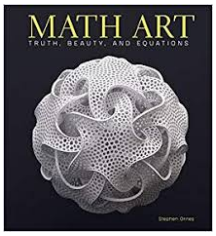
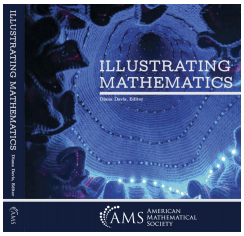
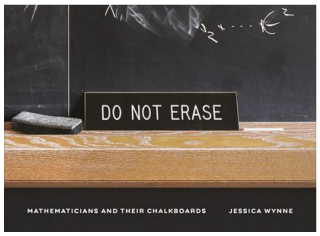
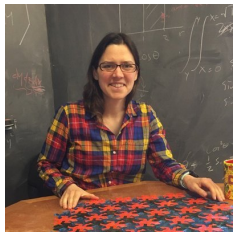
Math Art, *Stephen Ornes*, Sterling Publishing, 2019 (208 p.) isbn: 978-1454930440.
Illustrating Mathematics, *Diana Davis*, AMS, 2020 (174 p.) isbn 978-1470461225.
Do not erase, *Jessica Wynne*, Princeton University Press, 2021 (240 p.), isbn 978-0691199221.







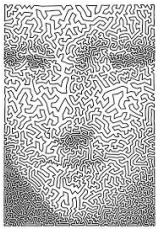




Stephen Ornes Diana Davis Jessica Wynne

There is definitely some link between mathematics and art. Of course everybody knows the graphics of M.C. Escher and the tessellations of the Alhambra and there are many examples where architects, painters, and sculptors have used mathematics in their work. The *Bridges Organization* promoting the connection between mathematics and art, music, architecture, and culture organizes an international conference every year since 1997. Recall the Springer book series *Mathematics and Culture* edited by M. Emmer containing the proceedings of the eponymous conferences. And there is so much more. Some of my previous reviews in this Newsletter were discussing books that focussed on the interaction between mathematics and art.



Robert Fathauer
Trifurcation
A fractal construction.



Robert Bosch
Da Vinci curve
Mona Lisa drawn as a closed connected curve.

Since the connection is here between mathematics and visual art, there are obviously many pictures that form the main contribution, but there is also some short introduction about the artist/mathematician, sometimes more about the mathematics behind it or the origin of their work and possibly how it was realized. There is however a certain gradation in this triplet of books. The first one has contributions mainly from artists whose work has a mathematical grounding, the second is showing work of mathematicians who appreciate the artistic aspects of their work and the last one is by Wynne, a photographer, who is fascinated by the blackboards that mathematicians produce while presenting or discussing their results.

The first book has mainly text but with a lot of illustrations. For each of the 19 artists (although some of them are professional mathematicians), there is first a text explaining the ideas and the work of the artist which is probably the result of an interview. In a second part, some mathematics that is behind the work of the artist is explained. The type of artwork is very diverse (from monumental sculptures, to weaving, computer generated curves, quilts, 3D-printed objects, wood carving, or crocheting), as diverse as the mathematics discussed (π, the golden ratio, Euclidean solids, Fibonacci numbers, fractals, chaos, complexity theory, and more). Some of the designs are used in the production of lamp shades or common utensils, like the Klein Bottle tool that is actually for removing bottle caps.

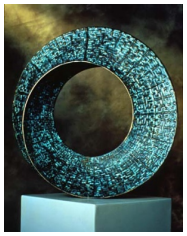
The second book consists of about 70 double pages. The left page is a picture of one or more pieces of art and the right page has a picture of the mathematician(s) that produced the work with a short text explaining why and how they did it and to what kind of mathematics it is related.



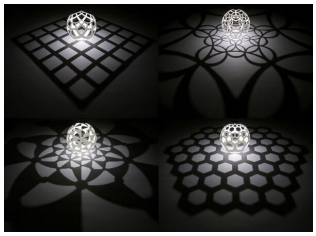
John Sims
Seeing Pi
Quilt. The colours represent the digits of π.



Bathsheba Grossman
Lamp shade
3D print.



Helaman Ferguson
Umbilic torus NC
Silicon bronze



Henry Segerman
Grids
The plane projection of the sperical object are regular grids.



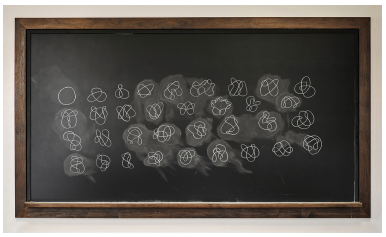
David Rainford
Re and Im of $\zeta(s, 0.75)$
Computer plot.



Daina Taimina
Pseudosphere
Crochetted wool.



Carlo Séquin
3-level star-cilinder on icosahedral tangle of 3D-circular borders
3D print.

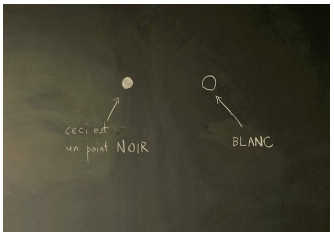


Jessica Wynne
Knots (drawn by Sahar Khan).
Photograph.

In both of these books the artists and their work are grouped in parts. In the first one the grouping is rather loose. For example John Smit (see pics above) falls in the first part "making sense of nature", Bathsheba Grossman, Helaman Ferguson, and Robert Fathauer are found in the part "stranger shapes", Robert Bosch is classified under "Journeys" (his Jordan curve can be seen as a traveling salesman problem), Carlo Séquin and Daina Taimina are examples of "(nearly) impossibilities". This book with hard cover and glossy pages has the allures of a coffee table book, although it contains a lot of text with explanations about the mathematics.

The second book however is a soft-cover book, also printed on glossy paper but where the contributions are almost all by (and for) mathematicians. The explanation about the mathematics is really short and different for every contribution. These contributions are often coming from a published paper or they are taken from a website where often animated versions can be found. So it is worth to read more explanation in the paper or to look up the websites. The grouping is here by the technique used like, drawings, laser cutting, video and VR, 3D printing, etc. There is little overlap between the two books since the first one presents mostly artists while the second has mostly mathematicians, but there is obviously more overlap in the subjects (fractals, tessellations, minimal surfaces, different geometries,...) and in techniques (crocheting here by Maria Trnkova, 3D printing, computer graphics,...).

The third book has a structure that is similar to the second one: a picture on the right page and on the left a short text about the mathematician and his work. The photographer Wynne has travelled the world to visit universities and research institutes to talk to mathematicians and take pictures of the blackboards they have written on. Some of the blackboards were especially prepared for the picture, others were just taken as they were at the moment of arrival. Here the work of art is this project by Wynne to collect the many diverse pictures. The sole condition for the picture was that it had to be blackboards and it had to be written on with chalk.



Jessica Wynne
Drawing Tadashi Okieda.

Three marvelous picture books that will be appreciated as a present by any mathematician (and some artists).

Adhemar Bultheel