Carpet Design Awards 2023 (Carpet Design Awards 2023)
05 Best Flatweave Design

Grid By Kaplan

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Entrant details

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Your Company Name	Private Label Sdn Bhd
Are you an exhibitor at DOMOTEX 2023?	✓ We have not yet decided whether we will exhibit at DOMOTEX. Please contact us about possible participation options.
I hereby confirm that all information is correct. I have read the conditions of participation and agree to them	✓

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Design/Design Concept

This rug is part of a series of experiments in the creation of floorcoverings that incorporate "evolving patterns".

An evolving pattern is a kind of animation in space rather than in time.

Instead of creating a large field of identical copies of a single motif, our motifs slowly undergo a process of change. The result avoids the monotony of pure repetition, producing a sense of flow, progression, and narrative structure to the finite canvas of a rug. Evolving patterns can imbue designed objects with visual interest without overwhelming the eye.

This style of design was explored most famously by the Dutch artist M.C. Escher in his "Metamorphosis" prints, in which lifelike animal forms grow and interact on the canvas. Inspired by Escher, the designer William Huff later introduced Parquet Deformations, a drafting exercise in which design students created abstract tessellations that evolved spatially. These ideas were popularized in America in the pages of Scientific-American: Escher by Martin Gardner, and Huff by Douglas Hofstadter.

Over the past two decades, Canadian computer scientist Craig S. Kaplan has conducted research on algorithms for drawing geometric patterns that evolve, inspired by both Escher's Metamorphoses and Huff's Parquet Deformations.

For this rug, he adapts a visual device he calls "grid-based evolution", found in many of the drawings created by Huff's students. A square tessellation is subdivided into a fine grid, and tile shapes evolve by enclosing or liberating one small grid square at a time, while also enforcing a global system of symmetries. The result is a design that evolves from a simple checkerboard at its ends to a dense, maze-like thicket in its centre. Kaplan's software quickly and seamlessly adapts to different grids, different patterns of evolution, and different symmetries, giving designers access to limitless possibilities within the design space of grid-based evolving patterns.

Material/Execution/Structure/Quality/Originality

The flatweave technique used for this rug is a natural physical medium in which to express the grids of Kaplan's designs. The grid-like structure of the weave evokes the precision of the pixel grid in computer graphics, but gives that precision a softer, more organic appearance through the hands of the human weavers who bring the design to life.

The loom is used as a contraption to reveal a computer-generated design. It can be also woven in cotton, wool , a mix of bamboo silk and cotton, in PET yarn, or silk.

The Grid rug is woven in Bamboo silk. Its has the luster and a "touch and feel" that only textiles evoke.

The family of tilings known as "isohedral" are particularly suited to tessellation based geometric design. Professor Kaplan created a software library named Tactile for the purpose of manipulating and drawing isohedral tilings efficiently.

In a linear parquet deformation only the edges of the shapes are permitted to evolve. The midpoints of the edges of each tile are plotted and an interpolation function renders changes in the shape.

In grid based evolution the 2D space is subdivided into squares ;and in steps the shape shifts one grid-square at a time. The pattern change is rendered or rather "snapped" to the nearest whole number of grid-squares. The edge does not evolve continuously. See image 5*.

If the call ever comes to develop more grid based pattern it will not be difficult for him to develop more designs.

Professor Kaplan wrote: I feel a much stronger sense of ownership over the shapes than the colours.

Possibly this motif should be woven in two-tones only: figure vs ground.
The design can also be woven in Sardinian Structures and as a handknotted.

*Page 115. "The Tiles, They Are a-changing". Space Tessellations. ISBN 978-3-0356-2517-2

Sustainability

A sustainable economy is not invented in a design studio.

We are aware of The Modern Artisan project by Federico Marchetti which is a blueprint for what fashion (and home furnishings) can do to become circular and responsible. The ecosystem of the argriculture or production method used for the raw materials; the processes of washing and dyeing the yarns should all be assessed for their sustainability. In particular, attention has to be given to wastewater treatment prior to discharge for use in say agriculture to ensure that that there is no damage to the environment.

It is possible to weave designs in PET yarns made from recycled plastic bottles but subject to a higher production run. Certification by a Fair Trade Organization also needs to be backed by higher volume.

This motif is likely to be produced in monochrome only: a single colour against a taupe/off-white ground.

It would be interesting to explore the use of indigo dyes. For this particular motif it appears that the exploration of color contrast adds unnecessary complication to the design.

We are inspired by the brand Shyam Ahuja which revived the handcrafted tradition of flatweaving. All his creations were handmade from first step to last. The emphasis is on quality over quantity, craftsmanship rather than over-consumption.

Branding

1. Craig Kaplan is an Associate Professor in the School of Computer Science at the University of Waterloo, where he studies the application of computer graphics and mathematics to problems in art, design, and architecture. He also helps organize the annual Bridges conference on intersections between art and mathematics.

2. Azmas Rugs got involved in making such rugs after Professor Craig S. Kaplan graciously replied to an email expressing interest in weaving “tessellation” rugs in July 2019.

“Evolving patterns” are visual and tactile explorations in asymmetry. Appearances that seem symmetric superficially are in fact asymmetric for example: the human face, DNA (which is right handed), the glucose molecule etc.

Developing “evolving patterns” might give us a better sense that our world is dynamic and ever-changing not “static and symmetric”. Reference: Lucifer's Legacy: The Meaning of Asymmetry. Frank Close ISBN 0-19-866267-X.

MC Escher's drawing no. 67 "Horsemen" was first used to conceptually illustrate situations in nuclear physics where left/right symmetry is violated by weak interaction on the cover of the book Elementary Particles by Nobel Physicist Chen Ning Wang in 1963. (Also see Lucifer's Legacy page 195).

3. Our explorations seem to corelate to a few of the exercises* from the Basic Course at the University of Ulm:

a. Parquetry/Tiling
b. Exactness through inexactness
c. depth perception studies
d. contrast through interaction of color

This curriculum was developed by Thomas Maldonado and Josef Albers in post-war Germany.

"Parquet Deformations" as taught by Professor William Huff emerged as an"asymmetry out of symmetry" exercise in parquetry/tiling. Weaving can be classified as a study of "exactness through inexactness". In coloring the patterns one needs to be aware that color contrast and the creation of depth can create confusing perceptual effects and avoid them.

*page 74 Space Tessellations experimenting with parquet deformation ISBN 978-3-0356-2517-2.

Other

Programming to create Grid-based evolution is explained by Professor Kaplan (from 34.5 minutes to 38.5 minutes) in the following online lecture:

https://vimeo.com/108239611?fbclid=IwAR1-gWA6fTUTvyy8CeDKNf9XN6-pIvhNYBwkGiUhAEa94csm3rGOX9qHzg8

and also at :

Craig Kaplan - Parquet Deformations: the tiles, they are a-changin

https://www.youtube.com/watch?v=T9zyvvXZmc8

(from 16.4 minutes to 20.3 minutes)

My initial plan was to attempt a collection of "Parquet Deformation" rugs. In fact, very few people design such patterns ;and in the past only a small number of such patterns had been created. I improvised and "moved the goalposts" slightly by conducting looser experiments named "Evolving Patterns".

This Grid pattern by Professor Kaplan is both an evolving pattern and a parquet deformation.
It conforms to the Huff rule that the deformations take place in one direction ;and it is possible to see a temporal progression in which one tessellation becomes another.

In a perceptive article in Scientific American in 1983 the AI writer Douglas Hofstadter analysed Parquet Deformations. The title of his article is revealing. "Parquet Deformations: A Subtle, Intricate Art Form". (page 23 "Space Tessellations.)

Creating animated patterns and weaving them into a textile is indeed a subtle idea.
To me it makes sense to continue experimenting with these ideas.

Azmi Merican, Azmas Rugs

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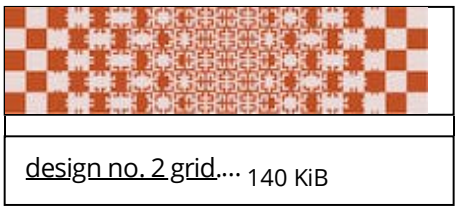

design no. 2 grid.... 140 KiB

grid on loom 2 (2... 118 KiB

Tessera design -... 653 KiB

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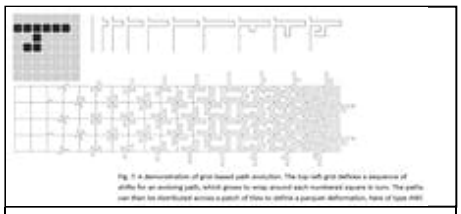

grid evolution di... 79 KiB