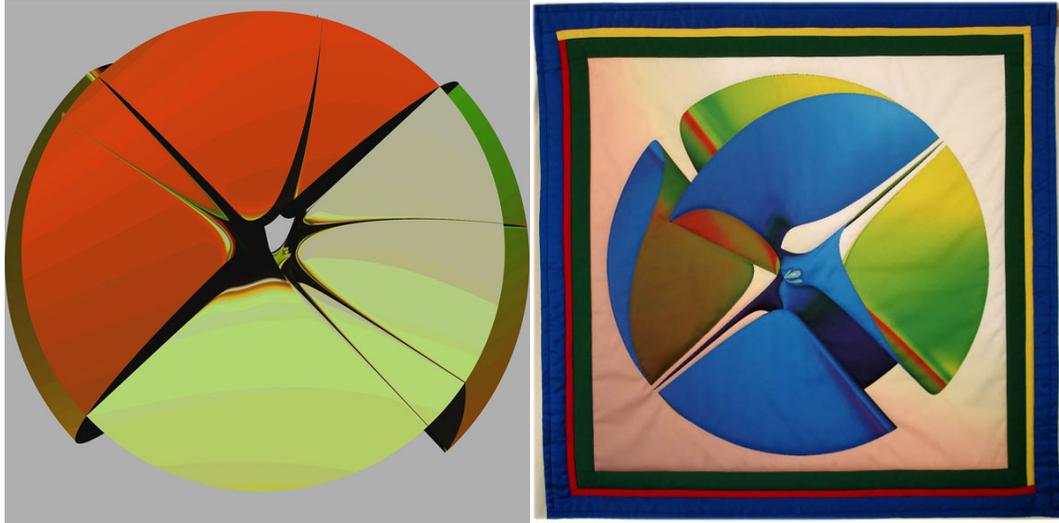
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The Programme SURFER introduced above was used in online picture competitions [1] and as a tool by many artists [2]; some with and others without any mathematical background. In the following we present a selection of artists and their work.

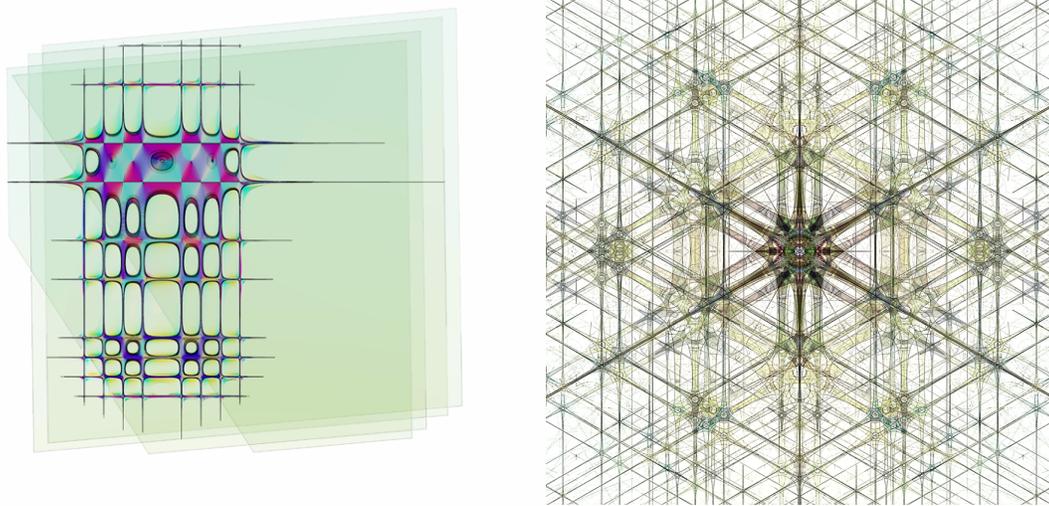
Playing with the programme the users sooner or later get to the point where they want to recreate a special imagined object. Valentina Galata, now student of bioinformatics in Germany specialized in remodelling real world objects with SURFER, a truly complex task. She found equations that create images of fruits, design objects or landscapes. The German artist Hiltrud Heinrich used her pictures in own math art exhibitions. The pictures are of abstract and aesthetic nature. She also replicated the design of the SURFER pictures as patterns for patchwork quilts. Kurt Ballay explores numerical errors and their beautiful outcome by creating a series of artistic images. Torolf Sauermann, a mathematical artist, explores mathematical properties and adds new effects to the surfaces. Bianca Violet, mathematician and film editor, created animations with SURFER, that were used at the film *LPDJLQH D VHFUHW* [3]. Mehrdad Garousi an Iranian artist and scientist is dealing with mathematical and digital forms. In SURFER he found new inspiration for his pictures. He published a paper about the programme and its use in math art [4].

The idea to connect algebraic equations with its visual aspect resulted in a general motivation to explore the connection between “formulae and images” and other art forms: Students at the ITBA University in Buenos Aires developed a plugin, where names and sentences are translated into equations and thus displayed as colourful surfaces [5]. Another project called SoundSurfer adds the possibility to generate sound files with SURFER. In Malaga the SURFER images were connected to fine cuisine, where unique algebraic dishes were created and presented in a photo exhibition - some of them were also offered in a restaurant.

## Images

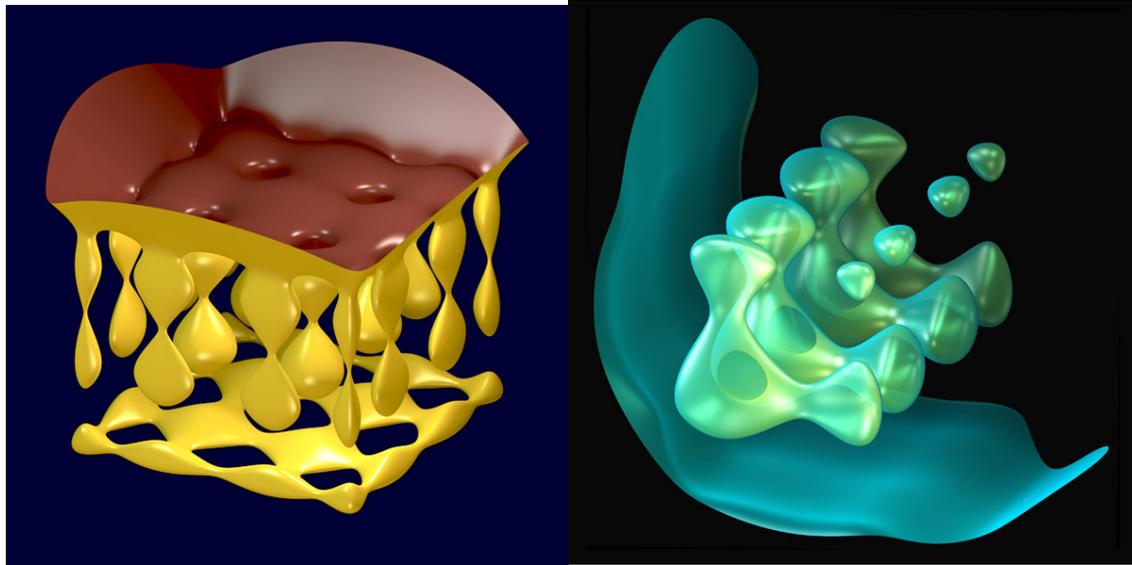


**Figure 1:** *Left: winner image of the SURFER competition with DIE ZEIT in 2008. Right: Patchwork quilt of an algebraic surface shown at a math art exhibition. Both pictures by Hiltrud Heinrich.*



**Figure 2:** *Images of numerical errors in the visualization with SURFER by Kurt Ballay.*





**Figure 5:** *Melting Chocolate and Buddhist Lads at the Back Seat* by Mehrdad Garousi.



**Figure 6:** *Mosaic of entries at the Spektrum SURFER competition.*



**Figure 7:** Picture of the exhibition “The taste of mathematics” in Malaga.  
Photographs by Pedro Reyes Dueñas.

## References

- [1] Ch. Pöppe. *Das Ausgedachte in Sichtbares umgerechnet*. Spektrum der Wissenschaft, 2008.
- [2] *IMAGINARY picture galleries*. [http://www.imaginary-exhibition.com/galerie\\_view.php?gal=93](http://www.imaginary-exhibition.com/galerie_view.php?gal=93)
- [3] *LPDJLQH D VHFUHW - a film of art and mathematics on elliptic curves and cryptography*. <http://www.cim.pt/?q=LPD-UHW>. 2010.
- [4] M. Garousi. *Mathematical Art and Surfer. Proceedings of ISAMA*. Chicago. 2011
- [5] A. Rincón, M. Merchante. *Experiencias en Artes Interactivas: Física – Música – Lingüística - Movimiento corporal*. Proceedings of ECIMAG. Buenos Aires. 2012.