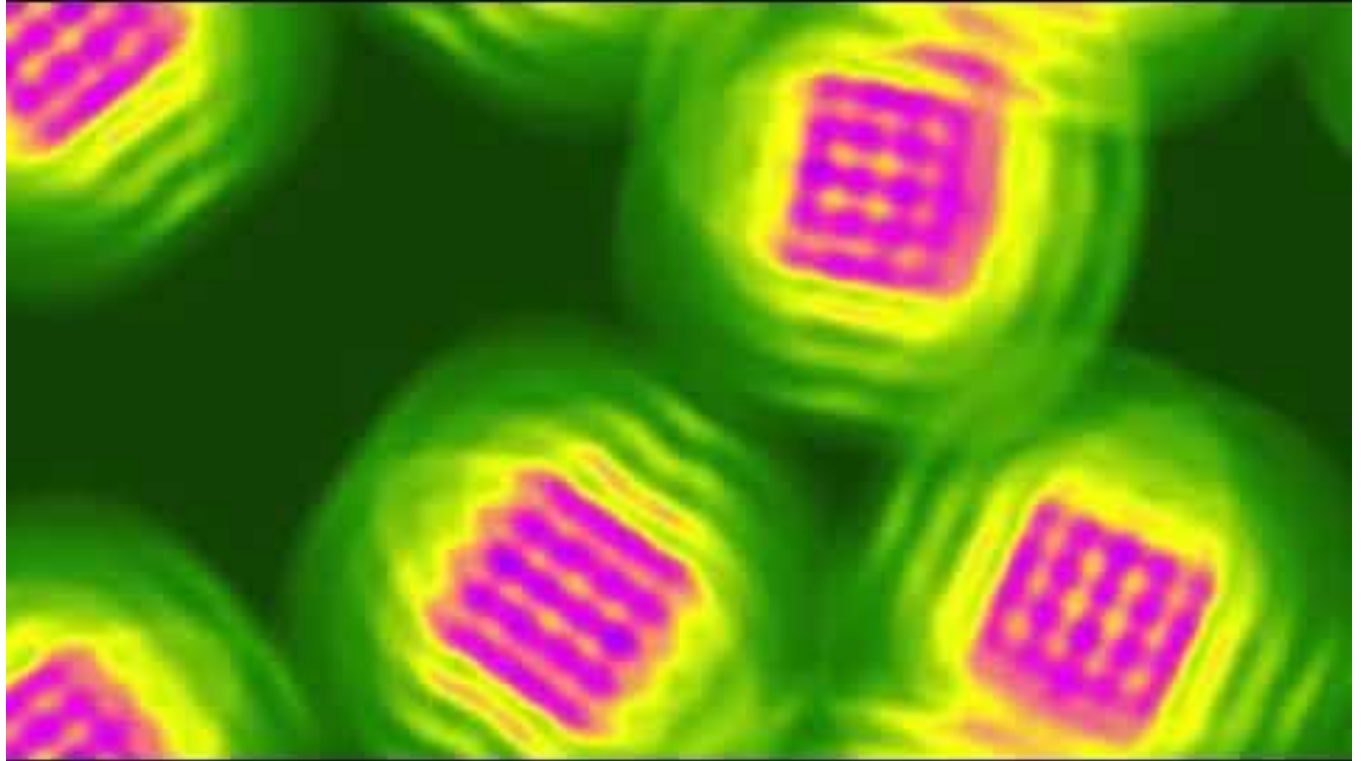


Latest Developments in Cellular Automata

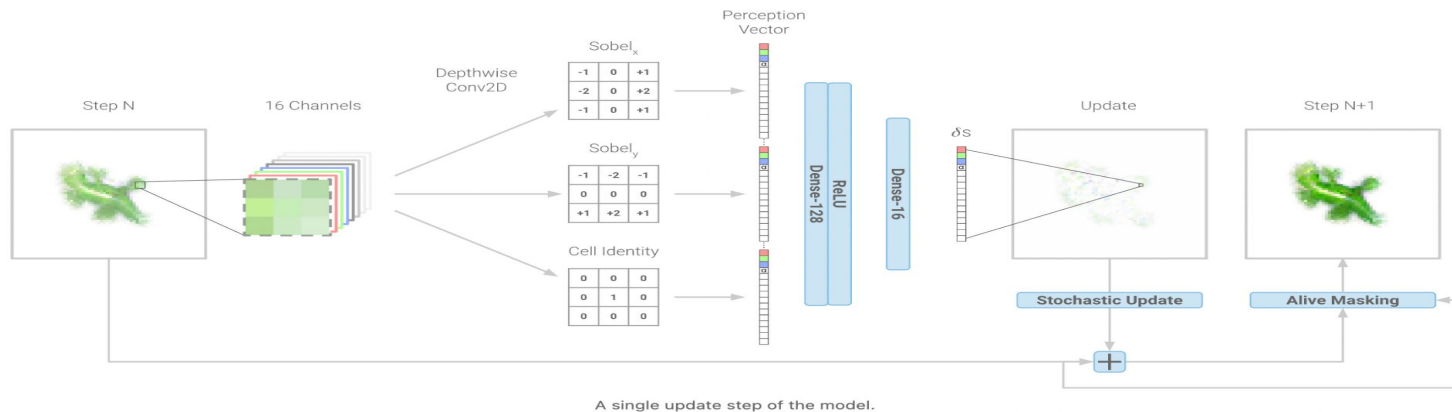
By: Jordan Donovan, Krishna K S, Connor Harrigan

Lenia:
Biology of
Artificial Life

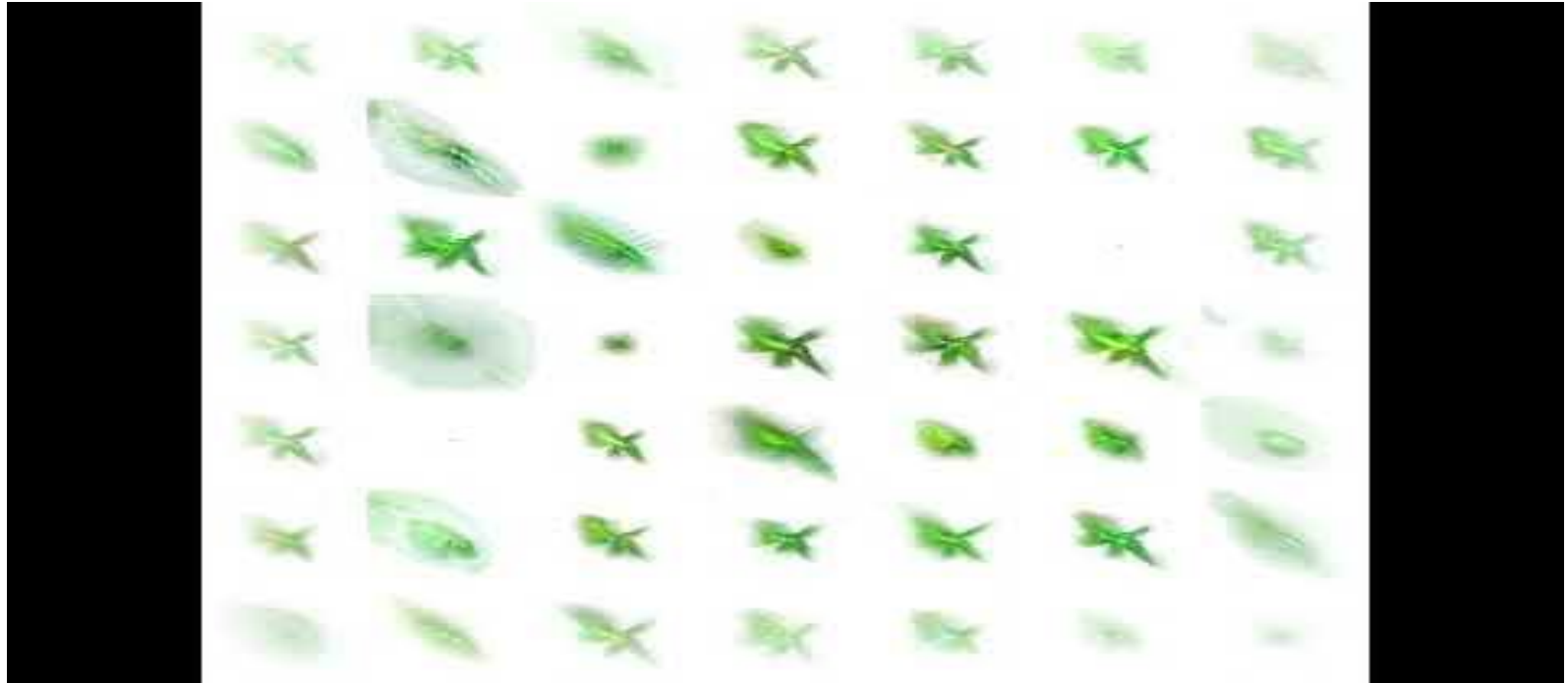


Neural Cellular Automata

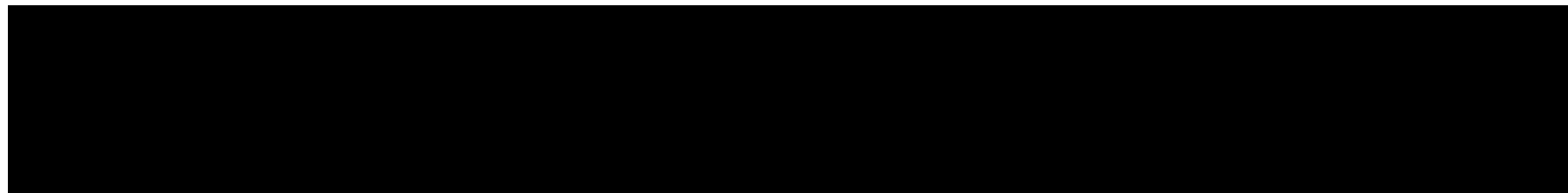
- Convolution + Non-Linear Activation vs Logical operators
- Differentiable Programming (optimization) to learn agent-level policies represented by neural networks that satisfy system-level objectives.



Neural CA training



Neural CA - growing a target pattern



Neural CA - Growing with Damage

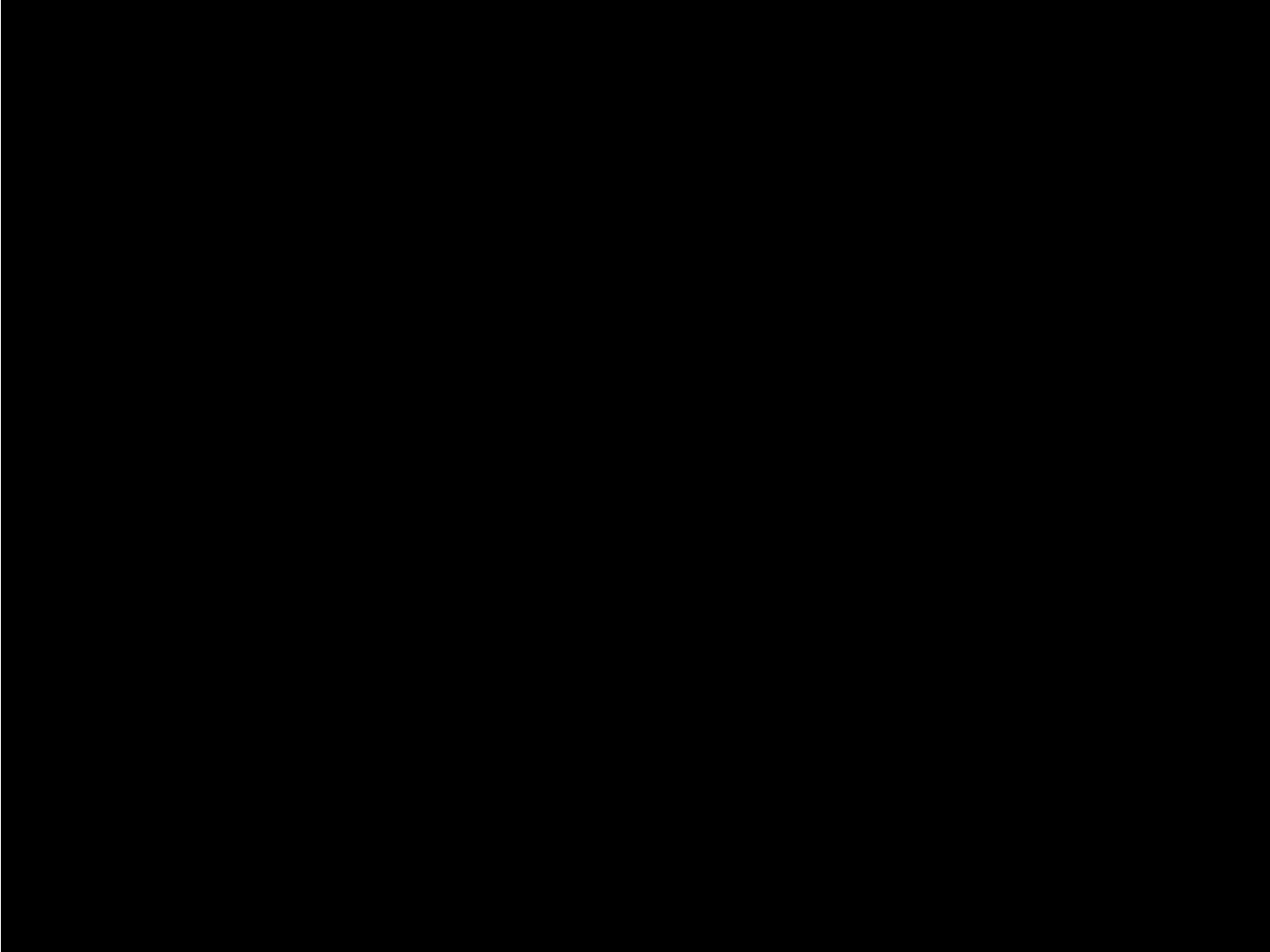


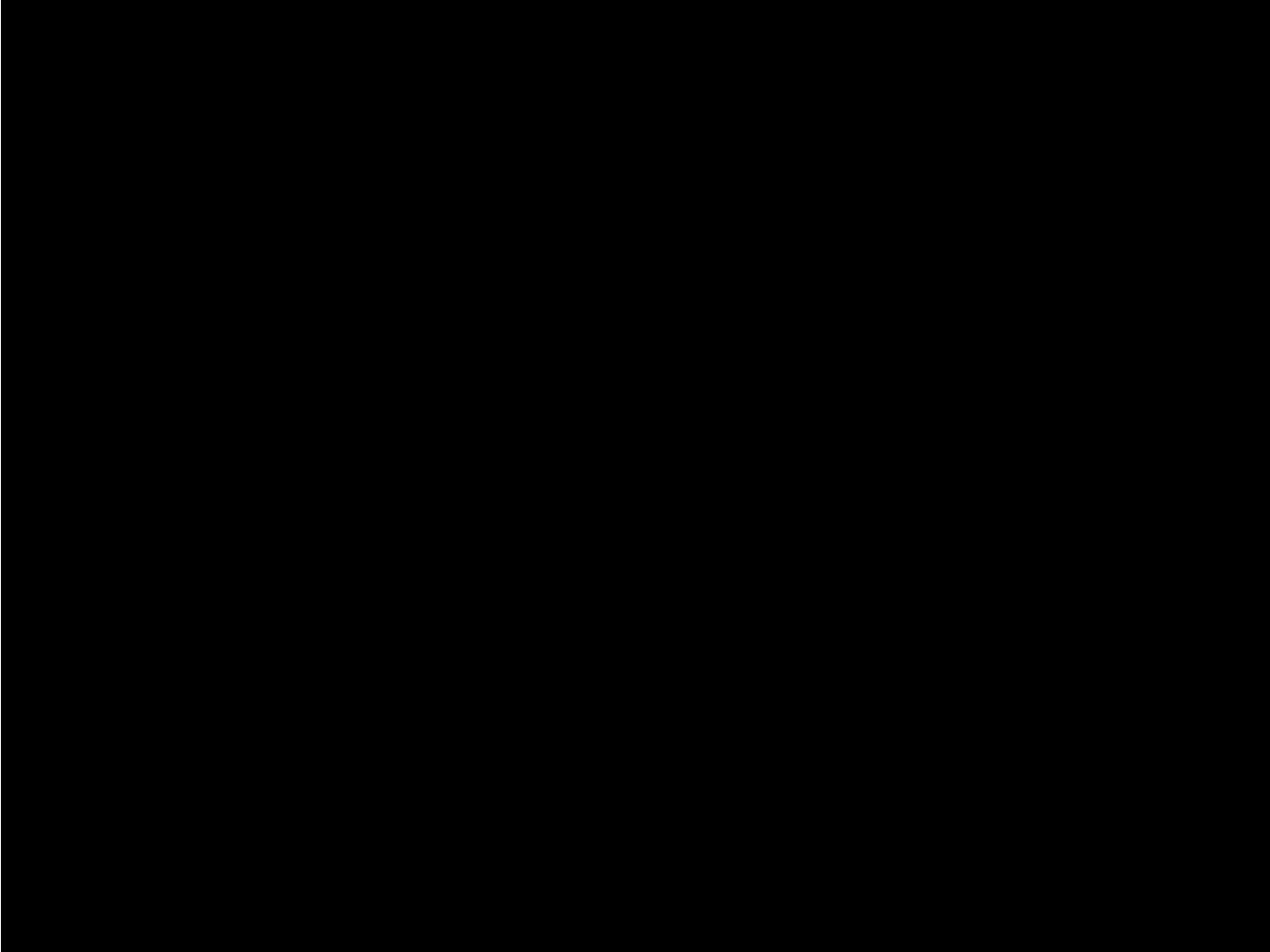
Applications of Self-Organizing Cellular Automata

Self organization can be applied in many natural systems including:

- Physics
- Chemistry
- Biology

Morphogenesis: the biological process in which cells organize and differentiate into more complex tissues, organs, and full organisms





Conclusion

- Quantitative models like the NCA to understand important biological phenomena, such as scaling of single cell behavior rules into reliable organ-level anatomies.
- The ability to simulate and explore the continuous state of CA with increased computation power.