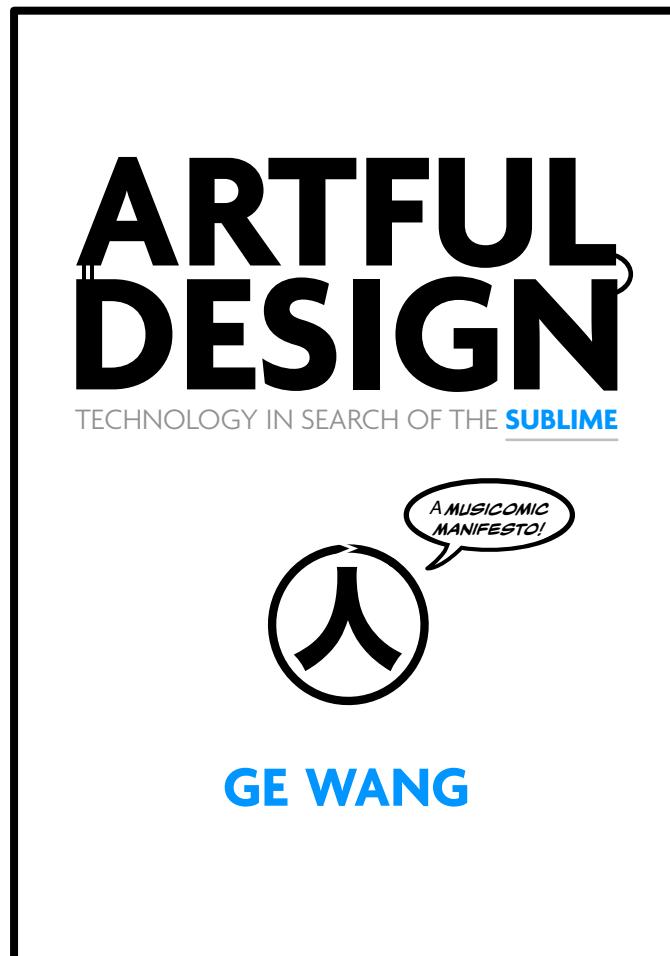


## "The Birth and Rise of the Laptop Orchestra"

excerpt (pp. 248-274) from *Artful Design*,  
Chapter 5 "Interface Design"



<https://artful.design/>



THAT THE NOTION OF A "LAPTOP ORCHESTRA" IS SEEMINGLY PARADOXICAL IS ONE OF MY PRIMARY MOTIVATIONS FOR CREATING ONE; THE PAIRING OF THESE TWO INVENTIONS IS PERHAPS OBVIOUS ONLY BECAUSE OF ITS APPARENT IMPOSSIBILITY. ONE IS AN ALMOST ARCHAIC INSTITUTION WHOSE CONTINUED EXISTENCE IS SOMETHING OF A MIRACLE, THE OTHER IS A TECHNOLOGICAL NEWCOMER THAT HAS BECOME COMMONPLACE AND SEEMS LIKELY TO BE WITH US, AT LEAST IN SOME FORM, FOR QUITE SOME TIME...



ONE SERVES TO PERFORM PRIMARILY EUROPEAN MUSIC FROM CENTURIES AGO, WHILE THE OTHER IS A CONVENIENT TOOL FOR EDITING TEXT, CRUNCHING NUMBERS, BROWSING THE WEB, AND CHECKING E-MAIL. NEVER THE TWAIN SHALL MEET.

## THE ORCHESTRA VS. THE LAPTOP (IN PERFORMANCE)

- IS LARGE
- TYPICALLY LIVES IN A REASONABLY LARGE PERFORMANCE HALL WITH GOOD MUSICAL ACOUSTICS
- SOUND IS NET SUM OF MANY RELATIVELY PROXIMAL INSTRUMENTS IN THIS HALL
- IS DIVIDED INTO **SECTIONS** ACCORDING TO THE NATURE OF THESE INSTRUMENTS
- INSTRUMENTS TYPICALLY TAKE DECADES TO MASTER, AND HAVE BEEN UNDER REFINEMENT FOR EVEN LONGER, SOMETIMES CENTURIES
- IS USUALLY **CONDUCTED**

## THE LAPTOP (IN PERFORMANCE)

- IS TYPICALLY USED **ALONE**
- PLAYS IN ALL SORTS OF SPACES: BARS, CLUBS, SOMETIMES CONCERT HALLS
- SOUND IS TYPICALLY AMPLIFIED THROUGH A **CENTRALIZED** PA SYSTEM
- INSTRUMENT DESIGN IS CONSTANTLY **IN FLUX**, SOMETIMES EVEN GENERATED DURING THE ACTUAL PERFORMANCE (LIVE CODING); OFTEN CREATED BY THE **PLAYER**
- **MASTERY** OF INSTRUMENTS CAN TAKE A FEW MINUTES OR **MUCH LONGER**
- "WHAT? A CONDUCTOR?"



THE LAPTOP ORCHESTRA MEDIUM WAS DESIGNED WITH THE ETHOS...

follow my lead from here

"BORROW WHAT MAKES SENSE. INVENT THE REST."

## THE LAPTOP ORCHESTRA

- TYPICALLY BETWEEN 4 (QUARTET) AND 20 (FULL ENSEMBLE) PERFORMERS IN SIZE
- EACH **HUMAN PERFORMER** IS PAIRED WITH A **META-INSTRUMENT**, SO CALLED BECAUSE IT'S A LAPTOP STATION THAT CAN BE DESIGNED INTO DIFFERENT AND MORE **SPECIFIC** INSTRUMENTS
- A **META-INSTRUMENT** CONSISTING OF A **LAPTOP**, MULTI-CHANNEL AUDIO INTERFACE, AND -- CRUCIALLY -- A MULTI-CHANNEL HEMISPHERICAL **SPEAKER ARRAY**
- SOUND IS **LOCAL** AND **PROXIMAL** TO EACH INSTRUMENT AND PLAYER
- INSTRUMENTS ARE OFTEN DESIGNED ON A CASE-BY-CASE BASIS, TIGHTLY TAILORED TO EACH **WORK** IN QUESTION, AS BESPOKE EXPERIENCES FOR EACH PIECE
- THE NOTION OF **PLAYING** THE INSTRUMENTS ARE AS VARIED AS THE INSTRUMENTS
- **FORMATS** OF PIECES RANGE FROM FREE-FORM OR STRUCTURED IMPROVISATION TO RIGIDLY SCORED PIECES; NO PRESCRIBED LIMITATION ON TYPES OF MUSIC (E.G., GENRE)

TYPICAL SETUP FOR EACH META-INSTRUMENT IN THE STANFORD LAPTOP ORCHESTRA

HEMISPHERICAL SPEAKER ARRAY  
KEEP SOUND LOCAL TO THE INSTRUMENT

MEDITATION PILLOW  
MIGHT AS WELL BE COMFORTABLE

MEDITATION MAT  
WE SIT CLOSE TO THE GROUND

LAPTOP  
FOR INTERACTION,  
PROGRAMMING, AND  
SOUND SYNTHESIS

AUDIO INTERFACE  
MULTI-CHANNEL AUDIO SIGNAL  
TO SPEAKER ARRAY

BREAKFAST TRAY  
FOR HOLDING THE LAPTOP

FOR ME, THE ALLURE OF THE LAPTOP ORCHESTRA IS A DESIGN LAB WHERE THE INSTRUMENTS WE BUILD AND THE WORKS WE COMPOSE ARE "DEPLOYED" IN CONCERT SETTINGS WHERE, AESTHETICALLY, THE RUBBER MEETS THE ROAD.

IT IS IN THIS REAL-WORLD CONTEXT THAT SUCCESS IS MEASURED. IT'S ABOUT FINDING THE RIGHT INTERPLAY BETWEEN WHAT PEOPLE ARE GOOD AT DOING AND WHAT COMPUTERS ARE GOOD AT DOING (WHILE EMBRACING THEIR RESPECTIVE LIMITATIONS) TO ACHIEVE AND EXPLORE AN AESTHETIC GOAL.

THAT WE HAVE TO DESIGN THE INSTRUMENTS FROM THE GROUND UP FOR EACH NEW WORK IS BOTH A BLESSING AND CURSE.

FOR EACH DESIGN, A FIRST-ORDER SANITY CHECK

DOES THE END PRODUCT JUSTIFY THE TECHNOLOGY?

DOES IT DO AT LEAST ONE THING THAT CAN BE ACHIEVED BY NO OTHER MEANS?

DOES THE DESIGN USE THE MEDIUM TO SUPPORT THE RIGHT INTERPLAY BETWEEN TECHNOLOGY AND HUMANS?

IF IT FAILS ANY OF THESE CHECKS, THEN PERHAPS THE DESIGN, AS IT STANDS, ISN'T THAT INTERESTING OR SHOULDN'T USE THE TECHNOLOGY. DESIGN IS COGNIZANT OF SPECIFICITIES OF THE MEDIUM, AND WE TRY TO SEE HUMANS AND COMPUTERS AS TWO FUNDAMENTALLY DIFFERENT TYPES OF ENTITIES, EACH WITH BUILT-IN ADVANTAGES AND LIMITATIONS.

## COMPUTERS VS. HUMANS

- NO INHERENT NOTION OF INTENTION OR AESTHETICS
- FOLLOW CLEARLY DEFINED INSTRUCTIONS AND LOGIC
- CAPABLE OF PRECISELY CARRYING OUT SEQUENCES OF SIMPLE OPERATIONS
- CAN SYNTHESIZE SOUNDS TO SPECIFICATION
- CAN BE NETWORKED

- INHERENT DESIRE TO EXPRESS
- CANNOT HELP BUT INTEND
- NATURALLY SOCIAL
- CAPABLE OF REASON
- CAPABLE OF AESTHETIC JUDGMENT
- REMARKABLY ADAPTABLE (WE ARE JACKS-OF-ALL-TRADES); SPECIALIZATION TAKES TRAINING

GOOD DESIGN EMBRACES EACH SIDE FOR WHAT IT IS. HERE, THE MEDIUM IS THE MIXTURE OF COMPUTERS AND HUMANS.

CENTRAL TO THE LAPTOP ORCHESTRA IS THE IDEA OF DESIGNING DIFFERENT TYPES OF MUSICAL INTERACTIONS THAT BRIDGE THE TRADITIONAL HUMAN-CENTRIC ASPECTS OF MUSIC-MAKING AND THE UNIQUE (AND LESS UNDERSTOOD) POSSIBILITIES OF TECHNOLOGY.



THE SOUND OF A VIOLIN DOES NOT NATURALLY COME OUT OF SPEAKERS AROUND YOU, BUT RATHER FROM THE ARTIFACT ITSELF...

OUR SPEAKER ARRAYS ARE DIRECT DESCENDANTS OF RESEARCH THAT PERRY AND DAN CONDUCTED IN THE 1990S. MUCH LIKE THE BOSSA, HEMISPHERICAL SPEAKER ARRAYS APPROXIMATE OUTWARD-RADIATING SOUND SOURCES, EMULATING THE WAY ACOUSTIC INSTRUMENTS RADIATE SOUND.

THEY PROVIDE A SONIC PRESENCE AND THE IMPRESSION OF A PHYSICAL ARTIFACT MAKING THE SOUND IN PROXIMITY TO YOU, IN STARK CONTRAST TO THE DISEMBODIED SOUND FROM SPEAKERS THAT SURROUND YOU.



INDEPENDENTLY ADDRESSABLE 6 SPEAKERS  
MEANING WE CAN SEND DIFFERENT SOUND TO EACH SPEAKER, MAKING POSSIBLE TECHNIQUES FOR SPATIALIZATION AND EFFECTS

MULTIPLIED OUT TO AN ENSEMBLE OF SUCH SOUND SOURCES, THIS EMBODIED APPROACH CHANGES THE WAY WE DESIGN INTERFACES AND WRITE MUSIC

ENCLOSURE ==  
IKEA SALAD BOWL  
(THAT'S RIGHT, SALAD BOWLS)

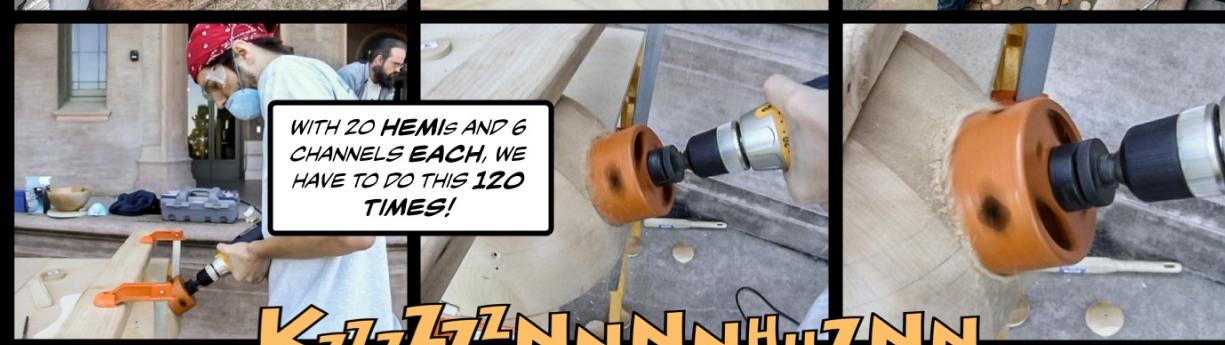


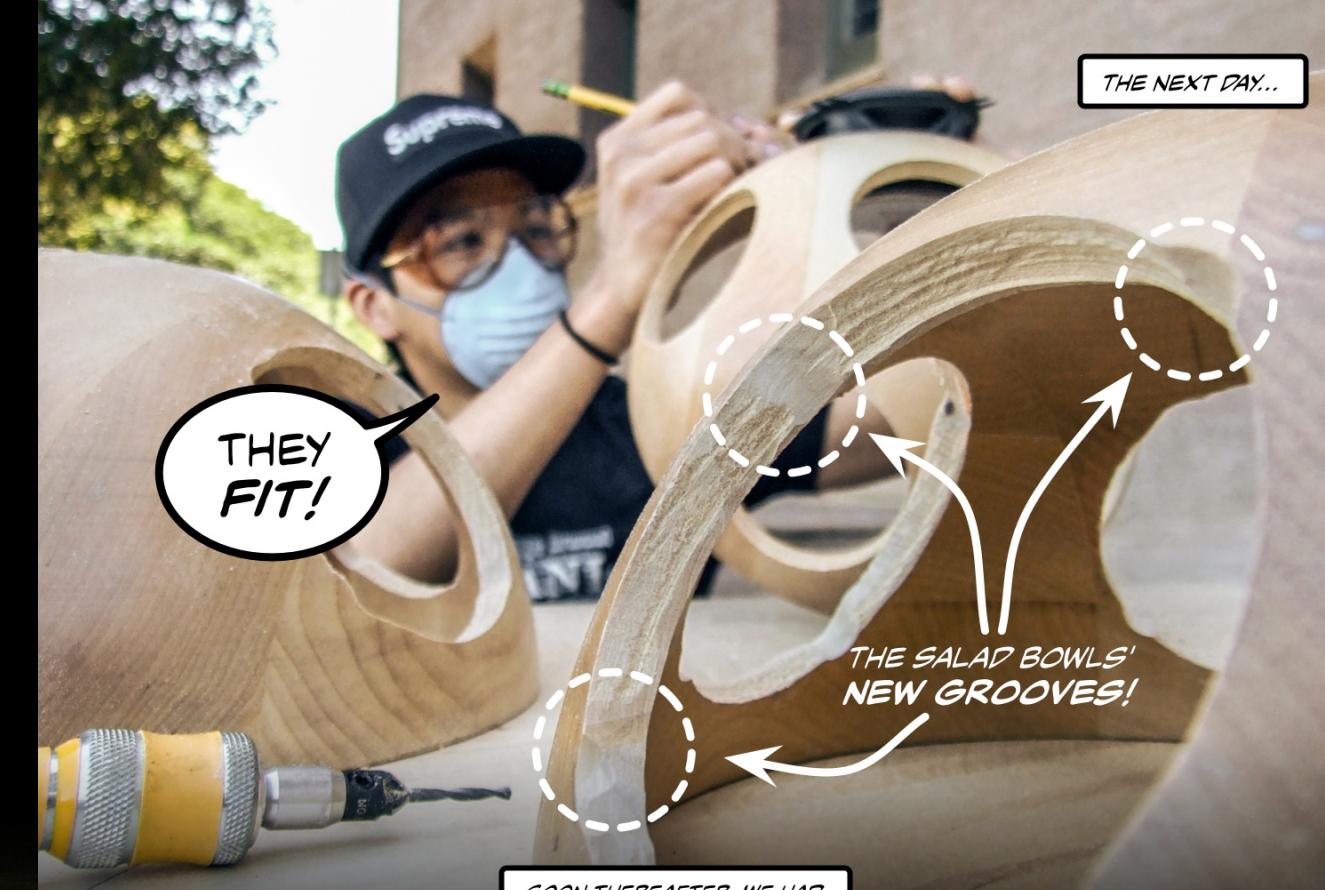
THESE THINGS WEREN'T EXACTLY OFF-THE-SHELF, SO WE HAD TO DESIGN AND BUILD THEM FROM SCRATCH. HERE IS HOW WE BUILT OURS FOR SLORK...

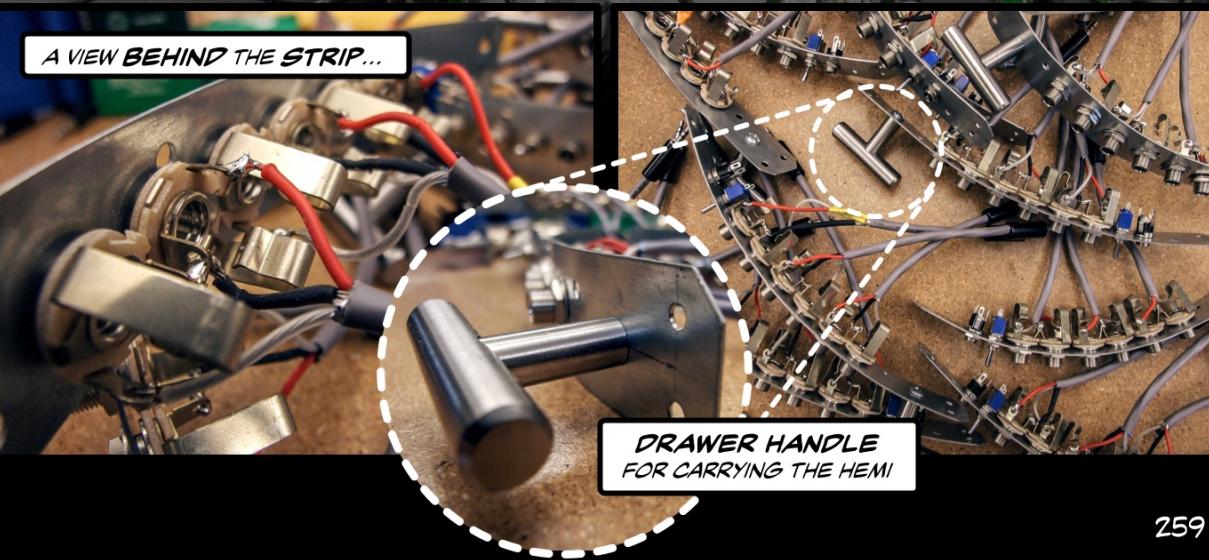
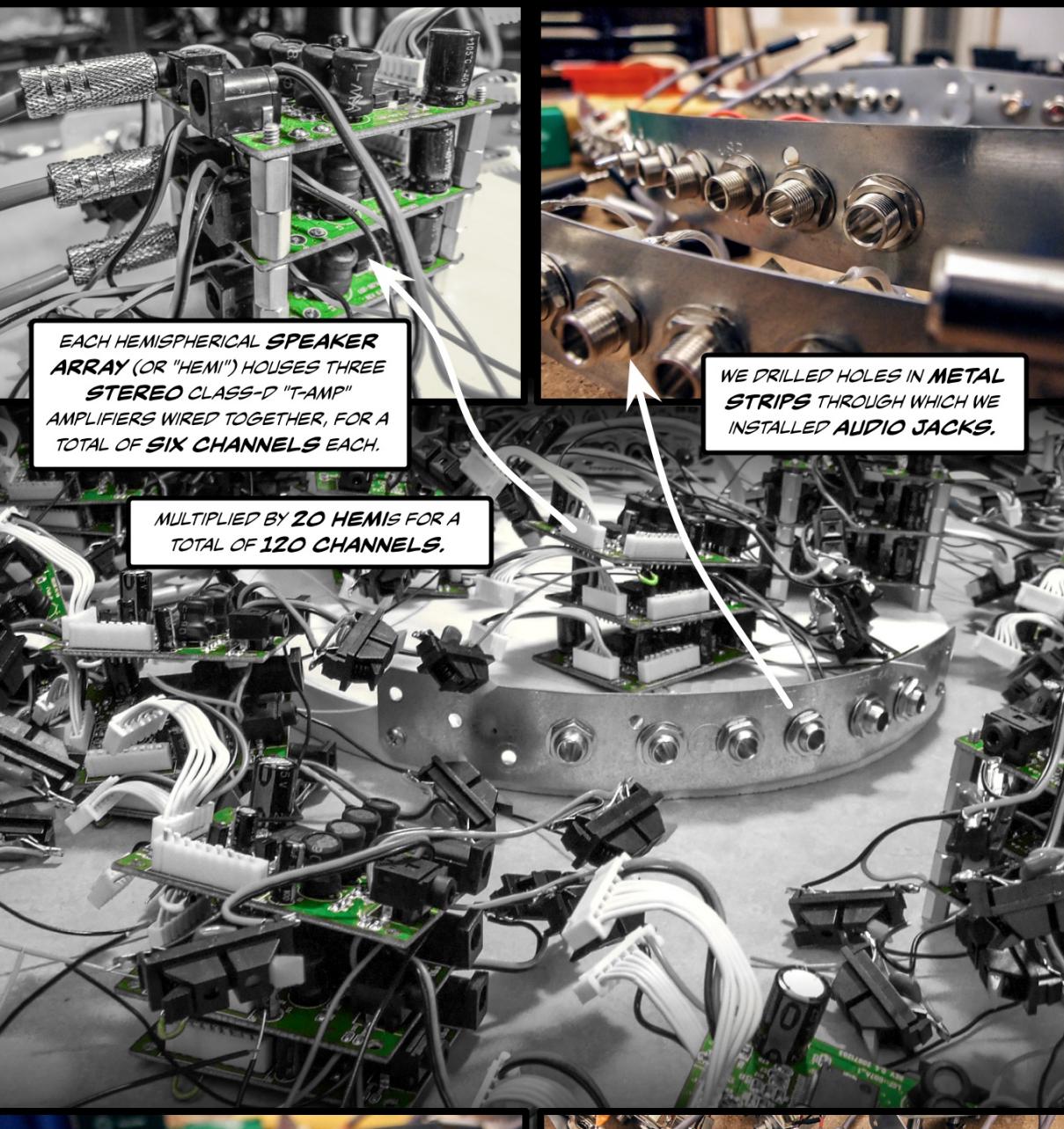
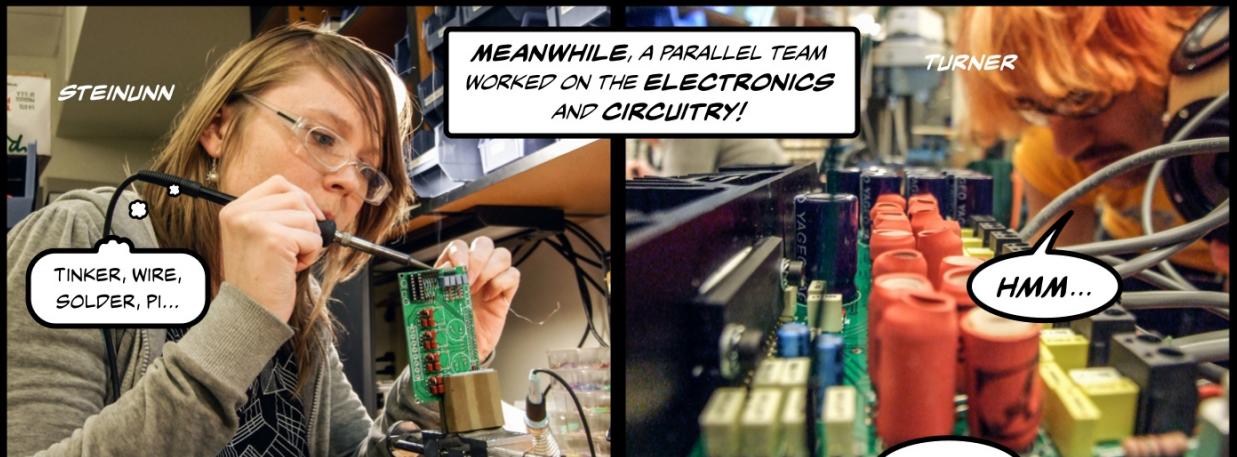




## ADVENTURES IN BUILDING THE STANFORD LAPTOP ORCHESTRA!

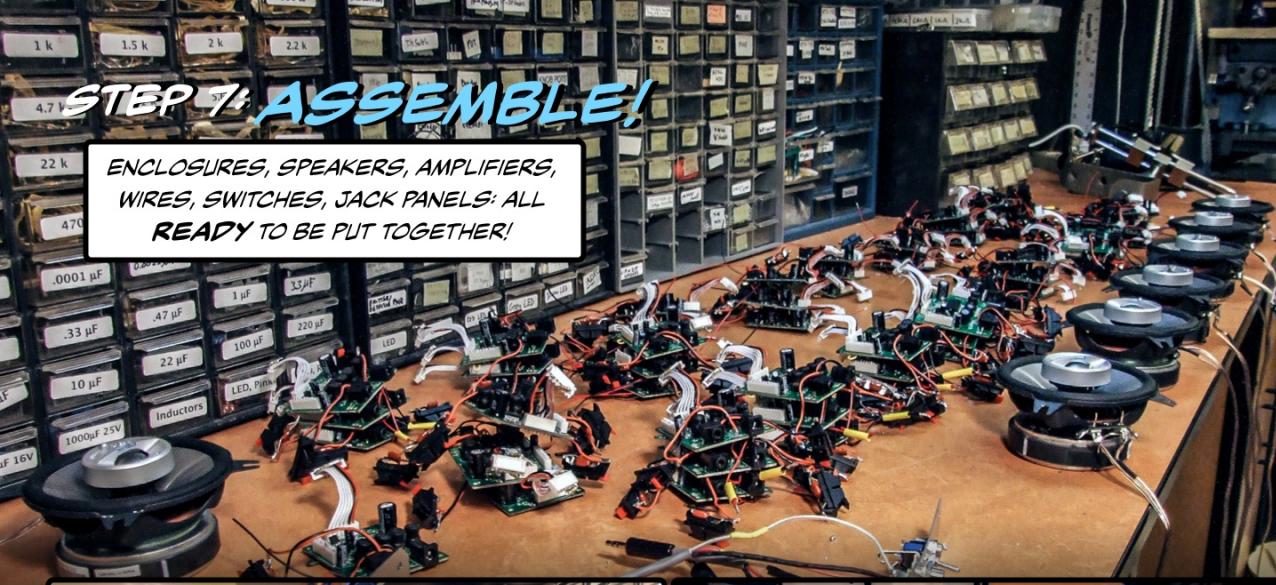






## STEP 7: ASSEMBLE!

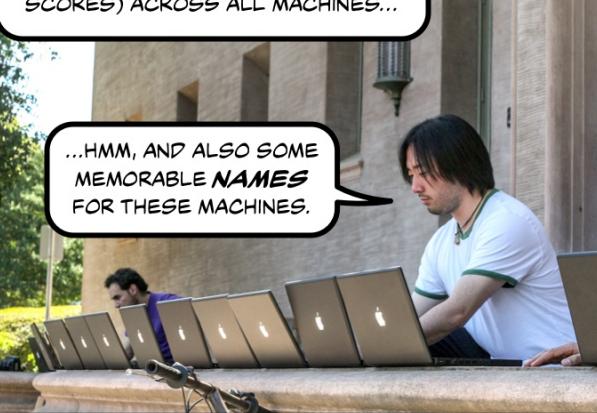
ENCLOSURES, SPEAKERS, AMPLIFIERS, WIRES, SWITCHES, JACK PANELS: ALL READY TO BE PUT TOGETHER!



OKAY, WE GOTTA GET THESE LAPTOPS CONFIGURED WITH SOFTWARE -- PROGRAMMING ENVIRONMENTS CHUCK (FOR AUDIO AND INTERACTION), PROCESSING (FOR GRAPHICS), AND C++ (FOR LOW-LEVEL SYSTEM DEV).

## STEP 8: INSTALL SOFTWARE!

JUAN CRISTOBAL



## STEP 9: TEST-DRIVE

BEST WAY TO TEST A LAPTOP ORCHESTRA: MAKE MUSIC WITH IT!

FROM CONCERT HALLS...



TO AN OUTDOOR SCULPTURE GARDEN...



TO INTIMATE CHAMBER MUSIC SETTINGS...



...WHERE WE DEPLOY  
FEWER STATIONS...



...AND THE AUDIENCE SITS AMONG THE ENSEMBLE.

ZZZ

AND FROM CALIFORNIA TO BEIJING...



SUMMER 2014

...WITH A NEW GENERATION  
OF SLORKERS AT THE  
STANFORD CENTER AT  
PEKING UNIVERSITY!



WE CREATED NEW  
WORKS INSPIRED BY THE  
SOUNDS, CULTURE, AND  
PEOPLE OF BEIJING...



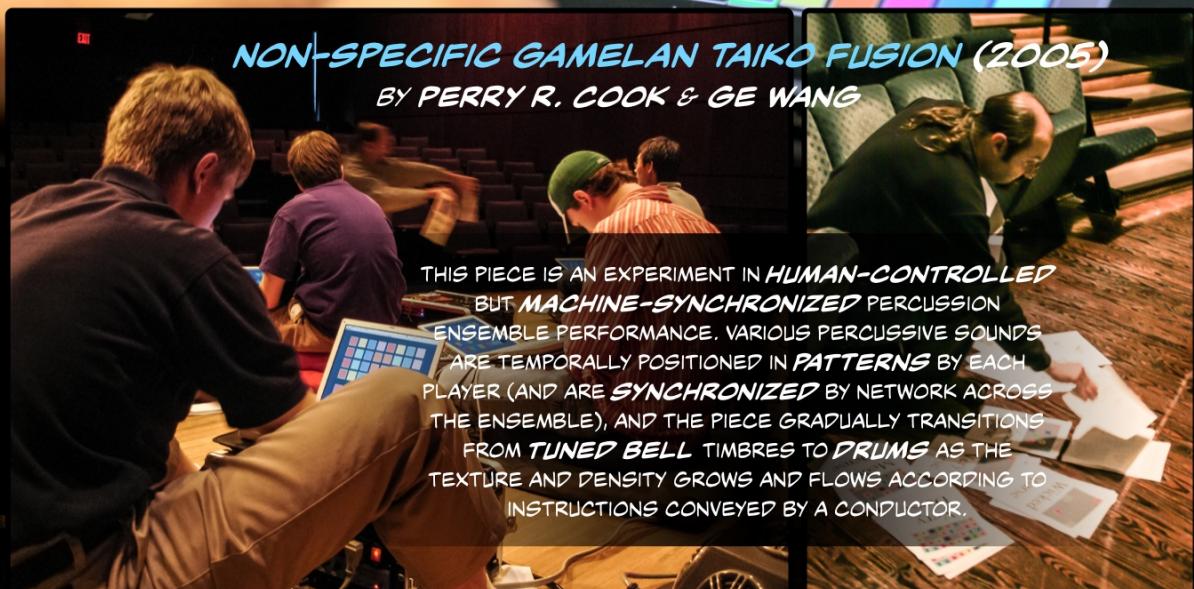
BEIJING CAN BE GORGEOUS, ON DAYS WHEN THE SUPER SMOG LIFTS...



## STEP 10: DESIGN NEW WORKS!

THE INSTRUMENTS IN THE LAPTOP ORCHESTRA ARE AS DIVERSE AS THE WORKS THEMSELVES. THEY ARE TRULY A TESTAMENT TO PERRY'S "MAKE A PIECE, NOT AN INSTRUMENT" PRINCIPLE. COMPUTERS AS A DESIGN MEDIUM SEEM TO UNIQUELY SUPPORT THIS MODEL OF PIECES IN SEARCH OF A CUSTOM INSTRUMENT, WHERE INTERFACES ARE DESIGNED SPECIFICALLY TO SUPPORT EACH PIECE.

INDEED, WE USUALLY DON'T DESIGN GENERAL-PURPOSE INSTRUMENTS AND THEN WRITE MUSIC FOR THEM, BUT RATHER WE START WITH AN IDEA FOR A PIECE, AND WE WORK BACKWARDS TO INVENT THE INSTRUMENT(S) SPECIFICALLY FOR THAT PIECE, OR WE CO-DESIGN THE PIECE WITH THE INSTRUMENT(S). IT'S A GOOD WAY TO DISCOVER WHAT FEATURES THE INTERFACE ACTUALLY NEEDS!



EACH INSTRUMENT IS PART OF A NETWORKED STEP SEQUENCER THAT PRECISELY SYNCHRONIZES ALL THE MACHINES, LEAVING THE PLAYER TO CONSTRUCT AND EVOLVE THE MUSICAL PATTERNS ON A DISCRETE TEMPORAL GRID.



A TOTALLY DIFFERENT PIECE, AND INSTRUMENT

## ON THE FLOOR (2005) BY SCOTT SMALLWOOD

THE INSTRUMENT INTERFACE IS A MOCK SLOT MACHINE, WHERE THE PLAYERS MAKE WAGERS OF ONE, TWO, OR THREE VIRTUAL COINS (CHOICES REPRESENTED AND VISUALIZED BY COLORED SPHERES). BY PLAYING THIS GAMBLING SIMULATION, THE ENSEMBLE RECREATES THE SOUNDSCAPE OF A CASINO.

A C-MAJOR CHORD DRONE CARPETS THE SOUNDSCAPE AND RAMPS UP INTENSITY OVER THE COURSE OF THE PERFORMANCE

CHOICES OF WAGER: ONE, TWO, OR THREE, RESULTING IN ALGORITHMICALLY GENERATED MELODY FRAGMENTS

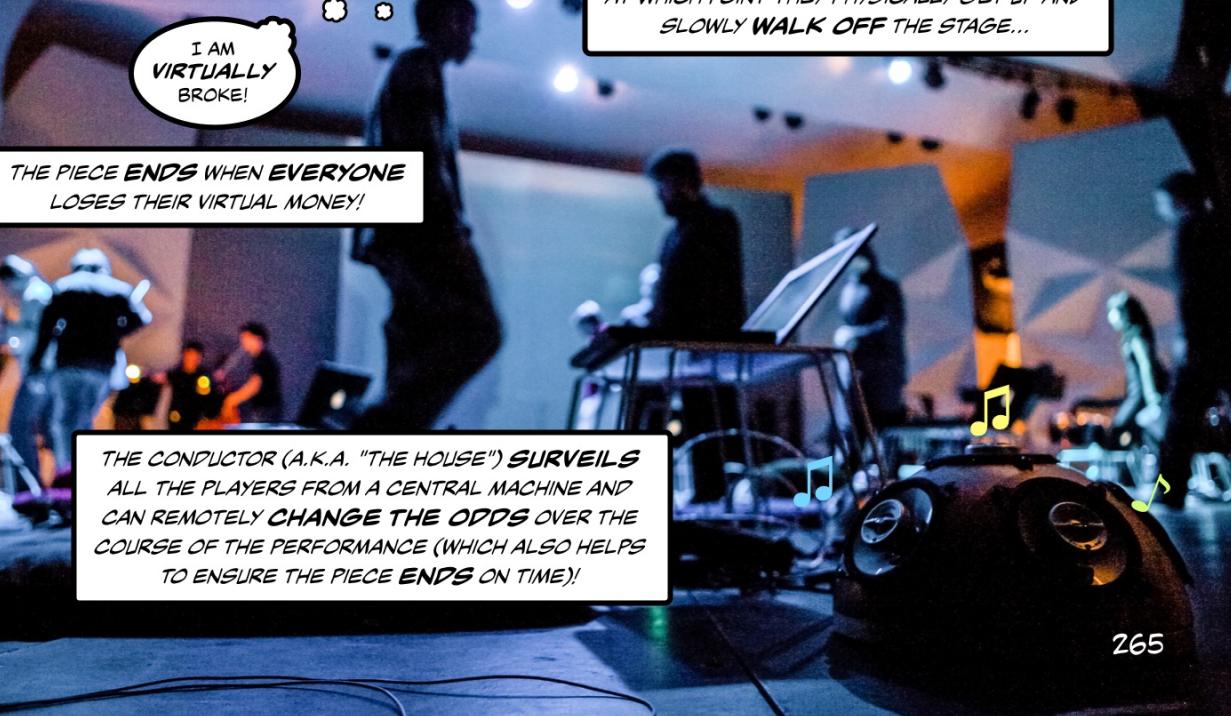
ready...

[ 30 ]

YOU WILL NOTICE WHEN YOU WALK INTO A CASINO THAT THE MACHINES ARE ALL TUNED TO THE SAME KEY: A C-MAJOR CHORD. THIS CHORD FLOATS AROUND THE SPACE, IN AND OUT OF EVERY CREVICE, CONSTANTLY ARPEGGIATING, HUMMING, DRONING, TWITTERING, ECHOING, SOMETIMES INCORPORATING SNIPPETS OF MELODY. THIS HAPPY DRONE SOOTHES THE NERVOUS CUSTOMERS AS THEY SLOWLY DROP THEIR MONEY INTO THE MACHINES. THEY CREATE A SEA OF C-MAJOR, EACH AND EVERY ONE OF THEM, PRESSING BUTTONS ON THE MACHINES, CREDIT AFTER CREDIT, ALL DAY AND ALL NIGHT.



AS PART OF THE THEATRIC GESTURE OF THIS PERFORMANCE, PLAYERS CONTINUE PLAYING UNTIL THEY LOSE ALL THEIR CREDITS, AT WHICH POINT THEY PHYSICALLY GET UP AND SLOWLY WALK OFF THE STAGE...





USING **ACCELEROMETERS** (SUDDEN MOTION SENSORS INTENDED TO PROTECT MECHANICAL HARD DRIVES IN THE EVENT OF, WELL, SUDDEN MOTION) BUILT INTO THE LAPTOPS, THE PLAYERS INTRODUCE SUBTLE ADJUSTMENTS TO RICH (IF SIMPLE) ADDITIVE SYNTHESIS ALGORITHMS IN AN EFFORT TO CREATE RISSET-ARPEGGIO-LIKE PATTERNS. A RICH, PENETRATING DRONE ARISES WITH INTRICATELY SHIFTING **TIMBRES** AND **HARMONICS** CREATED BY THE SLIGHT CONTROLLED **DETUNING** BETWEEN ALL THE MACHINES.



THE CONDUCTOR SHAPES THE TRAJECTORY OF THE PERFORMANCE

#### CONDUCTING SIGNAL

#### RESULTING PLAYER ACTIONS

- |                           |   |
|---------------------------|---|
| SIGNAL NUMBER (1-8)       | → CHOOSE <b>BASE PITCH</b> OF DRONE   |
| POINT DIRECTIONALLY       | → MOVE MOUSE CURSOR TO CHANGE TIMBRE  |
| OPEN ARM FORWARD/BACK     | → TILT LAPTOP FORWARD/BACKWARD TO CONTROL INTENSITY   |
| "CRADLE"; ROCK LEFT/RIGHT | → TILT LAPTOP LEFT/RIGHT; <b>LISTEN</b> ; MAKE INTERESTING BEATING PATTERNS   |
| "SPRINKLE"                | → RANDOMIZE ONE OR MORE PARAMETERS; CONTINUE UNTIL NEXT GESTURE   |
| "MIMIC"                   | → ONCE THIS MODE IS SIGNALED, EACH PLAYER PLAYS WHEN CUED,<br><b>MIMICKING AND EMBELLISHING</b> ON GESTURE OF PREVIOUS PLAYER |



#### SECTION A

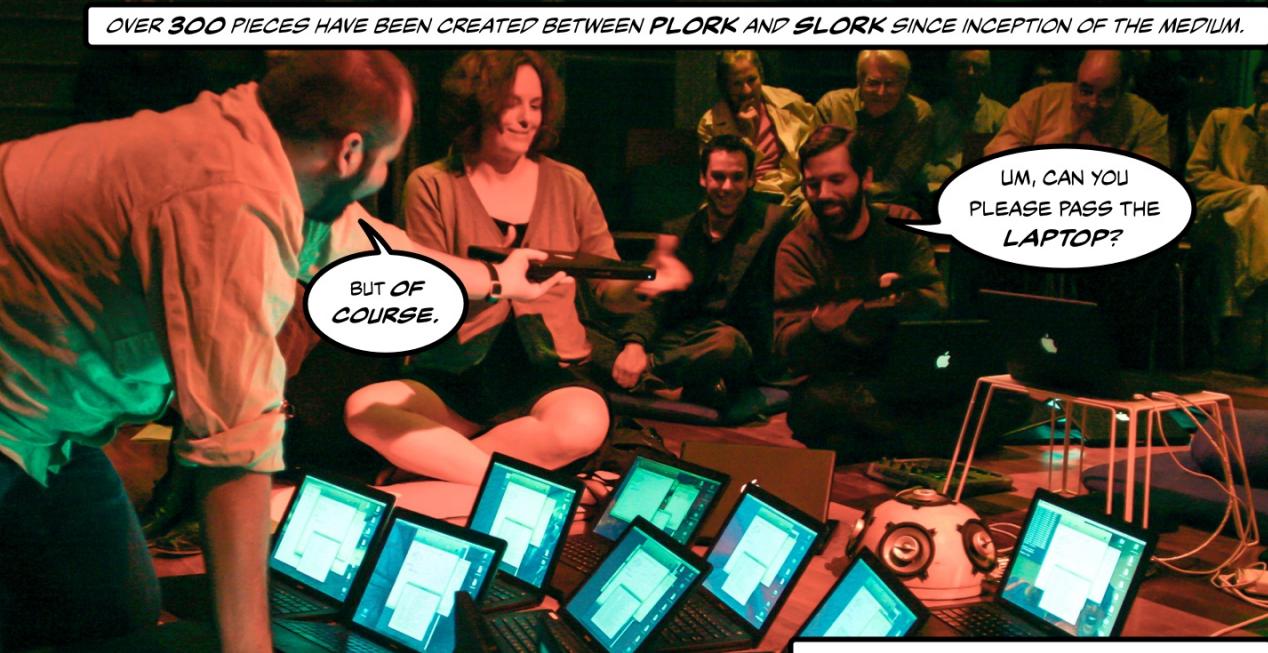
WE CONVEY NUMBERS USING HAND GESTURES!

FULL ENSEMBLE; EXPLORE VARIOUS TIMBRES; SHOULD SOUND **FULL** TO ALMOST (BUT NOT) OVERPOWERING; EVENTUALLY INCLUDE ALL CONDUCTING CUES EXCEPT FOR "MIMIC"; RANDOMIZATION SHOULD HAPPEN AT LEAST ONCE AND AT MOST TWICE; INCLUDE THREE TO SIX TOTAL CHANGES TO FUNDAMENTAL PITCH.

**SECTION B**  
"MIMIC" ONLY; ONE PLAYER AT A TIME, AS CUED BY CONDUCTOR.

#### SECTION C (OR A')

RETURN TO SECTION A, AND (1) RIFF ON A YET-UNEXPLORED FUNDAMENTAL PITCH; (2) THE **LOUDEST** POINT IN THE PIECE OCCURS IN THIS SECTION; (3) COMMIT TO A PARTICULAR TIMBRE AND FUNDAMENTAL AND FADE OUT ON IT.

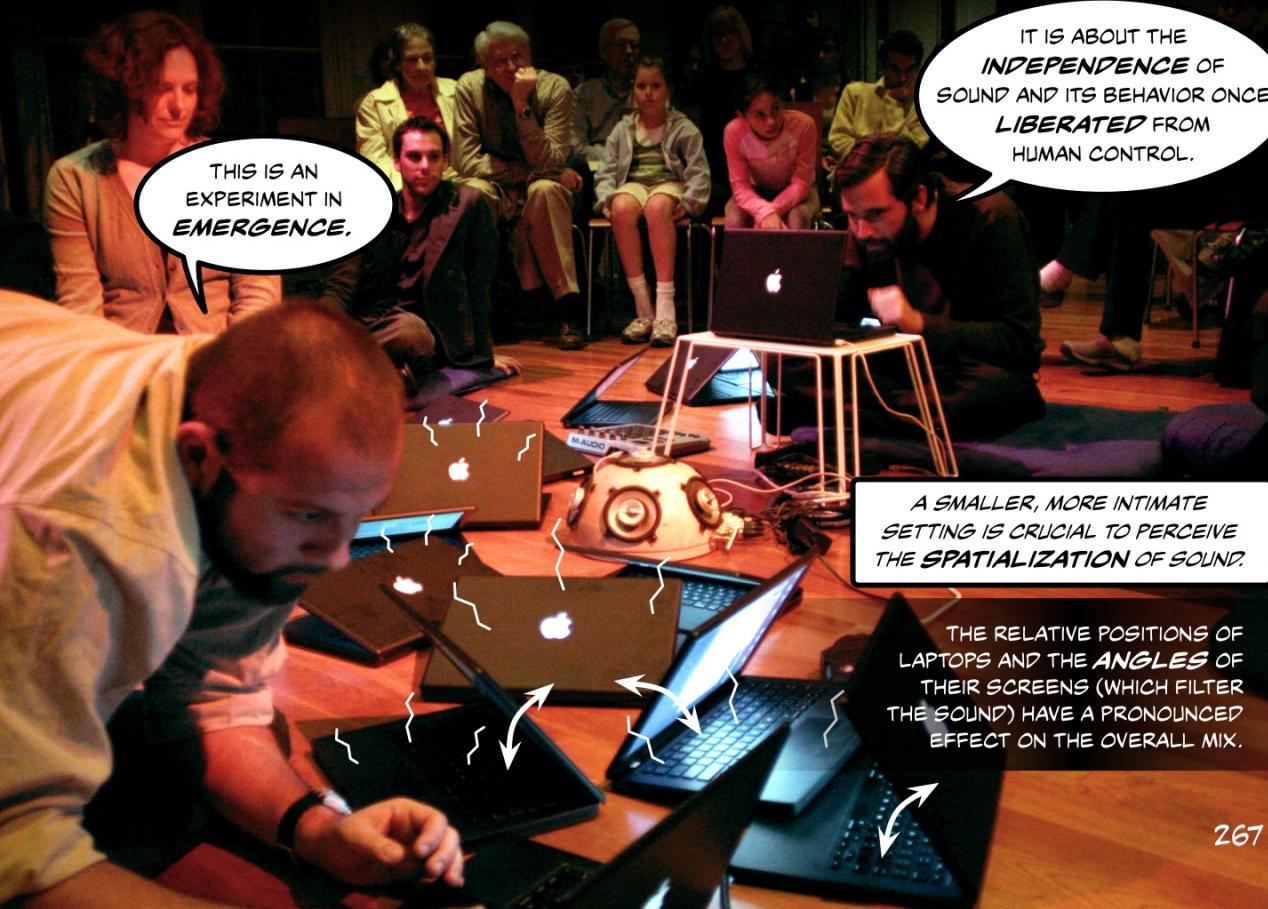


#### Z0 (2008)

BY ADNAN MARQUEZ-BORBON AND KYLE SPRATT

IN THIS WORK FOR Z0 "UNPLUGGED" LAPTOPS (AND ONLY 2 HUMAN PERFORMERS), EACH LAPTOP IS EQUIPPED WITH A PROGRAM THAT CAPTURES THE INCOMING SOUND FROM THE MICROPHONE AND PLAYS IT OUT ON THE ONBOARD LAPTOP SPEAKERS. THE LAPTOPS ARE INTRODUCED, ONE-BY-ONE, INTO A PHYSICAL CONFIGURATION OF CONTINUOUS **MUTUAL AUDIO FEEDBACK**. THE PHYSICAL LAPTOP **SCREENS** ARE USED AS A CRUDE LOW-PASS FILTER FOR THE SOUND, ADDING AN ADDITIONAL FUNCTIONAL AND VISUAL CONTROL ELEMENT.

IT IS ABOUT THE INDEPENDENCE OF SOUND AND ITS BEHAVIOR ONCE LIBERATED FROM HUMAN CONTROL.



THE RELATIVE POSITIONS OF LAPTOPS AND THE **ANGLES** OF THEIR SCREENS (WHICH FILTER THE SOUND) HAVE A PRONOUNCED EFFECT ON THE OVERALL MIX.

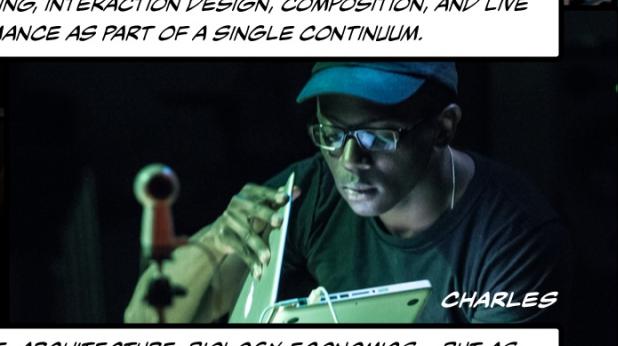
IN ADDITION TO BEING AN ENSEMBLE AND DESIGN LAB FOR NEW INSTRUMENTS...



A LOT OF WORK HAPPENS LEADING UP TO AND ON PERFORMANCE DAY...



...THE LAPTOP ORCHESTRA IS ALSO A CLASSROOM THAT EXPLORES MUSIC, PROGRAMMING, INTERACTION DESIGN, COMPOSITION, AND LIVE PERFORMANCE AS PART OF A SINGLE CONTINUUM.



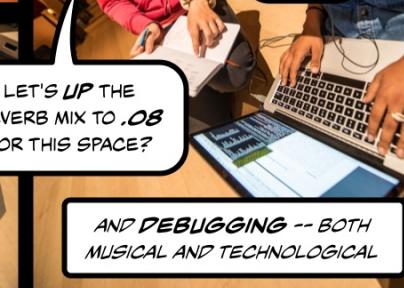
STUDENTS COME FROM MUSIC, COMPUTER SCIENCE, ARCHITECTURE, BIOLOGY, ECONOMICS... BUT AS PART OF OUR TEACHING PHILOSOPHY, WE DO NOT EXPLICITLY DIVIDE UP STUDENTS ACCORDING TO RESPECTIVE BACKGROUND (E.G., COMPUTER SCIENCE, MUSIC, DESIGN, ETC.); INSTEAD WE EXPECT EVERYONE TO NEGOTIATE THE FULL CREATIVE PIPELINE, EMPHASIZING THE CO-DESIGN OF ELEMENTS.



MAYBE THIS COWBELL?

SETTING UP THE ENSEMBLE TAKES A FEW HOURS.

ANYONE SEEN THE ROUTER?



SOFTWARE CONFIGURATIONS

SOUNDCHECK...

SOME "JUST-IN-TIME" CODING...

REHEARSAL..

HMM...

LET'S UP THE REVERB MIX TO .08 FOR THIS SPACE?



AND DEBUGGING -- BOTH MUSICAL AND TECHNOLOGICAL

SHOWTIME!

LIVE PERFORMANCE SERVES AS AN END GOAL, A FORCING FUNCTION TO BUILD SOMETHING THAT WORKS AND IS AESTHETICALLY COMPLETE.



# TWILIGHT (2013)

BY GE WANG



INSPIRED BY THE CLASSIC SCIENCE FICTION SHORT STORY "TWILIGHT" BY JOHN W. CAMPBELL (PUBLISHED IN 1934, UNDER THE PSEUDONYM "DON A. STUART"), THIS PIECE RUMINATES NOT ON THE DAWN, ASCENSION, NOR TRIUMPH OF THE HUMAN RACE, BUT ON OUR POSSIBLE **DEMISE**, SET **SEVEN MILLION YEARS** IN THE FUTURE. THIS END IS NOT ONE OF ANNIHILATION THROUGH WAR, NOR DECIMATION FROM FAMINE OR DISEASE, BUT A GOLDEN **DECRESCENDO** OF DEFEAT BROUGHT ON BY THE GRADUAL, PEACEFUL, BUT UNSTOPPABLE USURPING OF TECHNOLOGY AND **MACHINES** -- AND THE LOSS OF HUMANKIND'S **CURIOSITY** AND SENSE OF WONDER. FROM THE ORIGINAL TEXT:

"TWILIGHT--THE SUN HAS SET. THE DESERT OUT BEYOND, IN ITS MYSTIC, CHANGING COLORS. THE GREAT, METAL CITY RISING STRAIGHT-WALLED TO THE HUMAN CITY ABOVE, BROKEN BY SPIRES AND TOWERS AND GREAT TREES WITH SCENTED BLOSSOMS. THE SILVERY-ROSE GLOW IN THE PARADISE OF GARDENS ABOVE."

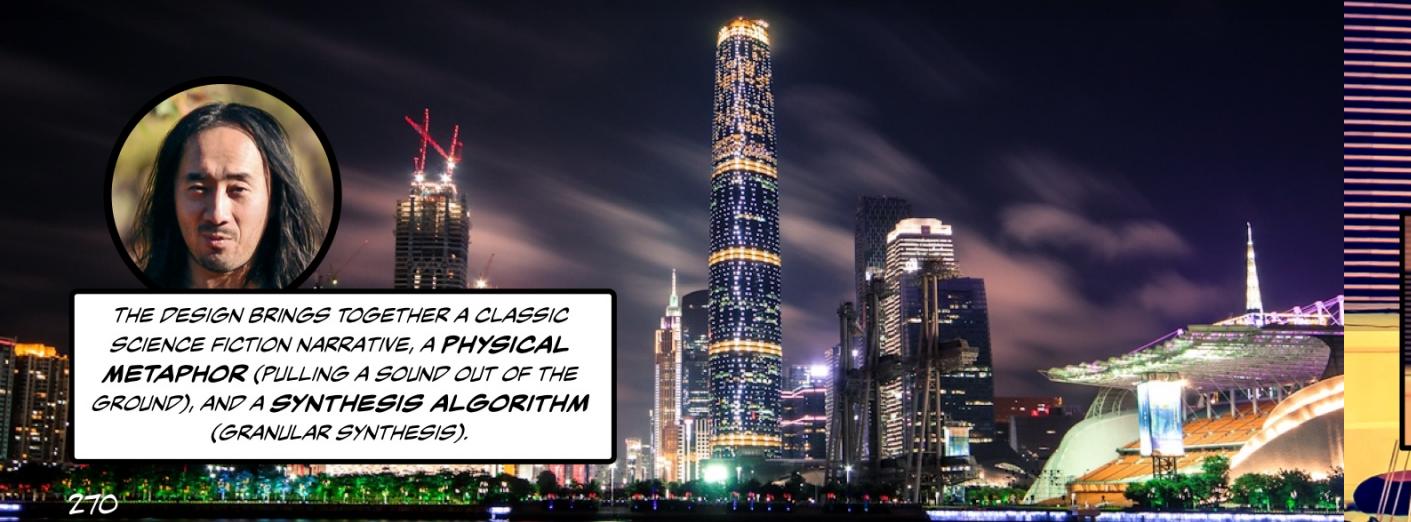
## MOVEMENT ONE

### THE DEAD CITY

"AND ALL THE GREAT CITY-STRUCTURE THROBBING AND HUMMING TO THE STEADY GENTLE BEAT OF PERFECT, DEATHLESS MACHINES BUILT MORE THAN THREE MILLION YEARS BEFORE -- AND NEVER TOUCHED SINCE THAT TIME BY HUMAN HANDS. AND THEY GO ON. THE DEAD CITY. THE MEN THAT HAVE LIVED, AND HOPED, AND BUILT -- AND DIED TO LEAVE BEHIND THEM THOSE LITTLE MEN WHO CAN ONLY WONDER AND LOOK AND LONG FOR A FORGOTTEN KIND OF COMPANIONSHIP. THEY WANDER THROUGH THE VAST CITIES THEIR ANCESTORS BUILT, KNOWING LESS OF THEM THAN THE MACHINES THEMSELVES."



THE DESIGN BRINGS TOGETHER A CLASSIC SCIENCE FICTION NARRATIVE, A PHYSICAL METAPHOR (PULLING A SOUND OUT OF THE GROUND), AND A SYNTHESIS ALGORITHM (GRANULAR SYNTHESIS).



## "THE METAPHOR"

THE PRIMARY INTERACTION IN MOVEMENT ONE IS BASED ON THE ABSTRACT IDEA OF **PULLING A SOUND OUT OF THE GROUND**.



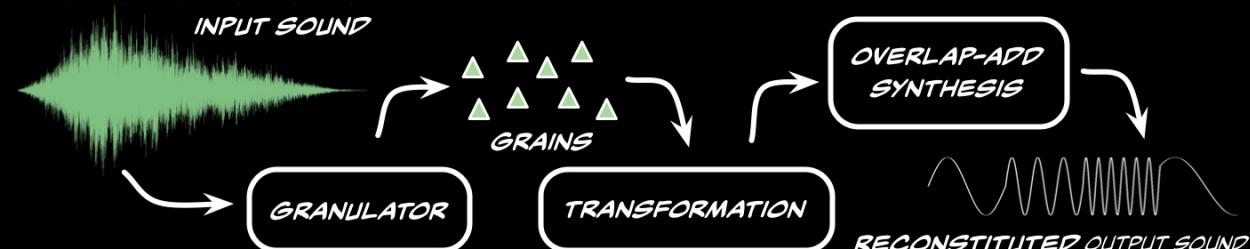
HEIGHT  
CONTROLS PLAYBACK POSITION

LEFT/RIGHT  
CONTROLS PITCH DETUNING

GAMETRACK  
CONTROLLER

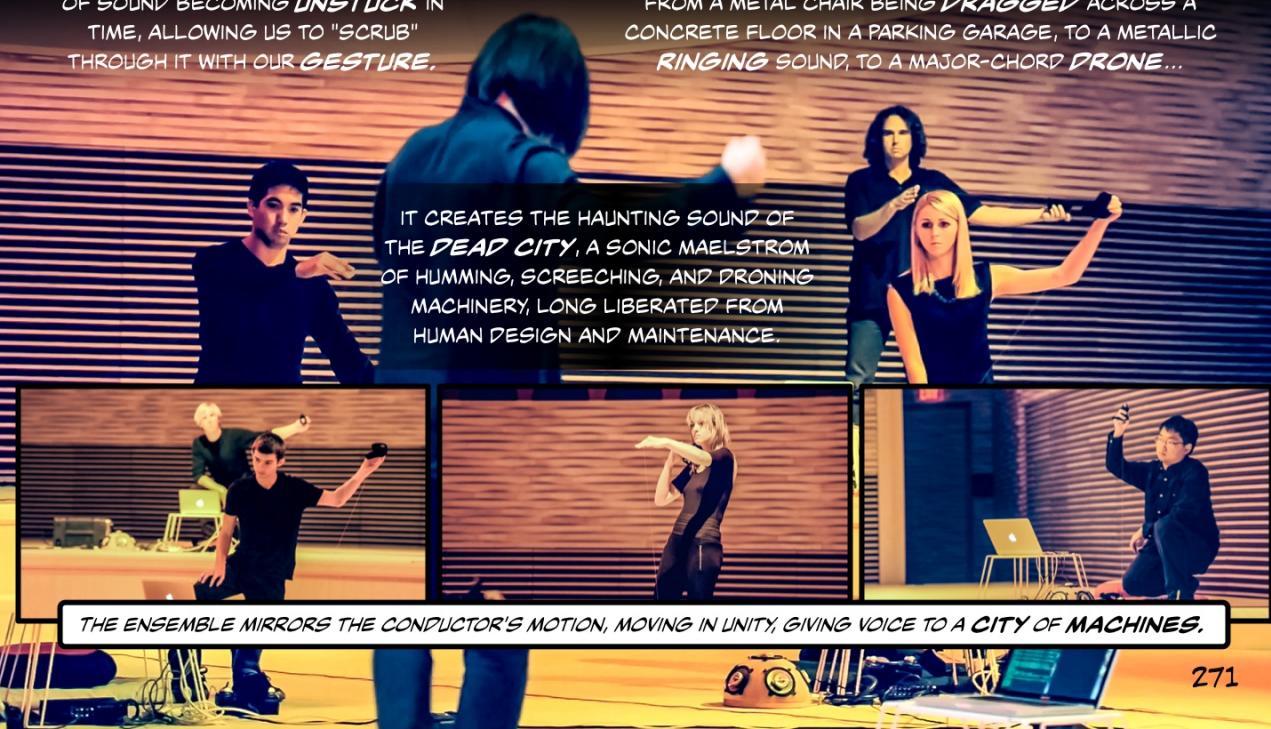
## GRANULAR SYNTHESIS

CHOPS UP AN INPUT SOUND INTO TINY (10-100::MS) WINDOWED PARTICLES (CALLED **GRAINS**), TRANSFORMS THEM (IN PITCH, DENSITY) AND RECONSTITUTES THEM INTO IMPRESSIONISTIC SOUND CLOUDS



THE RESULTING EFFECT IS A SENSE OF SOUND BECOMING **UNSTUCK** IN TIME, ALLOWING US TO "SCRUB" THROUGH IT WITH OUR **GESTURE**.

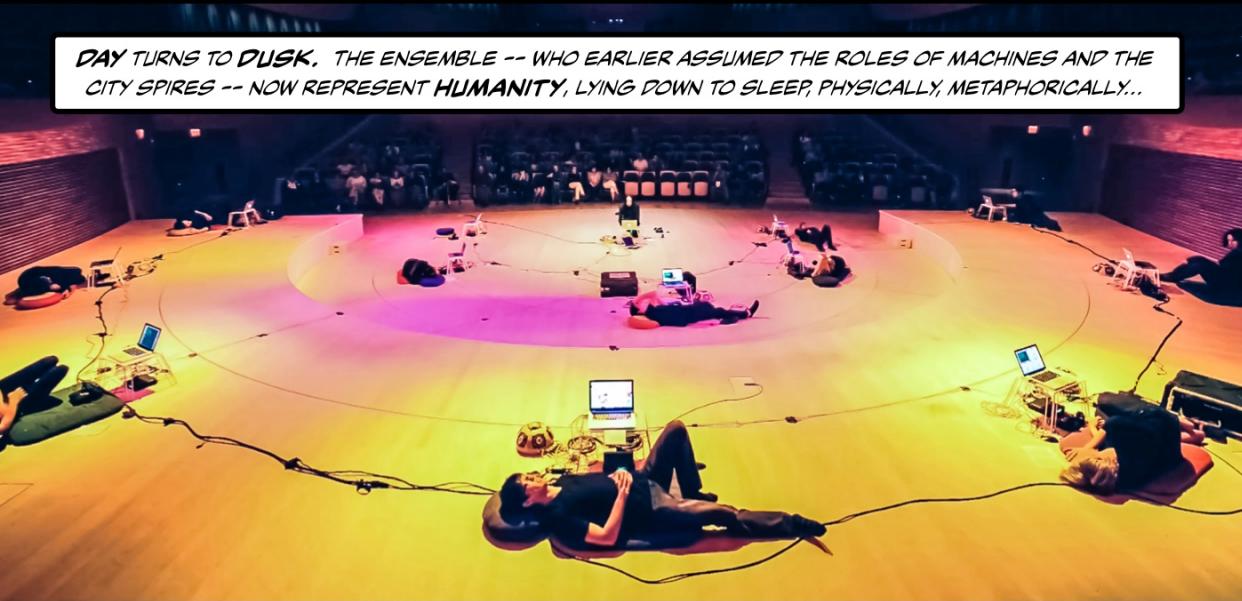
THE **INPUT** SOUNDS FED INTO THE **GRANULATOR** VARY FROM A METAL CHAIR BEING **DRAGGED** ACROSS A CONCRETE FLOOR IN A PARKING GARAGE, TO A METALLIC **RINGING** SOUND, TO A MAJOR-CHORD **DRONE**...



IT CREATES THE HAUNTING SOUND OF THE **DEAD CITY**, A SONIC MAELSTROM OF HUMMING, SCREECHING, AND DRONING MACHINERY, LONG LIBERATED FROM HUMAN DESIGN AND MAINTENANCE.

THE ENSEMBLE MIRRORS THE CONDUCTOR'S MOTION, MOVING IN UNITY, GIVING VOICE TO A CITY OF MACHINES.

DAY TURNS TO DUSK. THE ENSEMBLE -- WHO EARLIER ASSUMED THE ROLES OF MACHINES AND THE CITY SPIRES -- NOW REPRESENT HUMANITY, LYING DOWN TO SLEEP, PHYSICALLY, METAPHORICALLY...



TO DREAM...

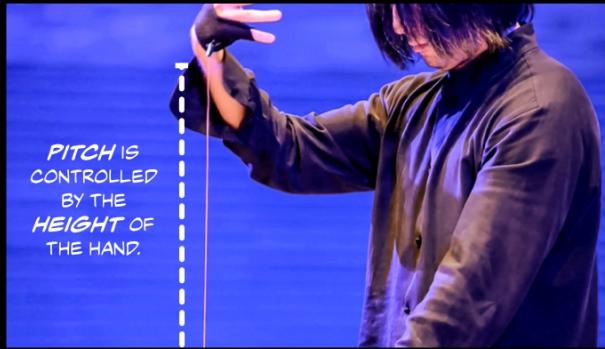
...A SONG OF LONGINGS.



MOVEMENT TWO

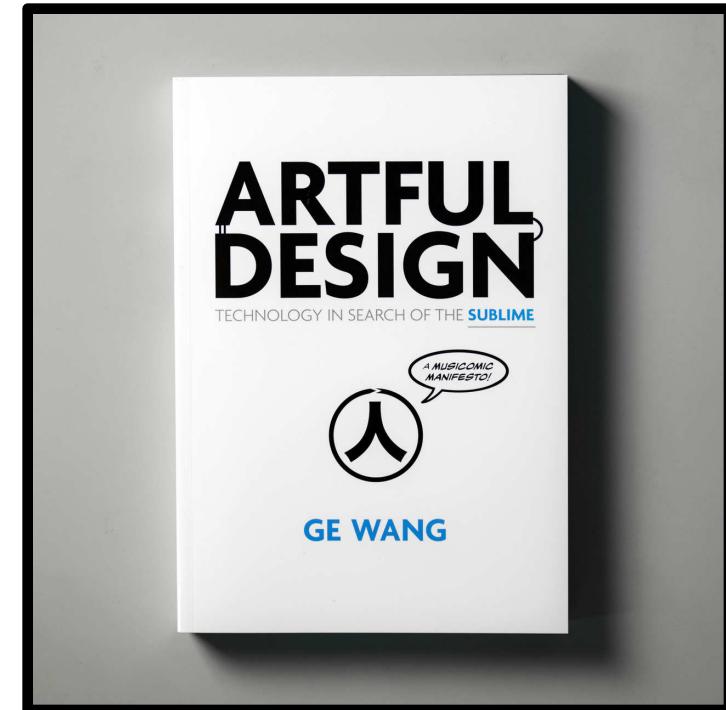
A SONG OF LONGINGS

"AND THE SONGS. THOSE TELL THE STORY BEST, I THINK. LITTLE, HOPELESS, WONDERING MEN AMID VAST UNKNOWNING, BLIND MACHINES THAT STARTED THREE MILLION YEARS BEFORE-- AND JUST NEVER KNEW HOW TO STOP. THEY ARE DEAD-- AND CAN'T DIE AND BE STILL."



WHILE A LOW DRONE THROBS ACROSS ALL THE MACHINES, SOMBERLY ACCOMPANYING THE SONG...





<https://artful.design/>

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