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Path

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Virginia Commonwealth University

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PATH

A thesis submitted in partial fulfillment of the requirements for the degree of
Master of Fine Art in Sculpture + Extended Media at Virginia Commonwealth University.

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BFA, University of Florida, 2010

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Virginia Commonwealth University
Richmond, VA
2018

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PATH

By Evan Galbicka, MFA

Abstract:

Path is a collaborative system that developed over the course of five months of studio activity and continued through the duration of the exhibition. The system's main collaborators were a land snail native to eastern North America (*Neohelix albolabris*), myself, and a digital cellular automaton. These prime agents interwove processes and exchanges between one another into a complex network of folded fractal feedback loops. Cyclic processes produced artifacts and infrastructures to support communication between the components and agents of *Path*. As a whole, *Path* spoke to the possibilities for interspecies, cyber-physical, and ecological collaboration to create an emergent landscape.

The iteration of *Path* that follows in this document extends the collaborative system onto the space of the page. *Path.txt* is a concrete poem drawn from personal notes and observations from field and studio research. The composition of the text was generated through one of the processes at play in the production of *Path* as a gallery installation. The arrangement of text follows an algorithmically determined sequence initiated by the slime trail of *N. albolabris*. Following this textual iteration, a section of images and text outline the processes that operated in *Path* as a gallery installation.

PATH.txt

searching for the significant differences between the two groups
in terms of the mean scores on the various subscales of the
questionnaire. The results showed that the scores on the
subscales were significantly higher in the experimental group
than in the control group. This suggests that the intervention
had a positive effect on the scores on these subscales.
The results also showed that the scores on the subscales were
significantly higher in the experimental group than in the control
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the intervention had a positive effect on the scores on these
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than in the control group. This suggests that the intervention
had a positive effect on the scores on these subscales.

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s t b s o n d b l y l t h e r a s t e n e g
e t l e a n t f o a n s t r p o e r a s t e n e g
m r o f s e n g u l s t r p o e r a s t e n e g
g l o b u l n d g r o o v u n g v a r u s p a c k e t v e l o c i e g n i s
e f w n n a d e k u s p a c k e t v e l o c i e g n i s
o u n d o c o - l m e s s e n e
t a o n p o u c h k f e v s a g e a n i g
t e d f l e e r u o b a n s i o c a t h s o p k d
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 l w a n e o f t
 l b r e a k e q u i l
 f t h e r e p t o r s i
 u o e c i t e s l o m u
 a c a t u s e d a t c o o r
 r m i n a t e p o l l i n t s a c
 i s s i p a r o s s a g a l l e r y t i
 e f l o o
 r f i n
 e s y t e m h e n f r i n
 w h i o n o f m y i n t e n t i o n
 m e c t i r g e n o f m y i n t e n t i o n
 n a i l l a l p u t a t i o e t r a c
 n a g o r i e x r c i s j e n t a n
 t a s t h a t s o w n o s r i t s
 c r o u g h i t t p e r f o m i u m
 f o r u r s a s a m e d e n e t
 i c b p r a g g e s s e x h i b i
 i c b e o h a v i n s o l g s p a t i
 r n a i l n s h e l o r a l t c o o r
 l p i a t i o n p a t m r i b i v e s y s t e m i n w h i c h
 t e r n s t h e i s n a i l u t h e f r
 t r k s a m u l t i p l i c r e v e t i o
 i t y o f n a g t e s l i s i b n o
 f - a r e f l e c t i o n
 t t r a l e c t i t u a e v i r
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l i n l t h r o u m m o e n
b r a i d e f y g h o e k l g h t i m e n
n e i g h e r b o r l y t h r e s h b e t t
t h e r b o r l y t h r e s h b e t t
v i o a l a r t s t o c o l d n i n n
d c o m m u n o n c a p d r s n a m c
i g n t o o n a i n a t n e t e r a y w h
i f t i c a i n b e d a i t t i o c h i e c t t e m t i i u n c t i o n o f u g s p a h i e
f o m e t s f o a n y t h e r c e s v e i n t i i n a s n a i u l l c s y s t e m i c p r o c s s e p h i e
c o m m o d i t y r e l a b o r p e r c l a i m t h e v e m b o d i l u p l i o c c u y i n p r o b l e t s p a c e
s i n t e p l h a p e i o d i c p e r r t u i e d c h a y o r e x g a b i o s p a c e t s e
n h r i p i n g p s e s a n c l i i d p t r b a p u l a o s c i l l a t e r o m n e o u r l i v
p t o e r s m o l a s s d e r o t a k e a c h d i r e c t t a a t e t r n e r p e s v e s o n a l a b a m s
h e o u b i l l e c u e r o t a k e a c h d i r e c t t a a t e t r n e r p e s v e s o n a l a b a m s
s i t y o f m o l a r p t i r a l w a v e n d p o l y c o a y s b a c r y l i c w a t e r
p p h a s e e p a g u a t i o n t h r o u g l a s s b o p a t e s l i g h t l c
s p a c g r a d i e n t s i n p r i s m a t i x e s e h w i t h m m y d i s p l
i n g h o l u g h t a r e f o i l k n s a i d e n e i e e s w a p s a n e
t h r e s t h e r l a t i o n s h i p a t o d g h b o r n e l r r i l e n
f i t s p m i a r t s o o o i e x t e n e d o t h y l
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Path explores a collaborative system between three primary agents: a land snail native to eastern North America (*Neohelix albolabris*), myself, and a digital cellular automaton. The agents were entwined in circuits of exchange and topological feedback loops that began in the studio and continued through the period of exhibition. A variety of repeated collaborative exchanges produced differentiations of form, color, texture, and function of the installation's parts, and generated the emergence of the ecological artwork as a whole. Connected dynamic processes between the collaborative agents produced scalar activations of space from the microcosmic to macroscopic. The interspecies, cyber-physical, and ecological collaborations through *Path* led to an emergent landscape within the gallery space.

The first catalyst of *Path* was the movement of *N. albolabris*. Snails were observed moving across plate glass, and their residual slime trails were documented through carbon dusting and photo-imaging. The trails were then transcribed into grid form, and input as initial states of a mathematical automaton--an algorithm that mimics cellular development. As an initial state, the trail transcriptions created the base conditions for causal chains about to unfold. The algorithmic logic system within the automaton analyzed the initial state grid patterns and computed sequential changes of cell states within the grid.

The sequential generations of changing grid states were captured as images and then used as models to influence individual elements within the piece and the installation as a whole. For example, cellular automaton grid states were used to cast calcium sulfate tiles that were scaled to match the gallery's existing floor covering. Alongside the cast tiles, plexiglas reservoirs were built to the same dimensions. Grid states were also used to determine the layout of the plexiglas reservoirs and cast tiles within the gallery space, turning the gallery itself into a grid state of the cellular automaton. Grid states were also used to determine the physical structure of temporary snail habitats. By representing the cellular automaton at the level of the gallery architecture and at the level of the individual contents therein, a fractal structure of space took form within the installation.





The trails of the *N. albolabris* were also transcribed as line drawings carved into clay slabs. The action of transcribing snail trails brought my body and intuition into the equation, shifting the trace according to movements of my eyes and hands manipulating a carving tool through clay. In this way, the trace of the snail became a trace of myself, which in turn became an input for other processes, and allowed other agencies, both ecological and virtual, to make their mark.

Another process, involving the cellular automaton, digital mapping, and collage extended the fractal structure out of the gallery and also aided the collapse of scale within the installation's unitary components. In this process, grid states of the cellular automaton were overlaid onto maps of Richmond, VA, identifying activated cells within the city grid. These activated city grid cells became sites for real-world exploration. Photo-documentation and materials gathered from these sites were brought back to the studio. The found materials were incorporated into the cast sculptural elements of the installation, intersecting these "off-site" materials with the ecological processes unfolding within the installation.

The field expedition photo-documentation was collaged with vector renderings of the grid states that led to site identification. While collaging the grid state renderings, a software glitch occurred, serendipitously generating color artifacts within the images. These glitch artifacts were incorporated into the collages and output as a series of backlit digital prints that became image baths within some of the installation's plexiglas reservoirs. In this way, another feedback loop found a route of connection and the fractaling of scalar relationships within the system expanded and contracted, adding layers of complexity to the whole. The way color occurred in these collages, coming from "off-site" photo documentation and grid state image glitches, resonated with the way color occurred in other elements of the installation, emerging from within the dynamic processes activated therein.



Concurrent with sending snail trail transcriptions through the cellular automaton, transcriptions were also carved into clay slab molds for casting calcium sulfate, transmuting the interspecies trace into sculptural forms. The completed casts were placed upright and attached to grid state tiles. Aeroponic irrigation tubes for dripping and misting water were embedded within some of these trail casts, facilitating the humidification of the space around the sculptures. Water flowing through, misting out, raining down, and evaporating from these cast forms pushed and pulled pigments around the porous sculptures' surfaces, shifting their coloration over time. Two of the misting casts became temporary snail habitats, looping the permuted trace back under the movement of its initial maker. The snails slowly rasped calcium from these forms, integrating the material surface of the sculpture into the production of their shells and secretory slime, articulating one of the feedback loops within the collaborative system. The habitats were elevated within plexiglas water reservoirs like floating islands of snail architectures, simultaneously monumental and diminutive in scale.



Plexiglas reservoirs containing hydroponic lettuce were interspersed amongst the cast tiles and trail habitats, arranged on the automaton-determined floor plan. The lettuce was grown from seed in these tanks to feed the snails for the duration of the project. It reacted to environmental conditions in the studio and gallery space, highlighting the ecological processes at play. The method of hydroponic gardening used is known as “deep water culture,” which involves aerating a nutrient solution around the plant roots. To accomplish this, atmosphere is periodically injected into the nutrient baths, bubbling the water in the plant tanks. Water within the plexiglas image baths was also aerated, activating bubble pattern formations on top of the backlit digital collages, introducing a speculative functionality to the fluid of these containers.

The gallery installation’s components were lit by low hanging full-spectrum grow lights, and the existing ceiling fluorescent tubes were gelled with dark blue film. The grow lights, hydroponics, and aeroponics were installed on timer switches, creating three cyclically dynamic environmental interventions. Each operation had its own interval, so that the overlapping and intersecting of cycles was always changing, creating a moiré field of light, water, and air within the gallery. Four large windows within the gallery were opened as much as possible, highlighting the permeability of the gallery space, and drawing attention to the outside. The grow light timers were programmed to turn off and on periodically starting at dusk and continuing until sunset, calling attention to the changes in outside light, planetary, and solar cycles.





As these cyclic activations of light, water, and air took their course over the duration of the exhibition, the plants grew and moved with the fluctuating environment. Some of the lettuce flowered, inviting pollinators into the space, gesturing to cycles of sexual reproduction. Snails also reacted to fluctuations of humidity and wetness in their sculpture habitats, moving to dryer or wetter areas of the forms as they needed. The snails also explored their sculpture habitats, foraging for food, or to find a good place to estivate. The color of water in the plexiglas reservoirs also changed as it flowed out of the sculptures, carrying mineral pigments with it as runoff into the tanks, and sometimes onto the floor in the instance of an occasional overflow in localized areas. As water flowed into and evaporated from these reservoirs, the concentration of colors shifted respectively, creating gradients of color that changed over time.

The variety of cyclic environmental/material processes activated within the gallery space highlighted the ongoing development of the installation's physical composition. The mineral and animal erosions that caused color and texture differentiation, the root hairs that ingested nutrient baths, and the mist and aeration that humidified a fecund atmosphere drew attention to a multiplicity of microcosmic activity. At the same time, as lettuce was grown and harvested, and placed within snail habitats, slime trails accumulated on the habitat-sculptures, providing new inputs to the circuits of exchange that generated the installation as a whole. As such, *Path* can be seen as an indeterminate and on-going collaborative exploration that gestured toward a continued evolution of its landscape, shaped by the interwoven cyclic processes of snail, human, and cellular automaton.









