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Touch and Go is published in collaboration with Watermans and Goldsmiths College in occasion of the Watermans' International Festival of Digital Art, 2012, which coincides with the Olympics and Paralympics in London. The issue explores the impact of technology in art as well as the meaning, possibilities and issues around human interaction and engagement. *Touch and Go* investigates interactivity and participation, as well as light art and new media approaches to the public space as tools that foster engagement and shared forms of participation.

TOUCH AND *GO*

Watermans International Festival of Digital Art, 2012

Touch and Go **is a title that I chose together with Irini Papadimitriou for this** LEA **special issue.** On my part with this title I wanted to stress several aspects that characterize that branch of contemporary art in love with interaction, be it delivered by allowing the audience to touch the art object or by becoming part of a complex electronic sensory experience in which the artwork may somehow respond and touch back in return.

With the above statement, I wanted to deliberately avoid the terminology 'interactive art' in order to not fall in the trap of characterizing art that has an element of interaction as principally defined by the word interactive; as if this were the only way to describe contemporary art that elicits interactions and responses between the artist, the audience and the art objects.

I remember when I was at Central Saint Martins writing a paper on the sub-distinctions within contemporary media arts and tracing the debates that distinguished between electronic art, robotic art, new media art, digital art, computer art, computer based art, internet art, web art... At some point of that analysis and argument I realized that the common thread that characterized all of these sub-genres of aesthetic representations was the word art and it did not matter (at least not that much in my opinion) if the manifestation was material or immaterial, conceptual or physical, electronic or painterly, analogue or digital.

I increasingly felt that this rejection of the technical component would be necessary in order for the electronic-robotic-new-media-digital-computer-based-internet art object to re-gain entry within the field of fine art. Mine was a reaction to an hyper-fragmented

and indeed extensive and in-depth taxonomy that seemed to have as its main effect that of pushing these experimental and innovative art forms – through the emphasis of their technological characterization – away from the fine arts and into a ghetto of isolation and self-reference. Steve Dietz's question – *Why Have There Been No Great Net Artists?* [1] – remains unanswered, but I believe that there are changes that are happening – albeit slowly – that will see the sensorial and technical elements become important parts of the aesthetic aspects of the art object as much as the brush technique of Vincent Willem van Gogh or the sculptural fluidity of Henry Moore.

Hence the substitution in the title of this special issue of the word interactivity with the word touch, with the desire of looking at the artwork as something that can be touched in material and immaterial ways, interfered with, interacted with and 'touched and reprocessed' with the help of media tools but that can also 'touch' us back in return, both individually and collectively. I also wanted to stress the fast interrelation between the art object and the consumer in a commodified relationship that is based on immediate engagement and fast disengagement, touch and go. But a fast food approach is perhaps incorrect if we consider as part of the interactivity equation the viewers' mediated processes of consumption and memorization of both the image and the public experience.

Nevertheless, the problems and issues that interactivity and its multiple definitions and interpretations in the 20th and 21st century raise cannot be overlooked, as much as cannot be dismissed the complex set of emotive and digital interactions that can be set in motion by artworks that reach and engage large groups of people within the public space. These interactions

generate public shows in which the space of the city becomes the background to an experiential event that is characterized by impermanence and memorization. It is a process in which thousands of people engage, capture data, memorize and at times memorialize the event and re-process, mash-up, re-disseminate and re-contextualize the images within multiple media contexts.

The possibility of capturing, viewing and understanding the entire mass of data produced by these aesthetic sensory experiences becomes an impossible task due to easy access to an unprecedented amount of media and an unprecedented multiplication of data, as Lev Manovich argues. [2]

In *Digital Baroque: New Media Art and Cinematic Folds* Timothy Murray writes that "the retrospective nature of repetition and digital coding—how initial images, forms, and narratives are refigured through their contemplative re-citation and re-presentation—consistently inscribes the new media in the memory and memorization of its antecedents, cinema and video." [3]

The difference between memorization and memorialization may be one of the further aspects in which the interaction evolves – beyond the artwork but still linked to it. The memory of the event with its happening and performative elements, its traces and records both official and unofficial, the re-processing and mash-ups; all of these elements become part of and contribute to a collective narrative and pattern of engagement and interaction.

These are issues and problems that the artists and writers of this LEA special issue have analyzed from a variety of perspectives and backgrounds, offering to the reader the opportunity of a glimpse into the complexity of today's art interactions within the contemporary social and cultural media landscapes.

Touch and Go is one of those issues that are truly born from a collaborative effort and in which all editors have contributed and worked hard in order to

deliver a documentation of contemporary art research, thought and aesthetic able to stand on the international scene.

For this reason I wish to thank Prof. Janis Jefferies and Irini Papadimitriou together with Jonathan Munro and Özden Şahin for their efforts. The design is by Deniz Cem Önduygu who as LEA's Art Director continues to deliver brilliantly designed issues.

Lanfranco Aceti
*Editor in Chief, Leonardo Electronic Almanac
Director, Kasa Gallery*

1. "Nevertheless, there is this constant apparently inherent need to try and categorize and classify. In Beyond Interface, an exhibition I organized in 1998, I 'datamined' ten categories: net.art, storytelling, socio-cultural, biographical, tools, performance, analog-hybrid, interactive art, interfacers + artificers. David Ross, in his lecture here at the CAD-RE Laboratory for New Media, suggested 21 characteristics of net art. Stephen Wilson, a pioneering practitioner, has a virtual – albeit well-ordered – jungle of categories. Rhizome has developed a list of dozens of keyword categories for its ArtBase. Lev Manovich, in his Computing Culture: Defining New Media Genres symposium focused on the categories of database, interface, spatialization, and navigation. To my mind, there is no question that such categorization is useful, especially in a distributed system like the Internet. But, in truth, to paraphrase Barnett Newman, "ornithology is for the birds what categorization is for the artist." Perhaps especially at a time of rapid change and explosive growth of the underlying infrastructure and toolsets, it is critical that description follow practice and not vice versa." Steve Dietz, *Why Have There Been No Great Net Artists? Web Walker Daily* 28, April 4, 2000, http://bit.ly/QjEWlY (accessed July 1, 2012).

2. This link to a Google+ conversation is an example of this argument on massive data and multiple media engagements across diverse platforms: http://bit.ly/pGgDsS (accessed July 1, 2012).

3. Timothy Murray, *Digital Baroque: New Media Art and Cinematic Folds* (Minneapolis: University of Minnesota Press, 2008), 138.

Touch and Go:
The Magic Touch Of
Contemporary Art

It is with some excitement that I write this preface to Watermans International Festival of Digital Art, 2012. It has been a monumental achievement by the curator Irini Papadimitriou to pull together 6 ground-breaking installations exploring interactivity, viewer participation, collaboration and the use or importance of new and emerging technologies in Media and Digital Art.

From an initial call in December 2010 over 500 submissions arrived in our inboxes in March 2011. It was rather an overwhelming and daunting task to review, look and encounter a diverse range of submissions that were additionally asked to reflect on the London 2012 Olympic and Paralympic Games. Submissions came from all over the world, from Africa and Korea, Austria and Australia, China and the UK, Latvia and Canada and ranged from the spectacularly compli-cated to the imaginatively humorous. Of course each selector, me, onedotzero, London's leading digital media innovation organization, the curatorial team at Athens Video Art Festival and Irini herself, had particu-lar favorites and attachments but the final grouping I believe does reflect a sense of the challenges and opportunities that such an open competition offers. It is though a significant move on behalf of the curator that each work is given the Watermans space for 6 weeks which enables people to take part in the cul-tural activities surrounding each installation, fulfilling, promoting and incorporating the Cultural Olympiad themes and values 'inspiration, participation and cre-ativity.'

Some, like Gail Pearce's *Going with the Flow* was made because rowing at the 2012 Olympics will be held near Egham and it was an opportunity to respond and create an installation offering the public a more interactive way of rowing, while remaining on dry land, not only watching but also participating and having an effect on the images by their actions. On the other hand, Michele Barker and Anna Munster's collabora-tive *Hocus Pocus* will be a 3-screen interactive art-work that uses illusionistic and performative aspects of magical tricks to explore human perception, senses and movement. As they have suggested, "Magic – like interactivity – relies on shifting the perceptual rela-tions between vision and movement, focusing and diverting attention at key moments. Participants will become aware of this relation as their perception catches up with the audiovisual illusion(s)" (artists statement, February 2011). Ugochukwu-Smooth Nzewi and Emeka Ogboh are artists who also work collaboratively and working under name of One-Room Shack. *UNITY* is built like a navigable labyrinth to reflect the idea of unity in diversity that the Games signify. In an increasingly globalized world they are interested in the ways in which the discourse of glo-balization opens up and closes off discursive space whereas Suguru Goto is a musician who creates real spaces that are both metaphysical and spiritual. *Cymatics* is a kinetic sculpture and sound installa-tion. Wave patterns are created on liquid as a result of sound vibrations generated by visitors. Another sound work is Phoebe Hui's *Granular Graph,* **a** sound instrument about musical gesture and its notation.

Audiences are invited to become a living pendulum. The apparatus itself can create geometric images to represent harmonies and intervals in musical scales. Finally, Joseph Farbrook's *Strata-caster* explores the topography of power, prestige, and position through an art installation, which exists in the virtual world of Second Life, a place populated by over 50,000 people at any given moment.

Goldsmiths, as the leading academic partner, has been working closely with Watermans in developing a se-ries of seminars and events to coincide with the 2012 Festival. I am the artistic director of Goldsmiths Digital Studios (GDS), which is dedicated to multi-disciplinary research and practice across arts, technologies and cultural studies. GDS engages in a number of research projects and provides its own postgraduate teaching through the PhD in Arts and Computational Technol-ogy, the MFA in Computational Studio Arts and the MA in Computational Art. Irini is also an alumni of the MFA in *Curating* (Goldsmiths, University of London) and it has been an exceptional pleasure working with her generating ideas and platforms that can form an artistic legacy long after the Games and the Festival have ended. The catalogue and detailed blogging/documentation and social networking will be one of our responsibilities but another of mine is to is to en-sure that the next generation of practitioners test the conventions of the white cube gallery, reconsider and revaluate artistic productions, their information struc-ture and significance; engage in the museum sector whilst at the same time challenging the spaces for the reception of 'public' art. In addition those who wish to increase an audience's interaction and enjoyment of their work have a firm grounding in artistic practice and computing skills.

Consequently, I am particularly excited that the 2012 Festival Watermans will introduce a mentor-ing scheme for students interested in participatory interactive digital / new media work. The mentoring scheme involves video interviews with the 6 selected artists and their work, briefly introduced earlier in this preface, and discussions initiated by the student. As so often debated in our seminars at Goldsmiths and

elsewhere, what are the expectations of the audience, the viewer, the spectator, and the engager? How do exhibitions and festival celebrations revisit the tradi-tional roles of performer/artist and audiences? Can they facilitate collaborative approaches to creativity? How do sound works get curated in exhibitions that include interactive objects, physical performances and screens? What are the issues around technical sup-port? How are the ways of working online and off, in-cluding collaboration and social networking, affecting physical forms of display and publishing?

As I write this in Wollongong during the wettest New South Wales summer for 50 years, I want to end with a quote used by the Australia, Sydney based conjurers Michele Barker and Anna Munster

> *Illusions occur when the physical reality does not match the perception.* [1]

The world is upside down in so many alarming ways but perhaps 2012 at Watermans will offer some mo-mentary ideas of unity in diversity that the Games signify and *UNITY* proposes. Such anticipation and such promise!

Janis Jefferies
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Goldsmiths
University of London, UK

23rd Dec 2011, University of Wollongong, NSW, Australia

1. Stephen L. Malnik and Susana Martinez-Conde, *Sleights of Mind: What the Neuroscience of Magic Reveals about our Everyday Deceptions* (New York: Henry Holt and Company, 2010), 8.

Leonardo Electronic Almanac
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Drop, Phoebe Hui, 2006,
silkscreens and ink and pencil
on plywood drawings

Untitled

by

Phoebe Hui

MFA student, Department of Design | Media Art,
UCLA

"If space is infinite, we are anywhere, at any point in space." [1] (Borges, 1998, 91). If thinking is infinite, we may never stop sprouting thoughts. The main focus of this essay is the study of sonic art and to develop the new relationship between images and sounds. Instead of betraying the nature of thinking as a continuous motion, I decided to write in the same way as the mind thinks rather than disguised in any particular formation. I would consider the following blocks or texts or nodes or branches or sub-maps (whatever you like to call them) as a portrait that captures my ephemeral thoughts in a non-linear manner, in an effort to preserve their singular fluidity. Also, I would like to stress that the viewpoints here should not be perceived as something eternal, it should rather be considered as potential elements that enable further constructive conversation and possible trajectories for us to explore Sonic art.

This paper yet by no means purports to be an expression of Schaeffer, Wishart or other sonic art scholars' or practitioners' views on sonic art. My approach here, is rather, an invitation for readers to understand the principle tactics for my creative intervention in

relation to sonic art, which is very much influenced and galvanized by different sonic art scholars and practitioners such as Trevor Wishart, Murray Schafer, John Cage, Bernhard Leither, Christina Kubisch, Max Mathews, among others.

Building upon the fundamental trajectory of my strategies, not only do I attempt to scrutinize sound from its own material qualities, but I also enable the unusual connotations between aural and visual perception of sound. This leads to the three main experimental directions of my sonic art project. I will illustrate my views and ideas with concrete examples.

One of my more general aims in this paper is to engage with people who are not interested in sound to begin to resituate the discourse of sonic art. On a personal level, the discourse of sonic art has strongly inspired my own works, and there is still a lot of room for further development and discussion.

Although the realm of sonic art I am going to elucidate in this paper has an affinity with western classical music, I assume that no prior knowledge of music theory is needed so as to understand it. In fact, it is a misapprehending to believe that musicians can understand this writing better than those without a musical training background. Classical musicians can understand the existing notation system, but this does not mean that they can have a better understanding of ideas that challenge the fundamental presuppositions of that system. My interest is therefore not to reaffirm the established structures but to open up the medium to new possibilities. Classical musical knowledge may well be a burden, a veil that prevents appreciation of alternative forms, rather than an advantage. I would like to clarify that it is not my intention to despise the profession of classical musicians. It is rather to build the confidence in people who tend to panic over sonic art in virtue of the assumption of the classical music

background as a prerequisite. Also, it is a merit to bring up the issue that the origin of sonic art is in fact so broad that only part of the story has been stirred up as a discourse. [2]

CRITIQUE OF CLASSICAL NOTATION

Pitch is a technical term in music to describe the height or depth of sound. It can also be understood as the particular frequency of a note perceived by human beings, of which first suggested by philosopher Boethius [3]. In Eric Taylor's book *The AB Guide to Music Theory Part I*, he introduces the definition of pitch:

> *Playing any note on piano produces a fixed sound. The sound gradually fades away, but it does not go up or down. Music is made up from fixed sounds such as this.* [4] (Taylor, 1989, 7)

Pitch and duration are considered to be the rudimentary parameters in classical musical organization. Yet, it is only a simulacrum building upon the priorities of music notation. According to sonic art scholar and composer Wishart [5] (2002), the precedence of music notation reinforces the precedence of pitch and duration over other aspects of musical experience. The problem of such approach is that it fails to notate one fundamental feature of our experience: the continuum of sound. There are few discrete, pitched sounds in the world around us. We have the need to search for a new notation system to address such unpitched sounds.

The concept of pitch operates within such strictly discrete tonal system of finite elements. It is rigorously closed system and determines the entire organization of the music system, from the construction of instruments to the relationships between composer and performer. The construction of Western instru-

ments, which are of the attack-resonance [6] type and so designed to reach individual sounds of particular height and depth, further reinforces the system of pitches. In theory, most traditional instruments are capable of generating any numbers of fixed pitches. Yet in practice none if any of traditional instruments are capable to produce a continuous, non-discrete sound. For example, on a piano with 88 notes, each of the notes is stuck to one singular frequency. Each of the pitches is named. [7] The selection of pitch of every single note is based on the musical harmonic ratio, of which is widely believed that the Greek mathematician and philosopher Pythagoras [8] discovered one day when he passed by a blacksmith shop in sixth century B.C. (Ashton, 2001). Though sometimes the frequency of each corresponding notes may be slightly different from one piano to the others, it is intended no divergent difference from the standard. The frequencies between any two notes are then expelled from the system. The system is full of gaps.

Classical music training reinforces the biases of the existing system. Musical training emphasizes musical 'literacy' (being able to read and write signs representing musical pitches, and to play corresponding notes) and so enhances the dominance of music notation. There are standards of musical 'competence,' which reproduce traditional structures. The art of sound thus becomes the activity of selecting sounds from this accepted palette of classical musicianship and combining them into patterns.

The activity of selection and combination is thus limited to the resources of a closed system. Sonic art is restricted to a standard vision of musical 'composition.' It draws a distinction between composer and performer. The act of composing becomes the primary source of creative work. The performer is often situated as a bridge between composer and listener; she is supposed purely to transcribe and reproduce sheet

music without missing a single note. While the performer does have some freedom to interpret the material, she is expected not to deviate from the notes and/or instructions written on the score. Thus the pitched system is used to subordinate the performer to the authority of the composer.

NEW INSTRUMENT BORN WITH THE COMPUTATION TECHNOLOGY

This research aims at opening up a field of sounds that are continuous rather than discrete which are also not restricted to the classical pitched system. How can sonic artists make use of continuous and unpitched sounds? What methods of organization can replace the traditional methods of selecting and combining sounds?

This idea is closely linked to the Dada movement. Dada artists like Kurt Schwitters used the principle of equivalence, where all materials, whether sanctioned by classical rules or not, are equally valid. This topic is also found in the history of visual art. For instance, Schwitters wrote extensively about the question of 'equivalence.' He meant that all material have equal value, and are equally legitimate. Instead of restricting ourselves to the possibilities of oil paint, artists can use everyday objects like newspaper and magazine cutouts, wooden panels, theater or bus tickets, etc. Schwitters often described this new outlook as a Merz approach. Following this attitude, the Dada movement accepted the use of 'noise' in music, the use of nonsense in poetry, and the use of readymade materials in painting (collage).

It is not coincident that, in the development of sonic art, computers have played a crucial role. Computers are capable of processing any sound whatsoever, regardless of whether it is fixed pitched or unpitched.

This idea of 'any sound whatsoever' is extremely important. The computer treats all sounds as equivalent, and is not limited by the biases of the classical music system. The uses of computers are essential to the very definition and realization of my concept. It can only be realized by means of the new control possibilities derived from the development of new technologies. The development of new technologies of electronic and digital synthesis and manipulation have opened up new control possibilities for structuring sound. The power of the computer enhances our ability to construct the internal architecture of pitch-free sounds in a structurally organized way. The possibility of getting inside the physicality of sound and manipulating its characteristics directly provides an entirely new source for composing. It gives the composer freedom to treat all sounds as being materially equal and be themselves, no matter whether they are pitched or unpitched sounds.

THREE PRINCIPLE TACTICS IN MY CREATIVE WORK

The first area has to do with unpitched or pitch-free sounds. I study the pure electronic music and on top of it expanding the perception and conception of tonality/atonality by stretching the concept of pitches in music theory. The expression 'pure electronic music' is to describe the act of generating sound waves by electrical means without the need to use conventional musical instruments. I particularly want to emphasize "music that exists because of electronics rather than music that simply uses electronics." [9] The composers should reach the deepest possible understanding of the technology, in order to explore new possibilities of this technology. Sonic art thus becomes an open system rather than a closed system.

The second area aims at increasing the fluidity of conventional musical notation. In this type of exploration, I will not generate sounds outside the pitched system, but rather engage with conventional notation in order to open it up and make it supple. One way to do it, pioneered by John Cage and others, involves chances and indeterminacy, so that performers can be involved

> *The possibility of getting inside the physicality of sound and manipulating its characteristics directly provides an entirely new source for composing.*
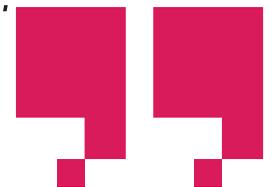
Drop, Phoebe Hui, 2006, silkscreen print on plywood with polythene (1ed.), beech par 50 × 50 cm

in the process of creativity. In John Cage's famous work, *The Music of Changes*, he used the Chinese philosophical methodology of divination known as the Yi Jing (Book of Changes) to compose the music. But his notational system is still derived from classical music. He does not reject classical notation, but he tries to use it in an unusual way by means of random or chance methods. This is an attempt to change the classical system from within. The classical symbols are not rejected, but the method of composition is completely changed.
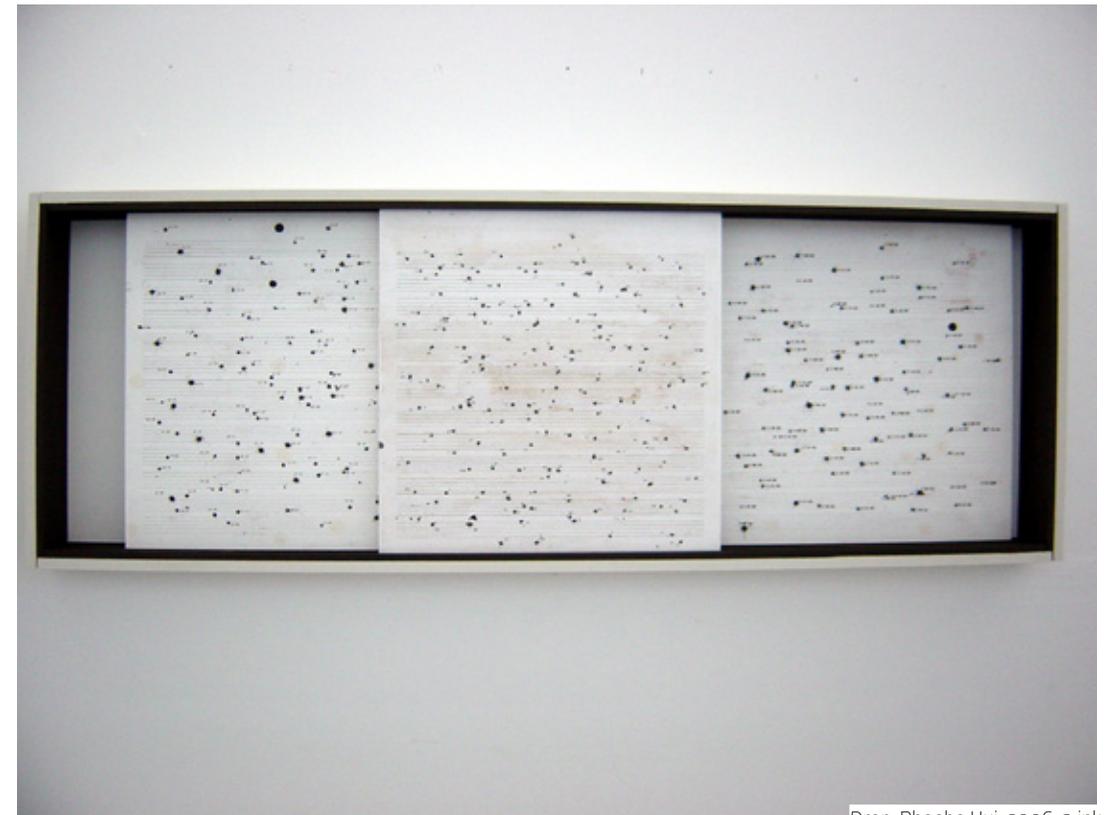
Drop, Phoebe Hui, 2006, 3 ink and pencil drawing on plywood, beech par 156 × 53 cm

Inspired by Duchamp and Cage, my work *Drop* is a 'score' composed by dropping marker on wood canvas. Performers are invited to response such score in their own way, thus enhance their creative participation.

Another method of opening up our ideas of music is the use of non-composed (non-harmonic) means. For instance, words and letters can be used as generative rules to make sounds by defining an arbitrary system of correspondences. A rule can be used to establish a correspondence between letters and sounds, so that a sentence can be translated into a musical line. [10] This correspondence will be based on the fact that music is written in the form of letters. For example:

C   A   G   E
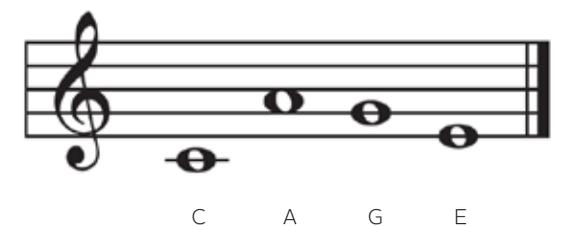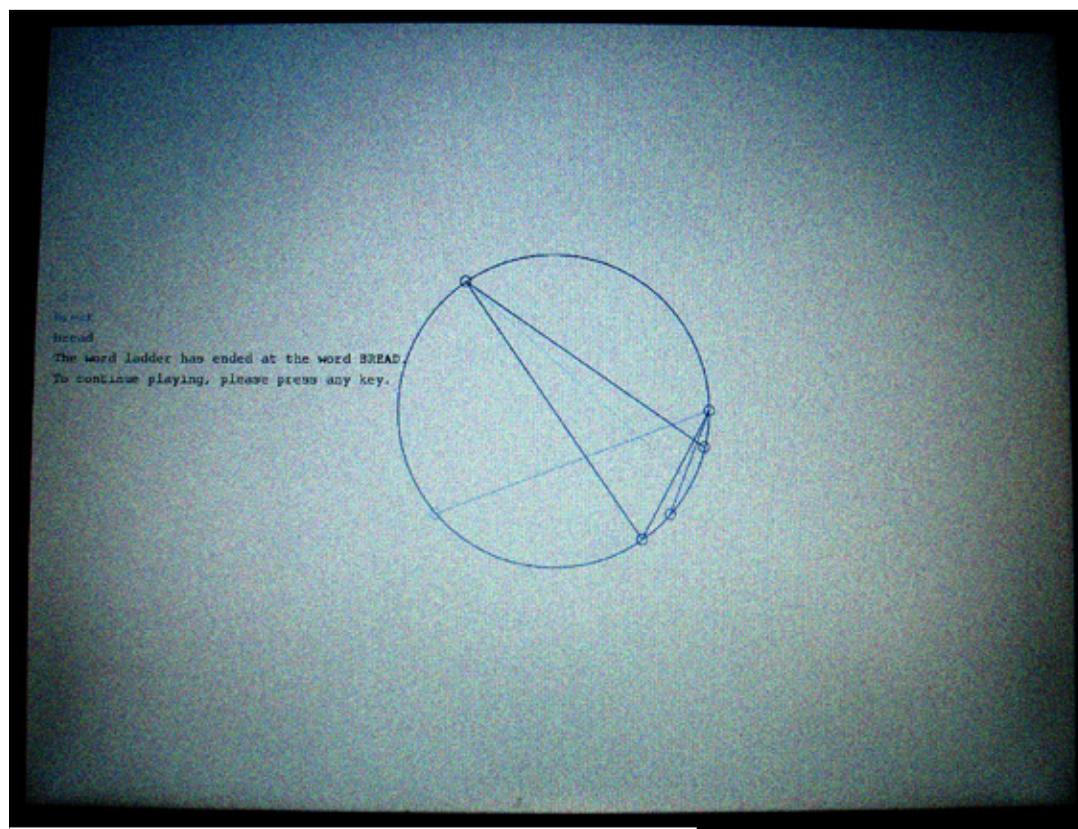
Doublet, doublet, doublet, Phoebe Hui, 2008, processing, video projection on wall.

In my work *Doublet, doublet, doublet,* I attempted to play with the fact that, in the classical music language, the name for each note is a letter, such as A, B, C..., and these letters are also used in the English language. This coincidence of musical language and ordinary language was the basis for my experiments.

Doublet is a wordplay game invented by Mathematician and writer Lewis Carroll. It is also known as the game of word ladders. The rules are simple. Players are given two words of equal length. One word is the beginning word, and the other is the end. By altering one single letter in the beginning word to another position, the beginning word will eventually change to the end word in a certain number of steps. The winner will be the one to use the least number of steps to change form beginning word to end word. Here is an example from Martin Gardner's book *The Universe in a Handkerchief: Lewis Carroll's Mathematical Recreations, Games, Puzzles, and Word Plays*, to change the word from cold to warm.

cold, cord, card, ward, warm [11] (Martin, 1996, 83).

So, if the length of the word is assigned before the game, which length is the best? In the book *The Stanford Graphbase,* Computer scientist Donald Knuth found that five-letter words can create the most interesting word ladders. Words of shorter or longer length are very difficult to develop into word ladders. He then used the programming language CWEB invented by himself to write a program named LADDERS, to further explore the 5-letter word ladders. He compiled his own dictionary with all the 5-letter word he met over a period of ten years. The accomplished list of dictionary is consisted 5757 words. Some of the findings are very interesting, for examples, some five-letter words are aloof, which means they don't have any neighbor, as so could never be use in the word ladders. Music is one of them out of 671 words.

Word ladders break the usual relationship between words. I used the dictionary established by Knuth and use word ladders as a ways of playing pitch and un-pitched by using computation for enhance interactivity of my installation. In the traditional music, each notes named with a letter, repeating with C, D, E, F, G, A,

B. By using the mathematical equation found by Pythagoras, I try to reach the unpitched sound and compiled the full list of alphabet for the music, so that the expelled frequency will be represented by H to Z. I use a portamento approach to achieve a smooth transition from one sound to the next. This method makes the existing music system more fluid, since it combines both pitched and unpitched sounds.

A visitor can input a five-letter word, which will be the end word of the ladder. The beginning word will be the previous visitor's input. The computer will then generate a word ladder and use those words as the basis to generate sounds.

The third area of exploration concerns the design of new instruments. My work was highly influenced by the ideas of modern musicians who designed their own musical instruments. Leon Theremin, for instance, built the machine that bears his name. [12] I am interested in building an instrument to enable free improvization in live performance using such sounds created in the real world. I would also like to strengthen this very idea through building an instrument for ordinary people to play and participate in the act (action/participation) of composition without any musical training.

The exhibited project, *Granular Graph: The Tank and the Pendulum*, is an example to explore sound with the three principle tactics above. I will further elaborate my concept in the next section.

GRAPHICS SYMBOLS AND SOUND RELATIONSHIP

In the existing system, we alter the position of signs on lines [13] in order to communicate information of time and pitch. There is also a list of performance directions vocabularies used as a guide of rhythm and

emotion should be delivered when performing a pieces, for examples, maestoso (Italian) means 'grand' or 'majestic,' fröhlich (German) means 'cheerful' and 'joyful.' However, in the composition of music on the continuum, how can we give directions for performance?

Gesture is one of the aspects suggested by Wishart [14] (2002) to describe and organize the composition of music on the continuum. What is gesture? Wistart (2002, 102) said that gesture is "the articulation of the continuum by the agent which instigates the event," in other word, the agent is the performer of the piece. The agent must make some effort, exert some pressure, execute some motions, breathe into the instruments, hit the drum, etcetera. The singer must use certain physiological organs, for instant, the larynx. The human agent causes something to happen: initiates an event. Thus gesture is related to the cause of a sound. To emphasize gesture is to emphasize the human beings that make the sounds, not just the intellectual system embodied in the notation.

To speak of events is to emphasize the time-based element of music. Gesture is not outside time. Gesture is essentially temporal: it unfolds in time; it is irreversible; it has a direction in time (cannot go backwards). In classical music, there is some room for improvization and 'interpretation,' where gesture does play a part. In other forms of music, there is free improvization; here, the immediate responses and interactions of performers is a temporal event. It can be highly sophisticated and refined, especially if performers have absorbed a strong sense of musical technique, but it may not be capable of being notated in the classical system.

Even classical instruments can transmit gestural information (information about the event of sound production): for instance, wind instruments are closely linked to the physiological act of breathing; we can sense from percussion instruments the amount of energy and effort and tension involved in causing the sounds. Speed variations can also give information about gesture, for instance showing the degree of intensification of the gestures. Gesture often manifests itself in sounds that are continuously changing. Gesture is, to a large extent, is a question of the expenditure of energy. In language, there is loudness, intonation, emphasis,

and other qualities that are not normally written down. These are often described in the theory of language as "paralanguage." [15]

One serious problem for sound art is that gesture is very difficult to notate. In many phonetic poems by Dada artists, for example, Kurt Schwitters, there is no notation about the sort of gesture that is made beyond just writing down phonetic symbols like letters. But other information about the gestural quality of the performance is very difficult to specify. The key problem is how to 'score' the gestural aspect. One early example, involving 'plus' and 'minus' sign, was developed by Stockhausen. [16]

We can also use analogical terms to describe gesture: sounds can be described as 'accelerating,' 'picking up or slackening the pace,' 'cracking,' 'shrieking,' 'groaning,' 'grating,' 'hissing,' 'murmuring.' We speak of a sense of 'sudden attack' or 'accelerated energy,' or 'intensifying,' so forth and so on. We can describe a vibrato as 'unstable' (random fluctuation of frequency widths), 'stable,' 'increasing,' or 'decreasing,' or even as 'stable-becoming-unstable.' Speed may be 'normal,' 'rapid,' or 'slow.' Yet, is it possible for us to use graphic elements for communicating such information? We can turn to the world of art (expressionism and abstract art) and comics for inspiration.

In Edward Munch's famous painting, *The Scream,* we don't hear any sound yet why do some of the people experiences sound through their eyes? Images may possess the power of evoking the interior sensation and commotion of human beings. It can maneuver with the other four senses.

Russian painter Wassily Kandinsky was mesmerized by the power of music through time and sound. It allows emotion and sensual response, and stirs up both imagination and freedom of interpretation. He

believed that it is possible to search the affinities between painting and music, which is known as the total work of art, so that painting also evoke the same tremendous power equivalent to music. The idea of synaesthesia initiated his interest in using line, shapes and color for expressing the inner state of mind. Kandinksy believed that the abstract vocabulary of modern painting (point, line, shape, and color) could be used as musical material to communicate emotional states without any need for realistic representation.

The use of abstract lines for communicating meaning is the vital means in the art of comics. In Scott McCloud's comic book *Understanding Comics,* he discussed how abstract graphic symbols used for express the emotion and atmosphere in comics. [17]

For examples, we learn to understand a group of curve lines is used for representing cloud on the sky. It is something visual in the real world. Then, when these curve lines appear over one character's head, we are able to decode these lines implying the meaning of daydream while it is something invisible and highly symbolic. It becomes a metaphor. Yet, the backward of such approach is that it allows the immediate response while it is not as specifically as word relatively (McCloud, 1994).

The exhibited project, *Granular Graph: The Tank and the Pendulum* is an audio-visual interactive instrument about musical gesture and its notation. The piece's title *Granular Graph: The Tank and the Pendulum* is a daffynition/play on the title of the short story *The Pit and the Pendulum* written by American author Edgar Allan Poe. The idea is inspired by a pendulum-based scientific instrument called Harmonograph. In its simplest version, two pendulums are suspended through holes in a table. The swinging pendulums cause an attached pen to move, thus creating a curvaceous

geometric image paper that represents harmonies and intervals in musical scales.

Granular Graph: The Tank and the Pendulum not only re-appropriates the idea of a mechanism by inviting audiences to form a living pendulum, but uses water to graph the amount of energy, effort and tension involved in causing the sounds.

According to the original design, two pendulums are arranged in a perpendicular relationship. While one pendulum keeps the distance between the pivot and the center of mass (in this case, weight) constant, the other pendulum changes the position of the weight to create different lengths, resulting in different frequencies and curvaceous graphs.

In the current version, any visitor can play the instrument by sitting or standing on one of two swings. The sitting swing functions as the constant length pendulum, while the standing swing changes the length of the pendulum by changing the center of mass, depending on the actions of the visitors, in this case, pumping a swing by standing and squatting.

The resulting pendular movements alter the water-flow, generating not only a vibrating pattern but also sounds. These sounds result from the combination of the two vibrations, just like two notes playing in unison. The image of the water vibrations is shown. The sounds and images can be regarded as forms of dynamic notation that graphically and kinetically represent the audience's gesture and energy expenditure.

Though the meaning can be evoked through graphic symbol is very vague, I believe it is one possible direction for notating the unpitched sounds and there is still a lot of room for meditation. ∎

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1. Jorge Luis Borges, *The Book of Sand and Shakespeare's Memory* (London: Penguin Books Ltd., 1998), 91.

2. For example, sound art like phonography, the origin was found in audio field recordings and the philosophy of corporeality, rather than in western classical music theories.

3. Frances Cheng, "Melody + Mathematics = A Noteworthy Combination" in *Yale Scientific Magazine*, Summer 2004, 12 – 15, http://research.yale.edu/ysm/article.jsp?articleID=76, (accessed November 30, 2011).

4. Eric Taylor, "Chapter 2: Introduction to Pitch," *The AB Guide to Music Theory Part I* (England, The Associated Board of the Royal Schools of Music (Publishing) Ltd., 2004), 7.

5. Trevor Wishart, "Chapter 2: Beyond the pitch / duration paradigm," *On Sonic Art* (London, Routledge, 2002), 11.

6. Attack is some kind of human energy. Resonance is the generalization of the idea of sound envelop, a technical term used to describe the changes of sound over time in amplitude. It can be specified by attack, decay, sustain and release of sound. The idea of attack is not the sound in itself but human energy transferred from the musician when she played some kind of instrument. It is different than other sonic art though, where sound may NOT generated via attack and resonance, like electronic noise, sampling or field recording.

7. Notes are most often designated by letters in English: C D E F G A B, or in Guido system in Italian: do re mi fa sol la si, which still used in some of the countries.

8. Anthony Ashton, *Harmonograph: A visual Guide to the Mathematics of Music* (Great Britain, Wooden Books Ltd., 2001), 4.

9. Thom Holmes, *Electronic and Experimental Music* (New York: Routledge, 2002), 2.

10. The five lines on which music is written are known as the stave. Each line and space represents notes, which are given the letter names from A to G. Music does not create sounds all the times, it includes silences, which is called rests (R). It tells how long each silence lasts.

C D E F G A B C rest (R)

11. Martin Gardner, "Doublets," in *The Universe in a Handkerchief: Lewis Carroll's mathematical recreations, games, puzzles, and word plays* (New York: Copernicus, 1996), 83.

12. The instrument Theremin is credited to be the first electronic instrument, invented by Leon Theremin. It is a very popular instrument used for sound designing in the Hollywood horror and sci-fi movies in the 50s, for instant, in Hitchcock's movie *Spellbound*. Yet, one day he is believed to be kidnapped by Soviet agents in his New York studio till 60 years later, he is bring back to America for union with him friend like Clare Rockmore. In the interview of the documentary *Theremin: An Electronic Odyssey,* Theremin mentioned, sadly that once the Soviet told him that electronic is used for killing but not for art. Information with referred to documentary *Theremin: An Electronic Odyssey* (1995) Directed by Steven M. Martin, Channel Four Films, 84 mins [Video: VHS].

13. Most of us are familiar with the five lines which musical signs are written on. It is known as music stave. The musical signs, named note values or time values, are used for showing the pitch and time elements when playing an instrument.

14. Trevor Wishart, "Chapter 5: Sound structures in the continuum," *On Sonic Art* (London: Routledge, 2002), 102.

15. The stress formulation in specific language.

16. Trevor Wishart, "Chapter 5: Sound Structures in the Continuum," *On Sonic Art* (London: Routledge, 2002), 37, Figure 2.7.

17. Scott McCloud, "Chapter 5: Living in Line," *Understanding Comic* (New York: Kitchen Sink Press, 1993), 120.

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PHOEBE HUI

in conversation with

◇◇

Jonathan Munro

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Jonathan Munro: Your installation for the Watermans Festival of digital art 2012, *Granular Graph*, is a sound instrument about musical gesture and its notation. The idea is inspired by a simple scientific instrument called harmonograph. Could you please elaborate on this?

Phoebe Hui: When I was studying in London, I read Anthony Ashton's *Harmonograph: A Visual Guide to the Mathematics of Music*. This book describes an intriguing scientific instrument called the Harmonograph which was very popular in Victorian times. I started to do more research about this instrument, and came across the text by Joseph Goold *Harmonic Vibration and Vibration Figures*. The Harmonograph is a pendulum-based scientific instrument. In its simplest version, two pendulums are suspended through holes in a table. The swinging pendulums cause an attached pen to move, thus creating a curvaceous geometric image on paper that represents harmonies and intervals in musical scales. I found this instrument fascinating but at the same time I wanted to be able to hear the sound generated though the harmonic relation. This train of thought suggested the idea of re-appropriating the same mechanism to create sound using digital technology.

In an earlier version of *Granular Graph*, the sound was generated though people walking on a wooden platforms, why for your Watermans exhibition have you chosen the swing as the main form of interaction between the user and the sound generated?

I am interested in the idea of pendulum. In the original version, each participant activates the instrument by triggering the pendulum and causing the pen to draw various patterns on a sheet of paper. I want to highlight the transformation of energy from one form to another. Thus, I came up with the idea that every visitor can become part of a mechanism. So I invited the audience of the show to become a living pendulum. I use a swing because it is another pendulum. I like to associate different devices that might serve different purposes but which have the same mechanical structures. In addition, the swing is an intuitive and immediate interface that invites playful participation. I am very interested in the idea of combining something mechanical with something very playful.

What do you hope the person interacting with the work gets from there involvement in the development of the sound?

I don't have any predefine expectations about what users will do and what sounds will be generated. This project is an experiment. I am interested in the concept of playground and the idea of making hybrid where part of the mechanism is replaced by a playground object. I treat this exhibition partly as a lab that will trigger and reveal different forms of behavior.

A screen displays the difference in light conditions on water, thus allowing the exhibition visitors a visual element to the movement, can you explain why you have choosen light and water in your work?

I am interested in the idea of natural magic. I think water is the best medium to notate movement. A significant fraction of the human body consists of water. Our body uses fluids inside our ears in maintaining balance and body position. This installation can thus create an interesting association between body, gesture and sound.

The work has many technical elements, can you please discuss the process you go through to use these tools, and what are the challenges or using such tools and materials?

One of the challenges is that how to recreate the same pendulum relationship using swings. I am not interested in faking the harmonograph so much as in

rebuilding the mechanism with a new twist. I want to build the swing so that the center of mass can adjust into different lengths and as a result create different harmonic relations. However, I cannot change the length of the swing easily in an exhibition setting. I then did a lot of research about pendulum swings, the relationship of mass to the oscillation amplitude, and the shifts in the center of mass when the swing is in motion. I realized that the sitting swing functions as a constant length pendulum, while the standing swing changes the length of the pendulum by changing the center of mass, depending on the actions of the visitors, such as standing and squatting. This led me to choose a standing swing as an interface.

Another challenge was how to transfer the pendulum movement from two swings to the water tank. I found that there is an interesting pendulum pattern called coupled pendula. When two pendula are connected with a spring or a thread, one oscillating movement will pass to the second pendulum. Two pendula will be finally in phase. I use such method to pass the movement of the swings to the water tank. Then, I experimented with many different materials to build the water tank so that the mass from the tank is light enough to facilitate coupled pendula movement.

You have worked in sound previously, what is it that interests you the most about it?

When I was doing my undergraduate work at the School of Creative Media, I took a one-year course focusing on digital editing and sound design. Because visual elements in moving images overshadow other elements, there is often limited attention paid to sound design; sound is thought to complement the image. I am always interested in changing the function of language and the idea of 'sound' is very important in this context. My practice plays with language by incorporating both its visual and sonic properties.

Later, I studied the art of pure sound and the development of new relationships between images and sounds. I use the expression 'pure sound' to describe the act of considering sound for its own material qualities, not as an instrument to communicate meanings or thoughts. I want to find ways of combining sound

and image in which sound does not merely complement the image; sound should be an independent element that enters into productive tension with imagery.

The visual representation of audio is an interesting part in you work, for example in *Drop* you where exploring the relationship between composer and performer, can you talk about what it is about the representation of audio that you find is worth exploring?

I am interested in the physicality of sound and manipulating its characteristics directly. One way to explore sounds directly is by revealing the materials of storing sounds. It is particularly interesting to explore different analog sound storage medium, for example, vinyl record and cassette tape, which usually stores music that operates within the classical music system. Exploring the sound storage materials directly enables me to discover musical resources and techniques beyond the discrete tonal closed system of classical Western music. Another direction involves experimenting with different conductive and sound generating materials. I started to research about different darkness of pencil and have used it to generate sound since 2005. By attaching a simple sound oscillator, different pencil of varying mark darkness can generate sounds of different pitches. An early piece called *Regain Wakes* was using this approach to visualize the data but at the same time generate sound.

Also can you tell us what is it about the relationship between the composer and performer that interests you?

I don't have a predefined answer on this question. One possibility is to let the performer have a higher involvement in the creative process. I was influenced in this respect by John Cage's interest in making works that would be "indeterminate with respect to their performance," by which he meant that the composer would give maximal freedom of interpretation to the performer. ∎