Goal:
Create a surface from repeating cells. Parametric changes to the cells will be driven by data from an image file. The image file also includes an alpha channel. The alpha channel data will be used as well.

1. New Scene with Grid Snaps On
Turn on grid snap dialog by right clicking on grid snap button.

2. Create guide planes
Using the plane tool, create 2 planes centered on the origin. Outer plane should be 40x40 units.
3. Turn on Vertex snapping

4. Create First Cell portion
   Draw line, use face extrude modifier (amount set to 0)
   Once completed, you can delete your guide planes.

5. Re-center pivot
   Under the hierarchy tab, select ‘Affect Pivot Only’ and move pivot to origin.
   Grid and pivot snaps can be used or use the transform type-in.
   Turn off ‘Affect Pivot Only’ when done.
6. Clone first portion
Turn on rotation snapping.
Use the rotation tool while holding 'shift' to clone.
Rotate 90° around z-axis.
Make 3 copies.

7. Attach All portions
Select the first mesh.
Click the 'attach' button in the 'edit geometry' rollout.
Attach 3 new clones.

8. Weld Vertices
In vertex sub-object mode, select all vertices. (Vertices will turn red)
Click 'selected' button in Weld area of 'Edit Geometry' rollout.
9. Select Inner Vertices

With inner vertices selected, select ‘XForm’ from modifier list. The vertex selection mode should be indicated in modifier stack. This will apply XForm to inner vertices only. Verify the XForm gizmo surrounds only the inner vertices.

10. Add ‘XForm’ Modifier

11. Add Custom Attributes

Attach ‘Attribute Holder’ modifier (sub-object mode doesn’t matter)
Add 4 custom attributes [R, G, B, A]
Use integer/slider with a range from 0 - 255
12. Add ‘Bezier Float’ controllers to custom attributes

13. Save your file.
   Just because.

14. Assign Float Expression controller to XForm Gizmo Position
    Verify controller assignment is to XForm Gizmo Postion X
15. Edit Float Expression Controller
Variable ‘input’ -- scaler, assigned to custom ‘R’ value.
Expression: “input/255*36-18”

16. Copy X controller to Y, Z tracks
Right click and copy X controller
Right click and paste on Y+Z tracks

17. Edit Expression Copies
Y Controller: Re-assign input variable from R to G value
Z Controller: Re-assign input variable from R to B value
18. Check your work
When you adjust the RGB values, the hole should move.

19. Assign Scale Expression to XForm Scale Track

20. Edit Scale Expression
Variable ‘input’ -- scaler, assigned to custom attribute ‘A’
Expression: \([\text{input}/255 \times 1.5, \text{input}/255 \times 1.5, 1]\)
-- 1.5 is a multiplier based on original size of opening. You may need to adjust this if your original opening was a different size.
21. Check your work
When you adjust the A value, your opening should scale in size.

22. Run MaxScript
Run the script titled: “imageGridWithControllers.ms”

23. Input settings and run
Choose your image file.
Set the transform for the grid  *(Generally will be width of cell for X and height for Y. The script works from the top down, so a negative value has been given to the Y Transform)*

With your object selected, run the script.

**CAUTION:** DO NOT USE LARGE IMAGES.
The script will produce a clone of your object for every pixel in the image. Use photoshop to reduce your image to a manageable size.
24. Check your work
After you run the script, your scene should be something like this. The input from the image should be revealed as variations in your object field.

25. Collapse Objects
Select all the objects and choose ‘collapse’ under the tools tab to produce a single mesh object.

26. Weld Vertices
In vertex mode under modify tab, select all vertices and weld.
27. De-select corner vertices
All other vertices in your object should be selected.

28. Assign Mesh Smooth Modifier
Verify you’re still in vertex sub-object mode (vertex icon on right in modifier stack)
Turn off ‘Apply to Whole Mesh’
Increase ‘Iterations’ as needed.

29. Enjoy