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## An Exploration into Computer Graphics: L-Systems and a Non-Photorealistic Filter

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*Colby College*

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## An Exploration into Computer Graphics: L-Systems and a Non-Photorealistic Filter

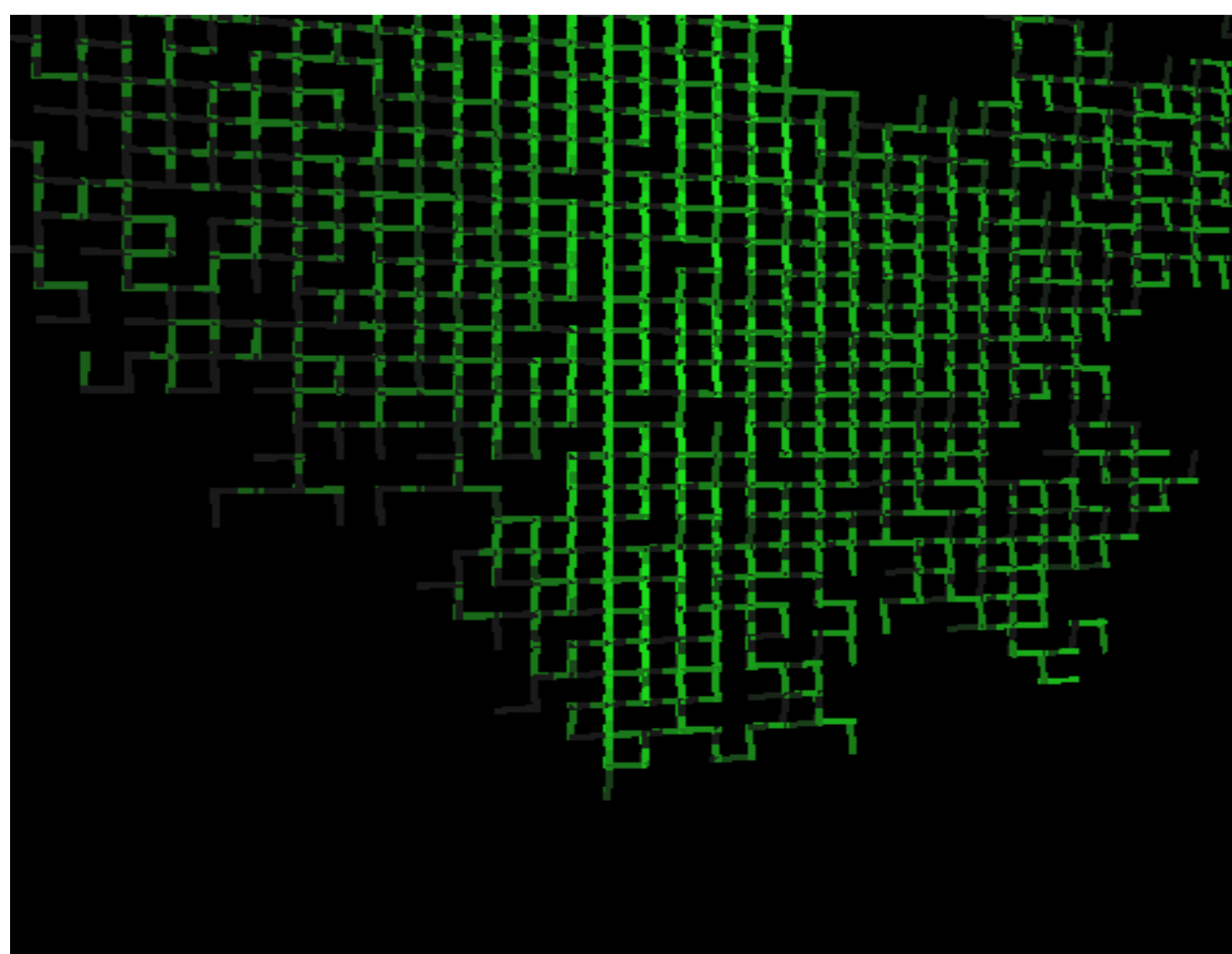
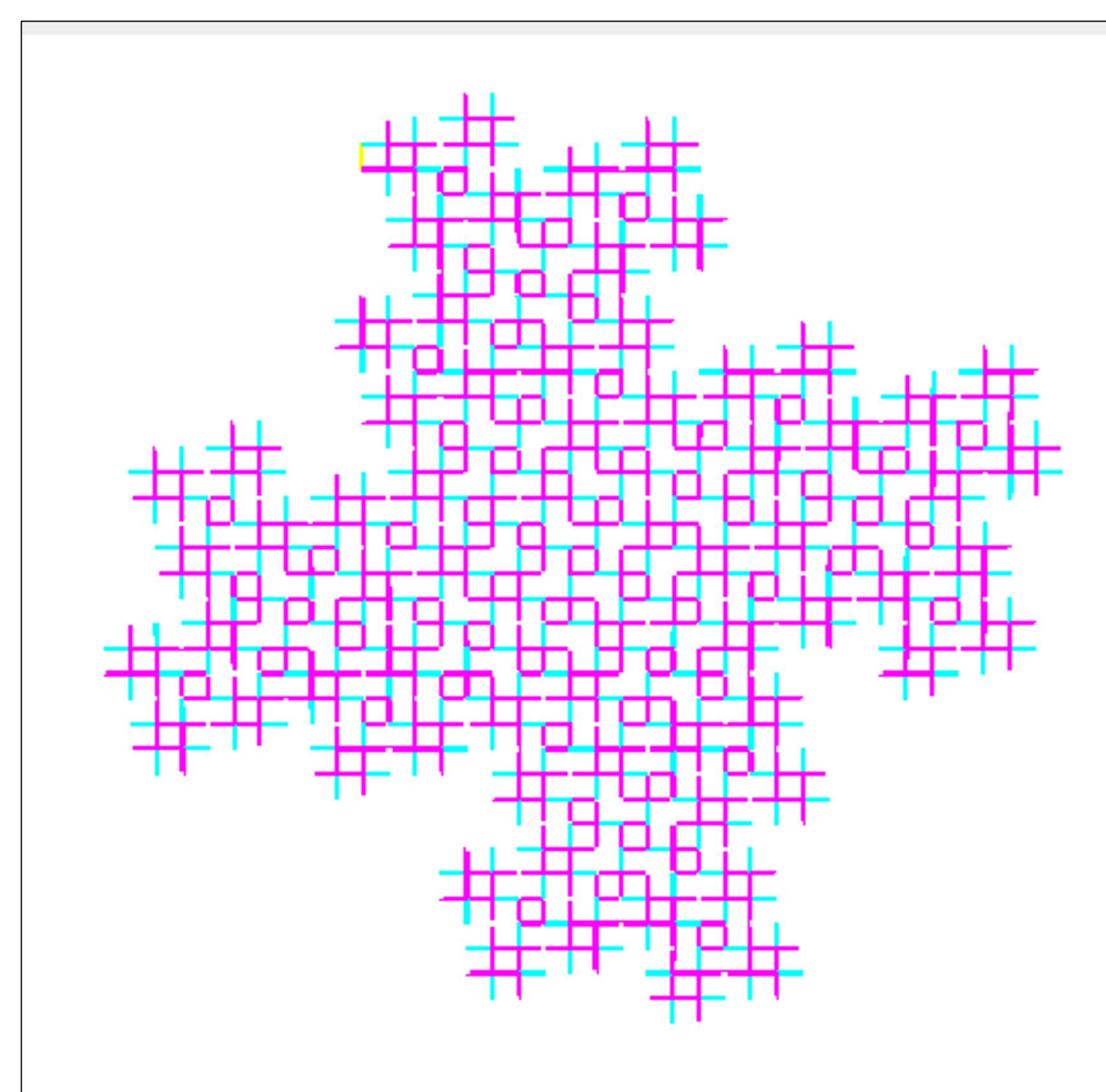
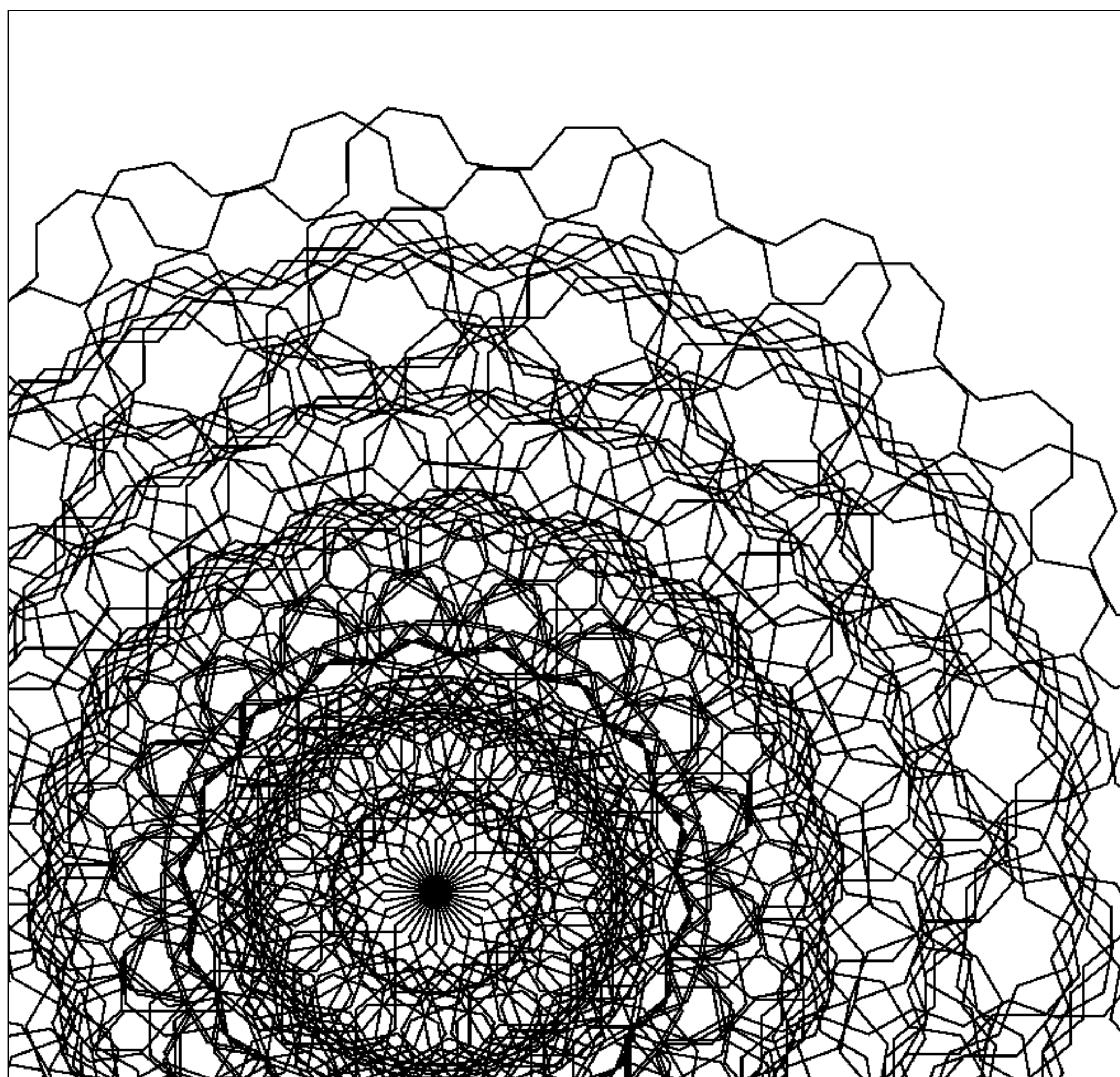
Victoria M Edwards

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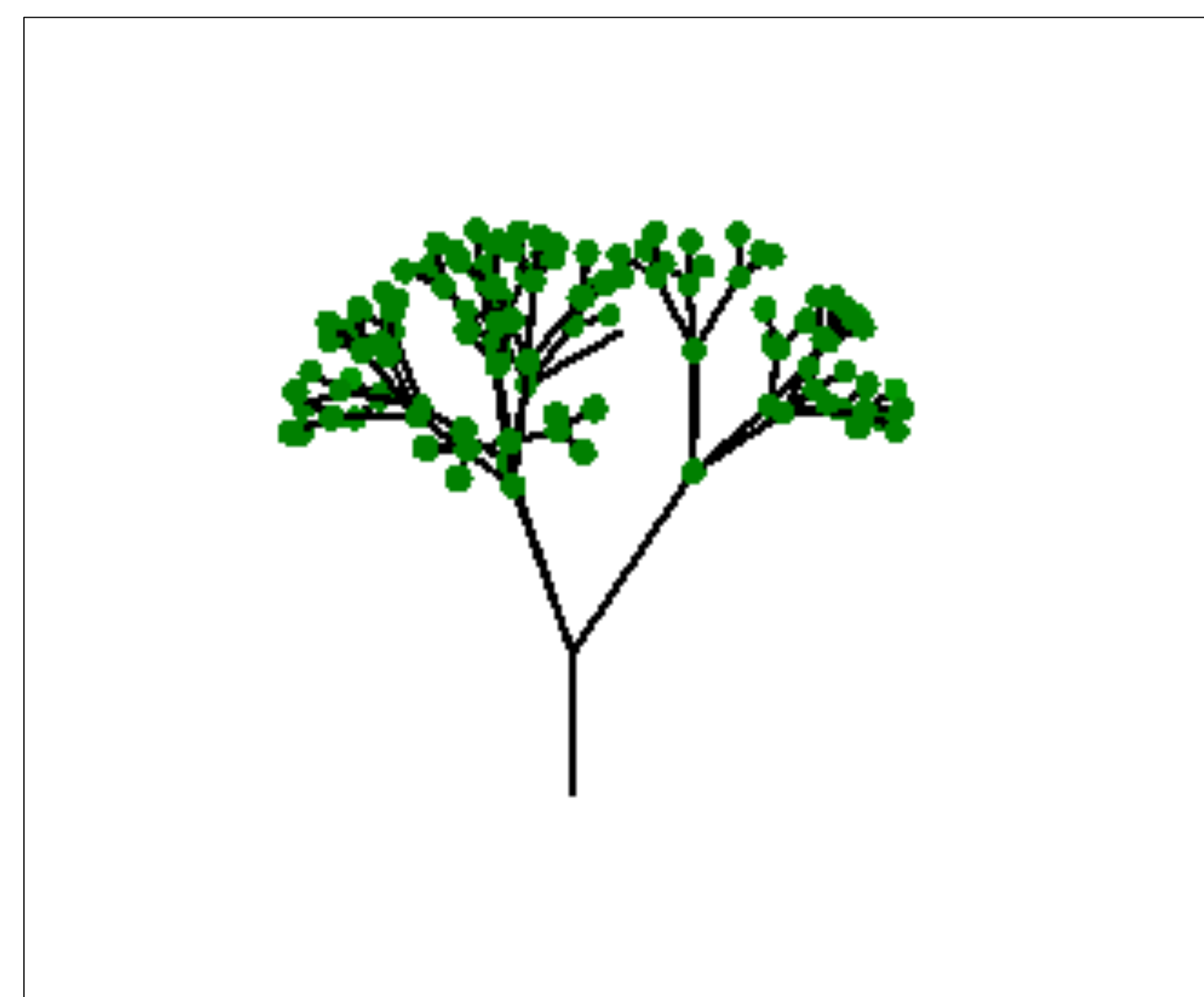
### L- Systems :

- L-systems are a Photorealistic method to render trees and other fractal like designs.
- To build the L-systems below, I used a 3D turtle, which follows the position and orientation of the fractal as the lines are drawn.
- The basic commands in an L-system are: 'F' move forward, '-' move left, '+' move right, '[' branch forward, and ']' branch backwards. Branching allows for trees to be drawn. For more complex L-systems more commands can be defined.

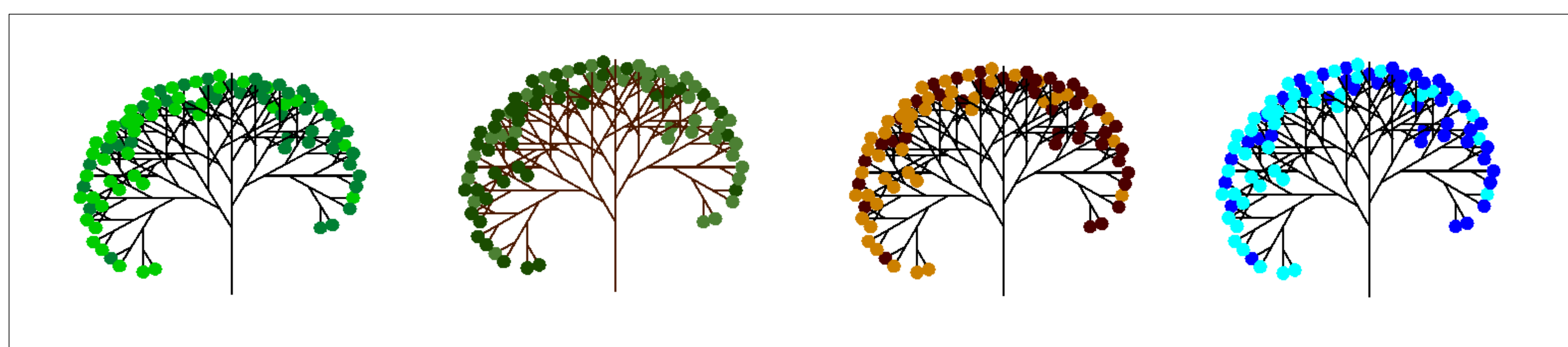
### Simple Fractal Patterns



L-System with a Spot Light



3D Tree



Seasonal Trees

Prusinkiewicz, Przemyslaw, and Astrid Lindenmayer. "The Algorithmic Beauty of Plants". New York. Springer-Verlag. 1990. Web pdf. <http://algorithmicbotany.org/papers/abop/abop.pdf>.

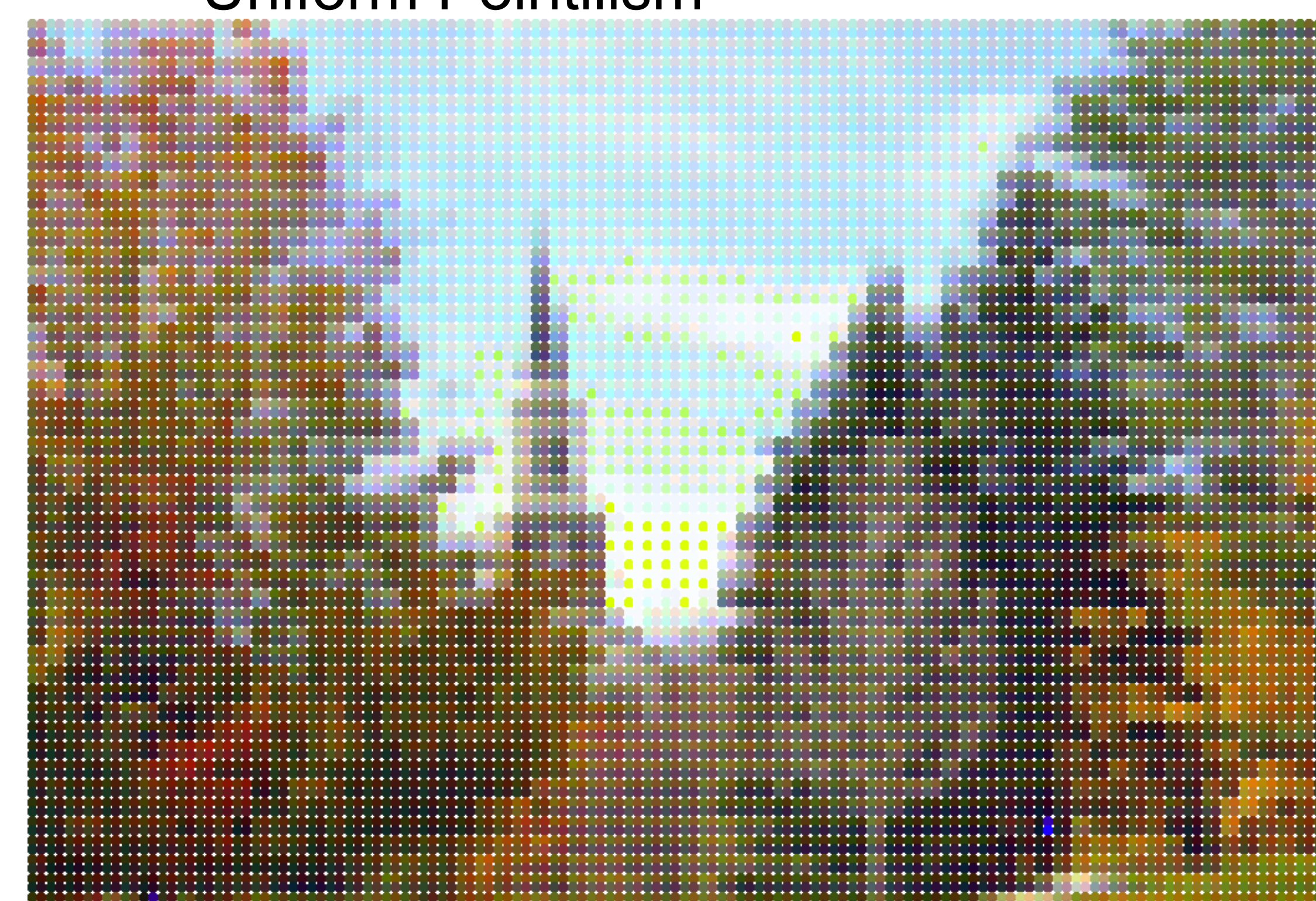
### NPR Filter:

- NPR is a field in computer graphics that puts emphasis on artistic expression.
- This filter was inspired by a SIGGRAPH paper on picking isoluminant colors and applying them to create images that look like Chuck Close's artwork.
- Up close, you will see a mess of dots or shapes, but as you move farther away from the poster, the image will become clearer.
- The different filters depend on how the isoluminant colors are drawn into the image.

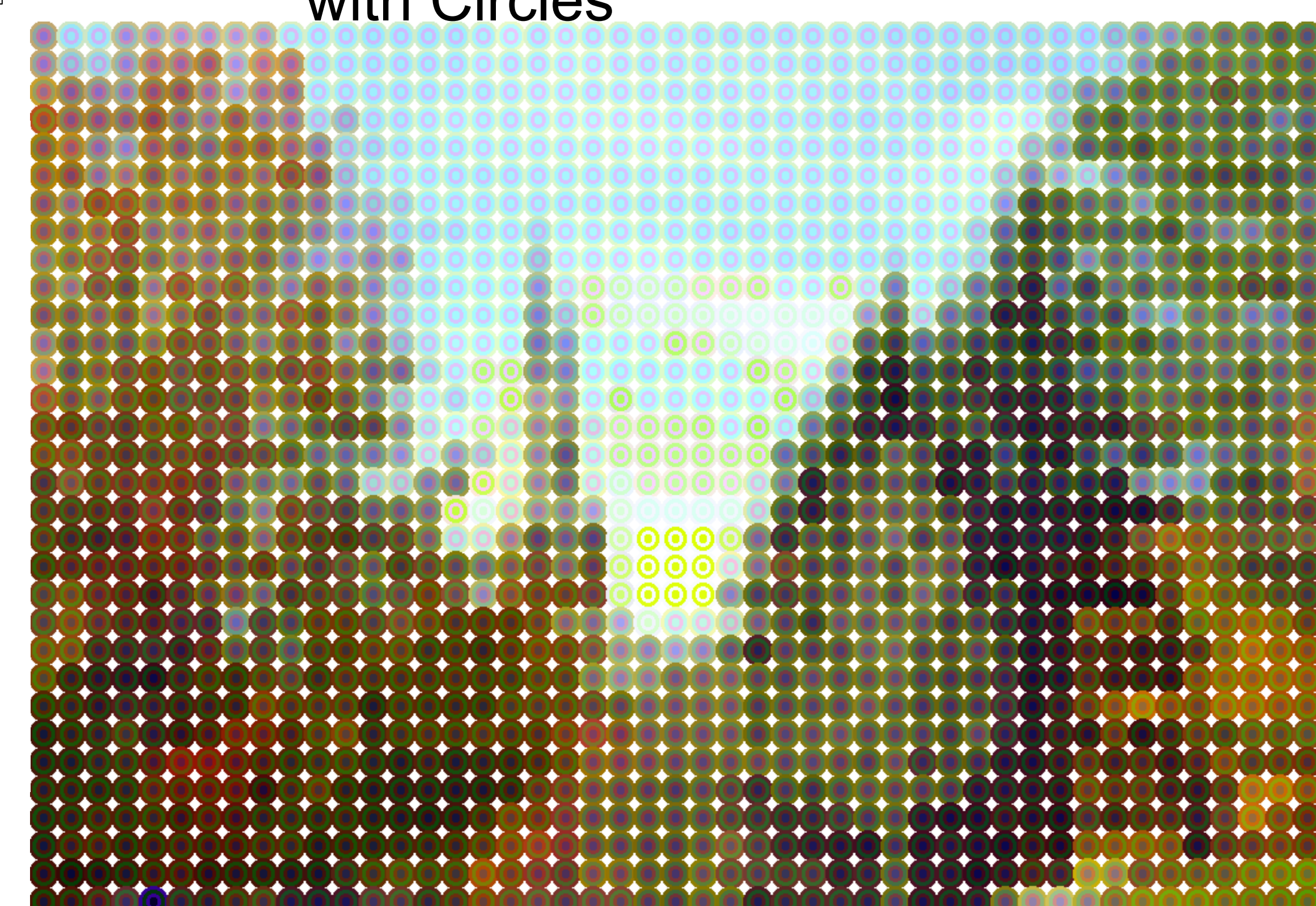
### Original



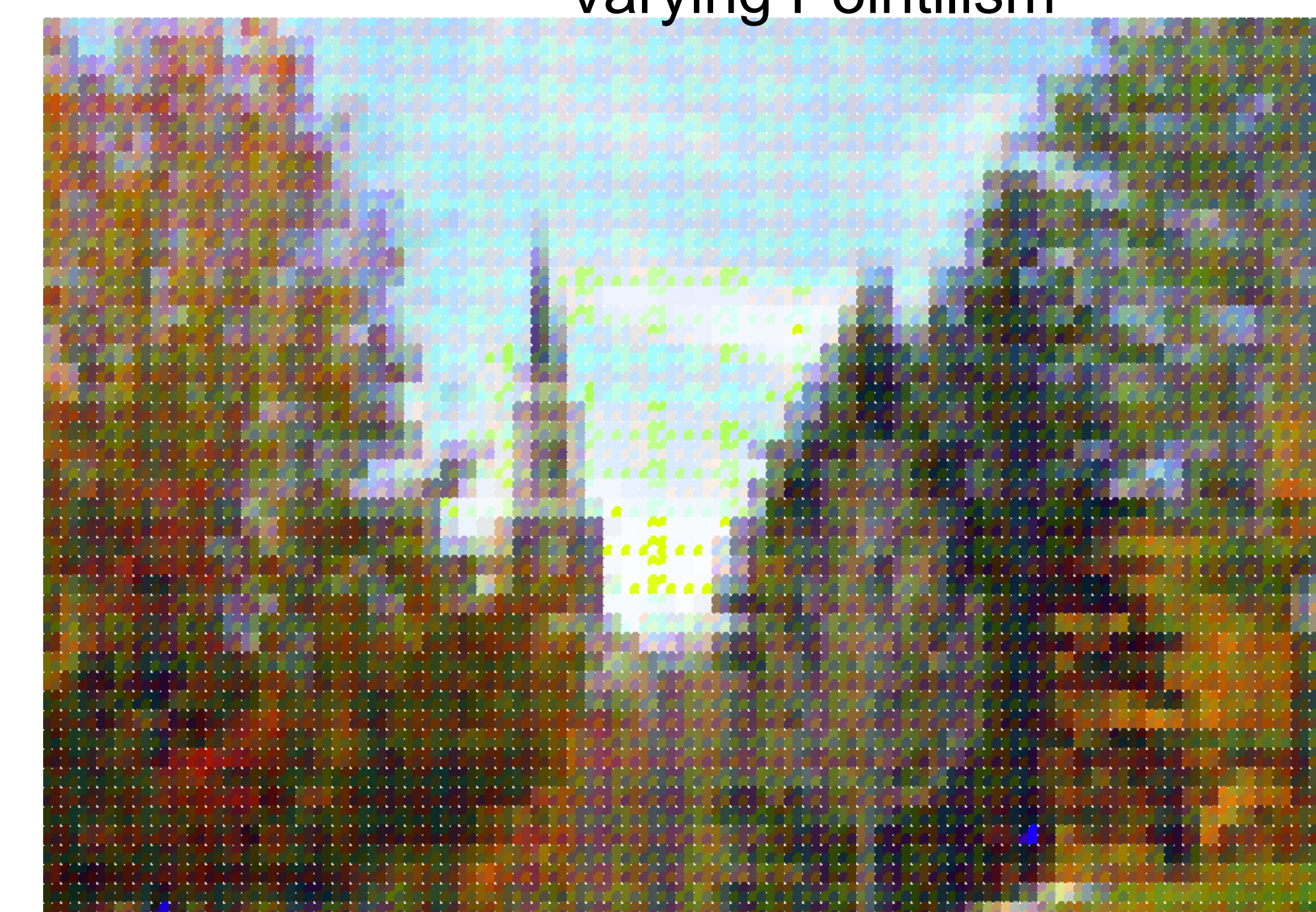
### Uniform Pointilism



Close Inspired Filter  
with Circles



### Varying Pointilism



Close Inspired Filter  
with Rectangles



Klein, Lawrence, Luong, Seth. "Isoluminant Color Picking for Non-Photorealistic Rendering." SIGGRAPH. 2005.