

Square Pixel Tessellation

designed in 2016 by Michał Kosmulski — <http://michal.kosmulski.org/origami/>

This is a general method for implementing bitmap images as origami tessellations, which can be applied to any picture. The image to the right is just an example.

A bitmap image consists of individual points, called pixels. You can create such images manually or use computer software to generate them from photographs. On a computer screen, each pixel takes on a color. In the case of a black and white image, a pixel can be in one of two states: “on” or “off”. In this origami tessellation, both pixel types use a 4×4 square grid per molecule.

The Crease Pattern (CP) for the “on” pixel is the first one. It is similar to a square twist, except that the pleats which connect one molecule to another are hidden behind, leaving only the central square visible. To collapse, turn the paper so that its back side faces up (note that all creases in CP will change their orientation from valley to mountain and vice versa). Collapse the outer square by pinching its corners and pushing the inside down. Crease the smaller square, and flatten. Four triangular flaps will be formed at the four sides of the molecule.

The CP for “off” pixel is the second one. It is just a square twist formed on the back side of the paper. This leaves just an intersection of four pleats visible in the front of the tessellation. There are many tutorials online for folding square twists like this.

Both types of molecules are chiral (having a twisting direction). Molecules will be connected on the back side of the paper with pleats, forming triangular or trapezoidal flaps. You can arrange these flaps in a regular manner, or you can spread-squash them which will prevent them from freely moving around.

