## Score \#1 :: :

## Note :: :

I have described each of the projects represented in work sample \#1 below. Following this are images of some of the physical, tactile elements that I think of as part of the "scoring" of the work or as an imprint of the sound ::: a recording / an artifact / a memory (like a vinyl recording or a geology). Also included are images of core ideas or metaphors that shaped my thoughts. Following these are excerpts from the companion generative books.

## swarm

The exhibit "swarm" contained several intersecting components ::: a machine orchestration of drawing and singing machines, a series of algorithmically-generated books (or scores) and quilts made by a coded, robotic stitch machine.

A bank of synchronized computers were displayed in clusters. Each machine created individual drawings and woven sound from a set of choreographic rules. These machines threw skewed projections across the walls / ceiling / floor and across the room / bodies / hanging quilts.

The animation machines enclosed the viewer in a relational web ::: a space between ::: a gap ::: an encircling. The networked sound and animation created a living cloth ::: a continuous weaving. The computers drew / sang non-stop during this exhibit (always changing) :: : they created an infinite flow ::: a networked, living, rhizomatic being ::: the cybernetic ze.

Embedded were fragments of sound gathered from various sources including those recorded during a residency with Zeitgeist New Music Quartet. These samples were filtered / processed live and formed sonic structures ranging from a frayed, stochastic cloud to a more structured harmonic-series / ladder. The sound weavings formed a weather system that was meant to cross the physical threshold of skin into the resonating, skeletal frame ::: the cross-sensory skull.

For the projects "chance," "swarm," and "count map pulse breathe," I created 32, 300-page generative books that mapped out patterns / rhythms / tonalities. I think of these as a series of frames ::: a slowing down of time. Each page is like a vertical, harmonic, chordal slice and the series explores the evolution of pattern. The books helped me hone a linguistics that could be applied to both the visual animations and the woven sound drawings.

The books were part of an ongoing effort to create a library ::: a count / map:: industry ::: production ::: a record, score, artifact, core text, book of calculations, code literature, seed. Several books investigated weaving structures. They used a chance-infused set of loom set-ups and peddle sequences to create each page.

This exhibit was about webs and time. There was a relational tie between elements and there were different manifestations of time. Time flowed almost continuously through the fast frame rate of sound and animation and was captured in the still snapshots of a book sequence and the very slow physical frame rate of each stitched textile body.

I experimented with text and speech synthesis (screen readers). I am interested in the aesthetics of accessible / multi-sensory work. I spent considerable time exploring with the Web Speech Synthesis API. In the end I kept this work pre-verbal / abstract.

I explored sine wave synthesis versus found sound fragments as the basis for the generative sound weaving ::: I can see the value of a complex sine wave surface / texture for a pointillist / cloud-like work. However, for this particular installation series, I used found-sound / recorded raw material for the loom. I explored pitch variance / harmonic series and the spectrum from tonal to non-tonal raw sounds. I was interested in harmonic structure as a cluster / density / gravitational force around tonal objects.

I started mapping this work to a textile series as well to further slow and physically explore the patterns ::: to create a tangible imprint of "sound."

## ingredients :: :

- time ::: intersecting gears / circles in circles ::: repeat / not repeat ::: the infinite writer / the infinite film ::: the always spinner ::: relentless singer ::: industry ::: mechanical looms ::: pouring ::: rivers
- random numbers
- colors ::: red, blue, yellow, black, white, warm grayscale
- color palettes ::: industry! (red white yellow black), photosynthesis palette (blue, yellow, grayscale)
- shapes ::: circles, rectangles, lines
- spatial contexts ::: the geography of the screen, the cloud, the hyper-linked / relational web, the room, the book, the landscape of textile / cloth / warp and weft, printed "maps" / "scores"
- found sound fragments / recordings / oscillator frequencies :::

```
cello harmonic
    "bird" ::: squeaky iron door
    bowed metal
    breath through clarinet tube
    breath through wooden flute
    "bells" ::: glass bowl
    typewriter
    "heartbeats" ::: web audio oscillator
    train
    fan
    weather radio / static
```

- human voice
- screen-reader, digital voice
- old piano keys
- crow
- snow plow scraping asphalt
- hollow wooden knock
- kantele
- tuning fork
- convolution reverb based on the Dan Harpole Cistern in Port Townsend, WA (the historic site of Pauline Oliveros, Stuart Dempster and Panaotis' 1988 recording of the CD Deep Listening (New Albion 1989).
- audio filters ::: sound fragments (or oscillators) + filters = instruments
- rate change (create harmonic multiples or random frequency shift)
- volume envelopes
- sampling (fractionating the sound buffer)
- binary "Euclidean" rhythms
- the book form :.:
- pages / frames
- a series left, series right (flipbook animation possibilities) \& 2-page spreads ::: the index
- paper
- pdfs ::: generative "prints" / sequences
- text ::: participant contributions, poems, scientific articles / excerpts
- data ::: twitter streams, climate data, news, participant coordinates
- prints $1 / 1$ or x/infinite $:::$ frozen time $:::$ artifacts $:::$ the ze as a magical one-off mimeograph machine
- self-reflective data stream ::: maps :.: collected history ::: archeologies ::: layerings ::: slides :.: google path-type collection of the cloud space $:::$ the algorithmic wanderings $:::$ the random number chains
- algorithms ::: the language code ::: the text ::: the score


## ensembles / combinations / permutations/ weavings

- color combinations
- sound weather patterns / particles colliding
- pages in a book ::: books in a library ::: encyclopedic series ::: maps ::: data collection ::: graphs ::: indices ::: card catalogues
- machine orchestra ::: networked ze ::: embodied algorithms ::: the dynamical system
- textile series ::: algorithmic quilts, weavings


## navigation ::: thinking about spaces

- the hypermedia web ::: links ::: traversals ::: trees / graphs
- fixed versus "unreliable" / shifting paths ::: improvisation
- the geography of the room ::: monitors trading algorithms ::: "infecting" each other :.:: passing messages
- relational databases ::: the joy of the join
- the way light \& sound stain a room ::: travel / spread / bounce across surfaces ::: leakages


## chance

This exhibit ran from October 2017 - December 2018. There were 38 networked computers that rendered generative drawings and sound $24 / 7$ while 9 short-throw projectors cast animations onto the walls. In the gallery higher frequencies bounced against surfaces and merged into an overall fabric while a single subwoofer released long-wave low frequencies that spanned the room. Live performance and class / community discussions took place frequently in the space and the code evolved through time. The many skylights meant that ambient light changed dramatically dependent on the season, time of day and weather. Twelve algorithmic books acted as scores / artifacts.

A book of ekphrastic poetry was commissioned by the writing department at the University of Minnesota, Duluth. This resulted in a publication and a reading in the space.

Zeitgeist New Music Quartet performed in the sound enclosure. A few of the embedded sound fragments were recorded during a composer's residency with them in 2013. We have worked together in this fashion again from time to time ::: a geologic accrual of sound from that initial experience woven with other found sound and visually-immersive "scoring" that surrounds their live, improvisational response (a study in memory / layering / histories).

A womens' community chorus also worked with me. I recorded their individual voices to create a minimalist chordal fabric that filled the space (these fragments were woven live by the computers). They then performed in the midst of this enclosure.

Other musicians / dancers rehearsed in the space and visitors used the space creatively for yoga / drawing / writing / resting. The Tweed Museum is located in the heart of a University campus. I particularly valued the interdisciplinary conversations that were sparked by the exhibit.

## count map pulse breathe

This project is currently evolving through multiple physical and online iterations. In early 2019 I learned to weave. The first modern computing machine rose from the mechanized Jacquard loom. As a time-based artist, weaving allows me to examine time physically at a much slower speed. The loom is like an instrument. The cello is like a loom with its 4 -string warp and tonal / harmonic weft.

# score \#1 sketches 

archeology ::: geology sound imprint ::: artifact pattern language

## figure 1 : weaving



## figure 2 : weaving



## figure 3 : textile drawing



## figure 4 : textile drawing


figure 5 : textile drawing

figure 6 : textile drawing


## figure 7 : textile drawing



## figure 8 : textile drawing



## figure 9 : textile drawing



## figure 10 : textile drawing


figure 11 : textile drawing


## figure 12 : generative books ::: series



## figure 13 : computer punchcards



## figure 14 : jacquard loom punchcards



## figure 15 : jacquard loom punchcards



## figure 16 : weaving draft


figure 17 : piano player roll


## figure 18 : quipu



## figure 19: score



## figure 20 : code

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// ***** clock stream
(function() {
    let name = "tick";
    let dt = 1; //in seconds
    let date0 = new Date();
    let t0 = Math.floor(date0.getTime()/1000);
    let tostring = function(e) {return "clock"};
    let clock0 = {
        date: date0,
        t: t0, count: 0,
        changed: false,
        count: 0,
        past: Math.floor(t0 / 1000),
        dt:dt, t0:t0, tostring: tostring, name:name
    };
    z.streams[name] = Kefir.withInterval( 1000, emitter => { emitter.emit( { date: new Date() } ) })
        .scan( (state, e) => {
            state.date = e.date;
            state.past = state.t
            state.t = Math.floor(e.date.getTime()/1000);
            state.changed = state.t !== state.past ? true : false;
            state.count = state. count + 1;
            return state;
        }, clock0 )
    z.streams[name].onValue( e => {
        // z.tools.logmsg(JSON.stringify(e));
    // ***** sound set stream
    (function() {
            let name = "sounds";
            let dt = 38; //in seconds
            let date0 = new Date();
            let t0 = Math.floor(date0.getTime()/1000);
            let tostring = function(e) {return "sounds"};
            let sounds0 = {
                    sounds: z.score.orchestration[ Math.floor(t0/dt)% z.score.orchestration.length ],
                    count: 0,
                    past: ["piano1"],
                    dt:dt, tostring: tostring, name:name
            };
            z.streams[name] = z.streams["tick"].filter( e => e.t%dt===0 )
                    . scan( (state, e) => {
                        state.past = state.sounds;
                        state.sounds = z.score.orchestration[ Math.floor(e.t/dt)% z.score.orchestration.length ],
                        state.count = state.count + 1;
                        return state;
                    }, sounds0 )
            z.streams[name].onValue( e => {
                    // z.tools.logmsg(JSON.stringify(e));
            });
    })();
    // ***** sound stream ---------
    (function() {
            let name = "sound";
            let dt = 1; //in seconds
            let tostring = function(e) {return "sound"};
            let sound0 = {
                    count: 0,
                    dt:dt, tostring: tostring, name:name
            };
            z.streams[name] = Kefir.combine([z.streams["tick"].filter( e => e.t%dt===0 && z.score.soundplaying && z.tools.rè
                    .scan( (state, e) => {
                        state.tick = e.tick;
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