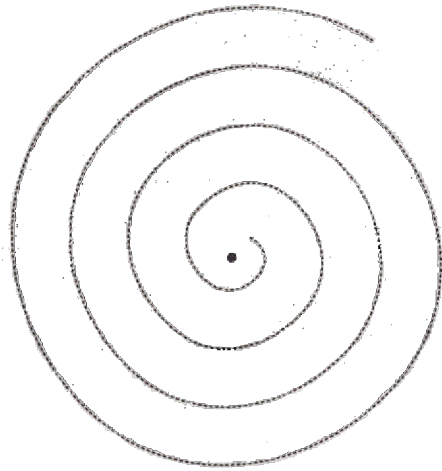# The Curved Line:

Reflections on sound, movement, skateboarding and the linear production of space.

Simon Morris

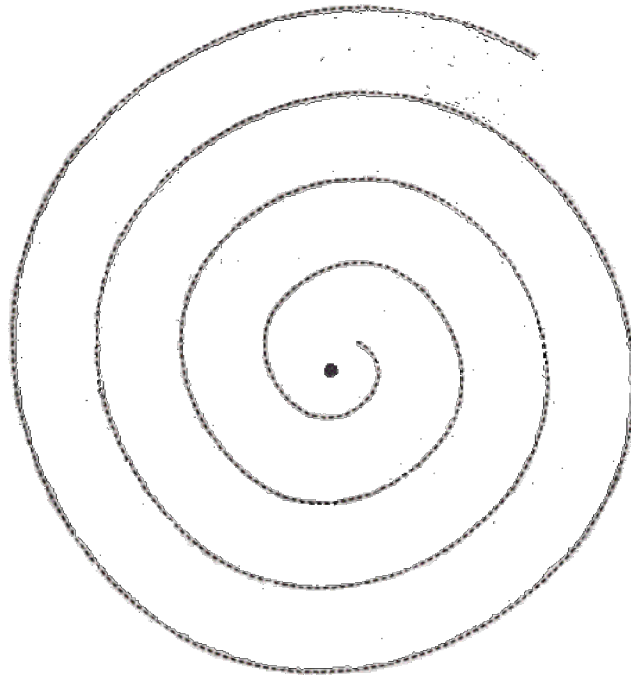**Thesis for the Degree of Master of Fine Arts with specialization in Digital Media**

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THE CURVED LINE:

Reflections on sound, movement, skateboarding and the linear production of space.

Everything you've learned in school as "obvious" becomes less and less obvious as you begin to study the universe. For example, there are no solids in the universe. There's not even a suggestion of a solid. There are no absolute continuums. There are no surfaces. There are no straight lines.
-R. Buckminster Fuller (1895 - 1983)

Introduction:

In Euclidian geometry, a line connects two or more points tracing the path of a series of coordinates. From a line, we can make logical assumptions about a given trajectory. In my artistic practice, lines have provided me with the framework to make certain decision about the intention, direction and motion of a path. I have worked extensively with lines as a way to relate to the physical forces which constitute our world.

In the following paper, I will present three works in which the line has become the "connecting thread." By interlinking my artistic practice with the physical phenomena of velocity, sound, gravity and magnetism, I will explain how these governing forces relate to the content of my work and how they extend to a wider context.

The first piece Song *Lines* is an interactive performance held in November 2009 at Röda Sten. *Song Lines* trace the trajectory of a musical score unfolding by the movements of two skateboards. In *Songlines*, skateboarders are transformed into musical composers. Tricks and movements are translated into sonic expressions. The physical forces of speed, velocity and gravity determine outcome of the composition. The skateboarders leave trails of musical expression behind them as the composition unfolds in both the spatial and temporal planes.

Spring is a video installation based on my research in computer vision, color tracking and data visualization. The video depicts a runner who is followed by a trail of computer-generated graphics. Set behind a bucolic landscape, ribbons of color trace the runner's trajectory as he weaves throughout the frame. As a result, the runner is transformed into a "human paintbrush" displaying patterns, colors, and textures, investigating the notion of the line as an expression of time and the physical forces that lie inherently within.

Invitation au voyage is an installation extending beyond the visual representation of lines. Here we discover a skateboard suspended in midair above a pedestal held up by the invisible "lines" of magnetism, but also by certain ideals: gravity, resistance and equilibrium. These are forces are inherent within the practice of skateboarding but also connect to larger questions, inviting the viewer into world of possibility, imagination and contemplation.

In writing this paper, I've encountered many variations of lines that exist: skylines, horizon lines, product lines, etc. To make a complete analysis of every line would extend beyond my purpose. Through this process, I have discovered that it was not enough to study the lines themselves, but to consider the forces which have driven them. Similar to the expression of a line itself, I wish to convey to the reader the sense of momentum, development and continuity as related to artistic process. Consider the following projects as coordinates: they may be connected together to reveal a larger meaning, pattern or reflection. Although these works vary greatly in form, they share a common conduit. I do not imply that the line I wish present is a straight line or a chronological line. Neither the artistic process, nor history always operates in such terms. Through the following three works presented, we discover lines visible and invisible, freehand and calculated, curved and plotted, solid and dotted, overlapping, expanding, retracting, and retraced. Alternatively, I do not consider this paper "non-linear." We are told that various narrative stories are "non-linear" because they extend beyond a logical sequence of events. This implies that life is lived on points rather than paths. Yet I wonder how can points exist if there was no journey to being with.

Paul Virilio states, "We just have to accept it, as Einstein said, '*there is no fixed point in space*[1]'" and in trying to understand my own path and larger questions of life, I've come to strongly identify with a relational model. The "timeline" below depicts the "connecting threads" that have made up my experience during my Master's studies in Computer Art Media. It is what I describe as the "curved line."

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[1] Paul Virilio, <u>Open Sky</u> (London:Verso, 1997), p. 32.

Songlines: Sound as a journey

Background

Growing up in New York, skateboarding had a great influence on my perception of the city. For years, I've skated city streets, empty swimming pools, urban plazas, and other locations within the urban environment. For me, the city was playground where I could translate my personal ideas into physical expression.

Skateboarders have a special relation to the city. They reveal important aspects of contemporary urban realities. They have the ability to conceptualize a city in specific ways. They inherit the shrewd and scrupulous abilities such examining cracks on the sidewalk, inspecting the smoothness of a particular rolling surface and calculating the

approximate angles and dimensions that would ensure a smooth transition for traffic circulation. In this respect, they share a similar profession to that of a public road inspector, architect or city planner.

As a skateboarder, the possibilities of creative expression within the city environment are endless. Ledges, banks, stairs, handrails and other architectural element are reinterpreted, reshaped and redefined in ways that had never been previously conceived.

When skateboarders ride along a wall, over a fire hydrant or up a building, they are entirely indifferent to its function or ideological content. They are therefore no longer even concerned with its presence as a building, as a composition of spaces and materials logically disposed to create a coherent urban entity. By focusing only on certain elements (ledges, walls, banks, rails) of the building, skateboarders deny architecture's existence as a discrete three-dimensional indivisible thing, knowable only as a totality, and treat it instead as a set of floating, detached, physical elements, isolated from each other; where architects' consideration of building 'users' imply a quantification of the body subordinate to space and design, the skater's performative body has 'the ability to deal with a given set of pre-determined circumstances and to extract what you want and to discard the rest', and so reproduces architecture in its own measure, re-editing it as a series of surfaces, texture and micro-objects.[2]

Although most people associate skateboarding with graphics, videos, computer games, and magazines, we often forget skateboarding's relationship to sound and rhythm. When we walk within the urban environment, the sound of wheels roaring over concrete is perhaps our first perception of skateboarders. These sounds are part of the micro-tonal universe of the skateboarder. They create unique and often unintended rhythms and reveal a lot about the surface conditions of the environment- wood, metal, concrete, asphalt, marble, etc. Rhythmic patterns are triggered by cracks in the sidewalk. Sounds are amplified and resonate through the wood of the deck extending the vibrations to the feet and legs. As a result, the skateboarder internalizes the physical terrain and texture of the city.
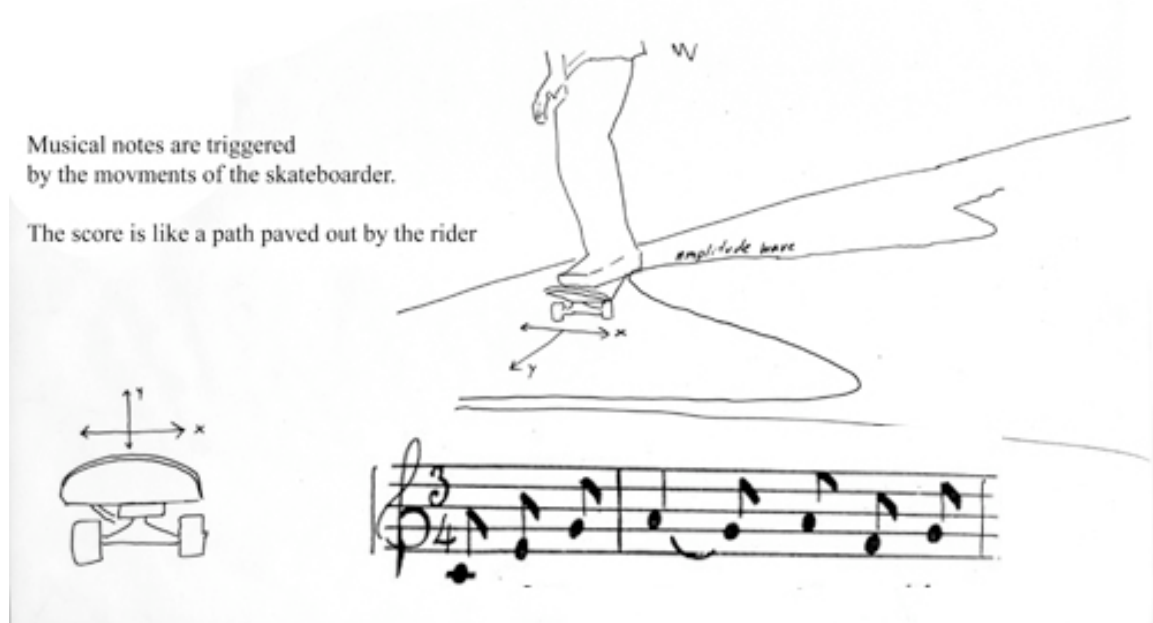
In this way, skateboarders answer to Lefebvre's statement that architecture 'reproduces itself within those who use the space in question with their lived experience.[3]"

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[2] Iain Borden, Skateboarding, Space and the City Architecture and the Body (Oxford:Berg,2001), p.214.
[3] Henri Lefebvre, The Production of space (Oxford:Blackwell, 1991), p.137.

Musique Concrete

In *Musique Concrete*, my goal was to connect the intrinsic qualities of movement and sound to the practice of skateboarding. By working within an artistic perspective, I hoped to challenge my own opinion of skateboarding and whatever thoughts I had associated with it. With fifteen years of skateboarding behind me, I knew that in some way, it could be represented ways I had not yet explored.

The desire to combine new technologies with skateboarding was highly appealing. In my research and experimentation, I had not discovered many musical instruments that could be "driven" in three-dimension space. This led me to the question: why must musical instruments always be stationary objects? I felt the Musique Concrete project addressed this limitation. I was thrilled to open up new perspectives, explore new technologies and challenge one's definition of an instrument.

The *Musique Concrete* project explored similar territories as sound artist and composer Richard Lerman. In his sound performance, *Travelon Gamelon,* Lerman uses customized electronics and Piezo sensors to amplify the sounds of various bicycle parts. As cyclists navigate throughout various cities of the world, trails of sounds are emitted, exploring the idea of the bicycle as instrument or vehicle of sound. *Travelon Gamelon*, like *Musique Concrete*, explores the role of the performer as a navigator, moving through space, unfolding the sequence of musical events in both spatial and temporal dimensions.

Photo from Richard Lerman's *Travelon Gamelon*

Another project which explores the idea of sound and navigation is the *GPS Beatmap*. In this project, the GPS coordinates of a moving automobile are synchronized with a customized "beatmap" software mapping territories to various musical expressions. As the automobile passes through diverse regions, musical phrases are triggered. The car therefore acts like a moving playhead, passing through a databank of collected sounds, resulting in new ways of investigating a city and its relation to sound.

Musique Concrete explored three main concepts.

Skateboarding as a production of space.

The skateboard as a musical instrument.

The skateboarder as a composer.

The title of the piece was meant to honor both the Musique Concrete movement developed in the 1940s by Pierre Schaeffer and the physical concrete on which skateboarders roll. Similarly to Schaeffer, I wanted to explore the idea of sound as the compositional resource of the piece, stress the importance of play, while incorporate technology of the times.

The second version of *Musique Concrete* was called *Songlines*. *Song lines* refer to an ancient aboriginal custom used by indigenous inhabitants of Australia to navigate across vast distances.

Songlines are recited songs, melodies or words associated with certain landmarks and territories. They may reveal information about a certain location, for example, the position of certain rocks, trees and rivers. These elements are reconfigured into musical phrases resulting in a sonic map of the physical environment. Songlines covered vast distances and it is believed that all of Australia can be read like a musical score.

Similar to the songlines of the aborigines, I wanted to focus on the narrative, melodic and geographic qualities of a composition. As the skateboarders navigated through space, the musical composition unfolded. In *Songlines*, two skateboards were equipped with wireless devices. Using the concept of the landscape as a score, two performers triggered various musical patterns depending upon their position in space. Naturally, assigning two musical voices to the skateboarders increased both the complexity and texture of the composition. Drums and bass alternated between each rider resulting in complex polyrythms and musical dialogue. *Songlines* aimed to bridge the intimate connection between social spaces, skateboarding and sound. It was performed at Röda Sten during the fall of 2008 hosted by the Gothenburg based electronic arts collective, Dåonk.

Photo from *Songlines* performance at Röda Sten

Songlines warm-up.

Photo from *Songlines* performance at Röda Sten.

Implementation

The *Songline* performance consisted of two skateboards embedded with sensors responsive to touch, motion, and turning. A wireless interface was mounted underneath each skateboard and transmitted data to a laptop computer. Custom-built sound generating software triggered various tones in relation to the movements of the skateboarders. The sound was amplified through speakers.

Rotation, turns and vibration were monitored by a photoresistor, a flex sensor and Piezo sensor respectively.
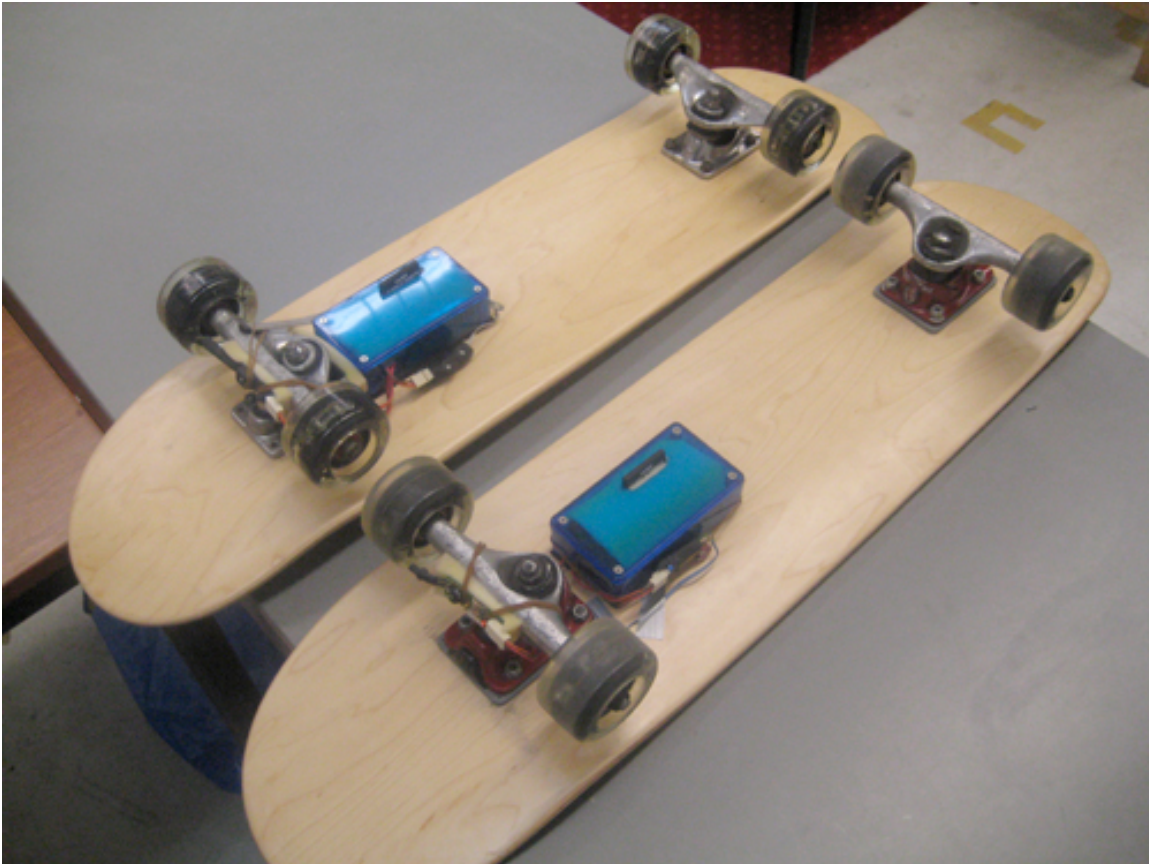
Photo of wireless interfaces.

The first sensor, the photoresistor was attached to the end of the wheel of each skateboard. The wheels were equipped with self-generating led lights, emitting light from the rotational and kinetic energy. As the wheels rotated triggering light, the photoresistor retrieved the data and outputted digital signals. This provided a useful way to know when the skateboarding was rolling or not. Another technique implemented was a self-made rotary encoder. Magnets embedded inside the inner rim of the wheel passed through a Hall sensor, detecting the magnetic field outputting the sensor data. This served as way to detect rotation of the wheel. The faster the wheels rotated, the faster the sounds were generated.

The second sensor consisted of a variable resistor or flex sensor, mounted beneath the truck of each skateboard deck. As the truck pivoted to the left or right, the flex sensor changed in resistance providing digital output to the interface. This provided a simple way to determine the direction of the turn. Left or right turns modified the carrier frequency of an internal oscillator.

The third and final sensor was a Piezo sensor. It was fixed to the bottom end of the skateboard and detected the vibrational force. Taps and "ollies" triggered digital output. As the skateboarder rolled over bumps, selections of pre-recorded sounds were generated.

Using the radio protocol, sensor data was routed wirelessly from the interface to a laptop computer. A MIDI tone generating software program translated the sensor data into musical phrases. The sounds were amplified and diffused through loudspeakers. The completed system enabled the skateboarder to control and modify real-time sounds directly from the skateboard.

Routing data

Calibrating the sensor data was a tricky process. Sensors are fragile instruments. Small changes in movements can have drastic effects on the outcome of the performance. Furthermore, increasing the number of sensors increased the complexity of the data. To balance out the jittery values in the sensor data, I used hysteresis filters which take the medium average of incoming sensor values and output a smoother data flow. The following sensors were mapped to musical voices.

Piezo sensor- pre-recorded samples taken from the urban environment.

Variable resistor (Flex sensor) –modular frequency and carrier frequency of an oscillator.

Light sensor (photoresistor)- drum phrases, midi sequences.

Sound paradigm

In building an interactive sound performance, the choice of sound is crucial to the framework of the piece. These decisions were largely based upon the need to be direct, simple and yet flexible. For the first movement, I chose pre-recorded sounds which could be easily recognized in the urban environment- traffic signals, cars horns, yelling, crowds, etc. These samples were loaded into the software and triggered at given intervals according to the vibration of the skateboard. The second part of the piece consisted of whirling sounds similar to that of a Theremin. These were assigned to the turning

motions of the skateboarder. The third voice was rhythmic drum phrases triggered by the rotation of the wheel. Mixed drumbeats provided a clear connection between the rolling movement and the music.

Each skateboarder was assigned a different instrument. For example, skateboarder #1 would transmit rhythmic sounds while skateboarder #2 melodic sounds. Beats and measures were programmed to output data in a quantized fashion so that the rhythm and melody would stay locked in the same measure. Reconfiguring the sound parameters proved to be a major challenge. There were many decisions: personal vs. objective, identifiable vs. discrete, subtle vs. obvious. In the end, I opted for simplicity and coherency rather than complexity and intangibility. Reducing the amount of sensors and their functionality helped keep the performance under control.

Intersecting Lines: Skateboarding and Art:

The first time I witnessed skateboarding represented within an art institution was in 2002 during the exhibition *The Essential Disturbance* held at the Palais de Tokyo in Paris, France. Ed Templeton, professional artist and skateboarder displayed painting and photos, mostly of adolescence during the fifteen years and more of traveling and touring. For me, the highlight of the show was the performance of skateboarding inside the museum.

Perhaps one of the most pivotal moments in skateboarding performance art was in 1998 by professional skateboarder and artist Mark Gonzales. Cruising on a longboard, Gonzales weaved in and out of the exhibiting minimalist works of Johannes Wohnseifer in Abteiberg Museum in Mönchengladbach, Germany. In 2005, the *First We Take Museums* exhibition which opened up at the Kiasma Art Museum in Helsinki, Finland, combined over twenty urban artists. One feature included an arena where people could skateboard inside the museum. More and more, skateboarding was relocating from city streets into established art institutions.

In *Circle Board*, Gonzales constructed a circular sculpture made out of nine skateboards. The *Circle Board*, a cross between a skateboard and a sculpture, blended function and form provided an audience with a new way to experience the production of movement and space in an urban context.

The "Circle Board"

In parallel to the Musique Concrete project, similar ideas that explored skateboarding and new media technologies began to surface. Artist Coby Van Tonder's *Skatesonic* explores sounds and sensors through the movements of skateboarders on half-pipe ramps. In his performance, *Skateoscope*, artist and sound designer, Felix Luque Sanchez takes a critical look at skateboarding sounds using custom electronics and unique architectural elements.

The desire to combine skateboarding, sound and social spaces led me to new ways of interpreting the line. In the case of *Songlines*, the line represented the music journey, symbolizing "the thread" of the composition and unfolding the musical score through the uncalculated movements of the skateboarder.

Spring

"Dance is an art in space and time. The object of the dancer is to obliterate that."
— Merce Cunningham

Background

The idea of using lines as the underlying element for capturing movement derived from my previous work in facial tracking. During the spring semester of 2009, I attended a course entitled "Digital Representation" at Chalmers University IT. As part of the program, we were required to collaborated with an outside institution. I worked with Dr. Martin Rydmark at the department of Mednet Institution for Biomedicine at the Sahlgrenska Academy. The department focuses on computer-assisted visual rehabilitation techniques for stroke recovering patients. Using computer vision technology, I developed *Head Drawing*, a software program which enabled stroke-recovering patients to draw lines on a projection screen using head and facial feature movements. This provided patients, who are so often left behind in the technological process, with a new way of exploring creative talents as well as exercising motor skills.

Implementation

Head drawing was a perceptual vision system that used facial gestures as a means of drawing. Using the video input from a standard webcam, head, nose, eyes, pupils, mouth, lips and tongue were tracked using the framework from Open CV, and Open Source Computer Vision external libraries. Head Drawing used optical flow, head tracking algorithms and XML encoded classifiers to visually detect and track facial features.

Head Drawing and *Sound Drawing* Program

One adaptation of *Head Drawing* was *Sound Drawing*. In *Sound Drawing,* the x, y and z position of each facial feature is mapped to sound generating objects using a custom-built software program. Sonifying facial expressions could allow for a much larger range of music expression otherwise limited to the hands. With this system, it would also be possible for the visually impaired to "hear" facial expressions.

One example of how the tools of technology and art are used in ways that stimulate those with physical challenges is a project by artist Younghyun Chung. In Chung's *Digital Wheel Art*, the wheelchairs of disabled patients are equipped with a wireless interface that allows them to draw images on a projector screen. Transforming the wheelchair into an artistic tool opens up new possibilities of expression and encourages those with physical challenges to take part in the creative process.


*Digital Wheel Art* by Younghyun Chung

Although the head tracking system was fairly robust, were many technological hurdles to overcome. (Image resolution, framerate, light sensitivity, etc). Furthermore, the field of medical technology is quite specific and coming form an arts background, I wished to explore other avenues of expression.

In *Spring*, I wanted to move away from the technicalities of computer vision, movement and headtracking and "loosen up." I felt that *Spring* was a way to celebrate the "honesty" of the line, exploring free movement while still remaining within the confines of data-crunching tracking algorithms.

Snapshots from *Spring* video installation
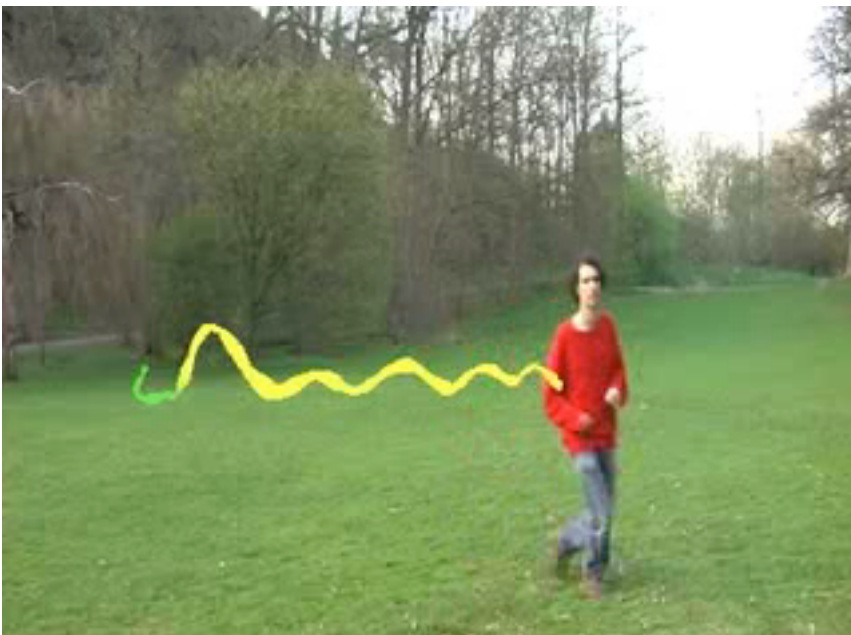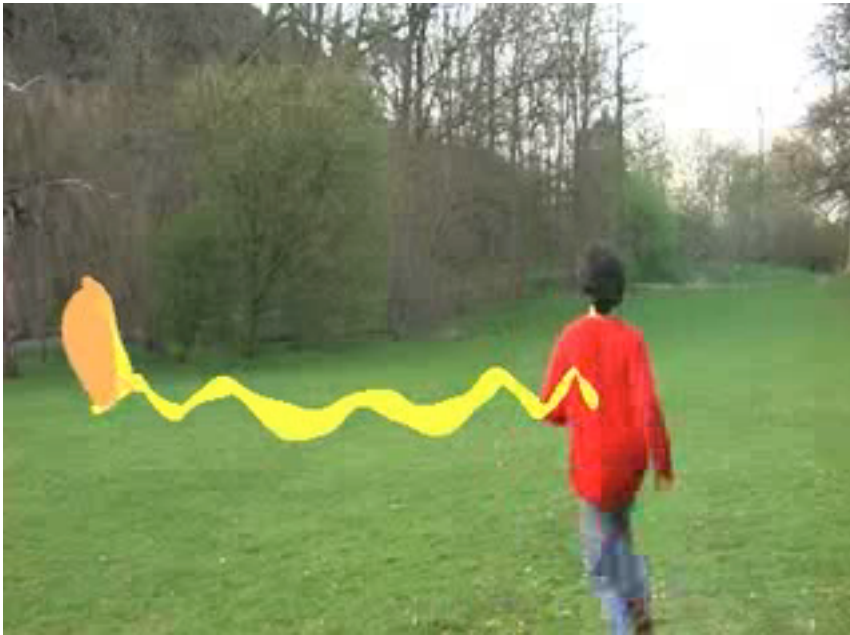
Snapshots from *Spring* video installation

Spring is a video which depicts a runner who is followed by a trail of computer-generated graphics. Ribbons of color trace the runner's trajectory, which is tracked by a customized color-tracking software program. As the runner weaves throughout the frame, lines of color are displayed in a string-like texture. As a result, the runner is transformed into a "human paintbrush" personifying the actions of a line further reminding us that the line is an expression of time.

Although the runner's path is not pre-determined, intensive computational algorithms of real-time tracking constantly check his position. Similar to *Songlines*, we witness a trajectory. In *Spring*, the emphasis is on the visual, rather than the sonic. We see lines manifested by movement, cause and effect, the laws of gravity and inertia, paths threaded and weaved.

The idea of combings movements with linear representations is accurately displayed in Merce Cunningham's dance production BIPED. In this performance, projections of stick-like figures appear behind the background of real dancers. Specific points on the dancers bodies were plotted using motion capture devices. These stick-like representations of bodies, inspired by the yarrow stick of the I Ching tradition, served as the background of

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the piece. In addition, variations of straight and perpendicular lines zoom towards the foreground creating interesting patterns of perceptual complexity. Similar to *Spring,* the line is the underlying element of the piece, connecting time with that of the human body and movement.
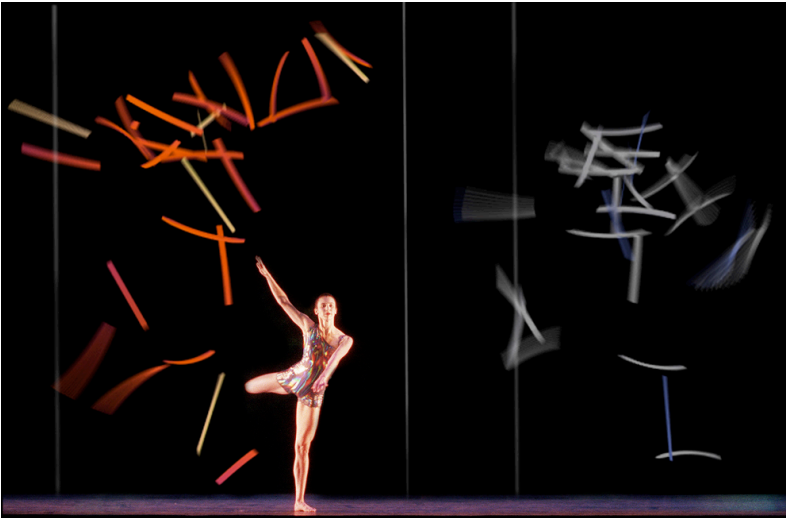
Still photo from Merce Cunningham's BIPED (1999)

Invitation au Voyage

"The blue sky above us is the optical layer of the atmosphere, the great lens of the terrestrial globe, its brilliant retina. From ultra-marine, beyond the sea, to ultra-sky, the horizon divides opacity from transparency. It is just one small step from earth-matter to space-light-a leap or a take-off able to free us for a moment from gravity." -Paul Virilio

Background

One evening, while walking home, I began to observe the night sky. It is often a counter-intuitive to look up while walking, but I could not help notice the starry arched dome curving over the horizon. The night sky became a window thorough which I could instantly access the layout of the universe.

I was reminded by the simple, yet profound understanding that our planet is a sphere floating in space. Why has it become so easy to ignore the fact that we, as inhabitants of earth are not standing on solid ground? Physically speaking, gravity is the weakest known force, yet it is one of the most evident in our daily lives. Galileo, Newton,

Hawking and Einstein tried to understand it, yet to me gravity still remains a mystery.

For me, to consider the vertical dimension was to consider the notion of gravity and weightlessness as something bewildering, incredulous, and mysterious. In my art practice, I have explored the areas of physics, mathematics and the natural sciences in order to further my understanding of gravity. I've learned about zero-gravity machines, magnetic levitation, aerogel, seagel and acoustic levitators yet scientific explanations could not satisfy my creative inquiries. As I walked home that evening, reminded by the fact that we are indeed floating in space, I began to form a line in my imagination. It was a line that connected the arts to the sciences. A glimpse into why scientific empirical data needs to coexist with the uncanny aspects of creation. This explained why NASA has its own artist in residence program and why more and more "electronic arts" festivals feature bio-scientists, physicists, astronomers, and geneticists. There it was: the curved S-shaped line, the Ying/Yang of art and science, two hemispheres intertwined that formed the basis for my Master's thesis project: *Invitation au Voyage.*

Invitation au Voyage is above all, an invitation to both the ideals of skateboarding and to the ideals of physical phenomena that constitute or world. We discover a skateboard suspended in mid air, held up by magnetic field but also held up by certain ideals: lightness, freedom, and imagination. Without wheels or trucks, a skateboard floating above a pedestal can conjure feelings of idolatry, adornment and reverence. In "Invitation au Voyage" French poet, Charles Baudelaire writes:

"There all is order and beauty,
Luxury peace and pleasure"…
See on the canals
Those vessels sleeping.
Their mood is adventurous;
Its's to satisfy
Your slightest desire
That they come from the ends of the earth
-The setting suns
Adorn the fields,[4]

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[4] William Aggeler, The Flowers of Evil (Fresno, CA: Academy Library Guild, 1954)
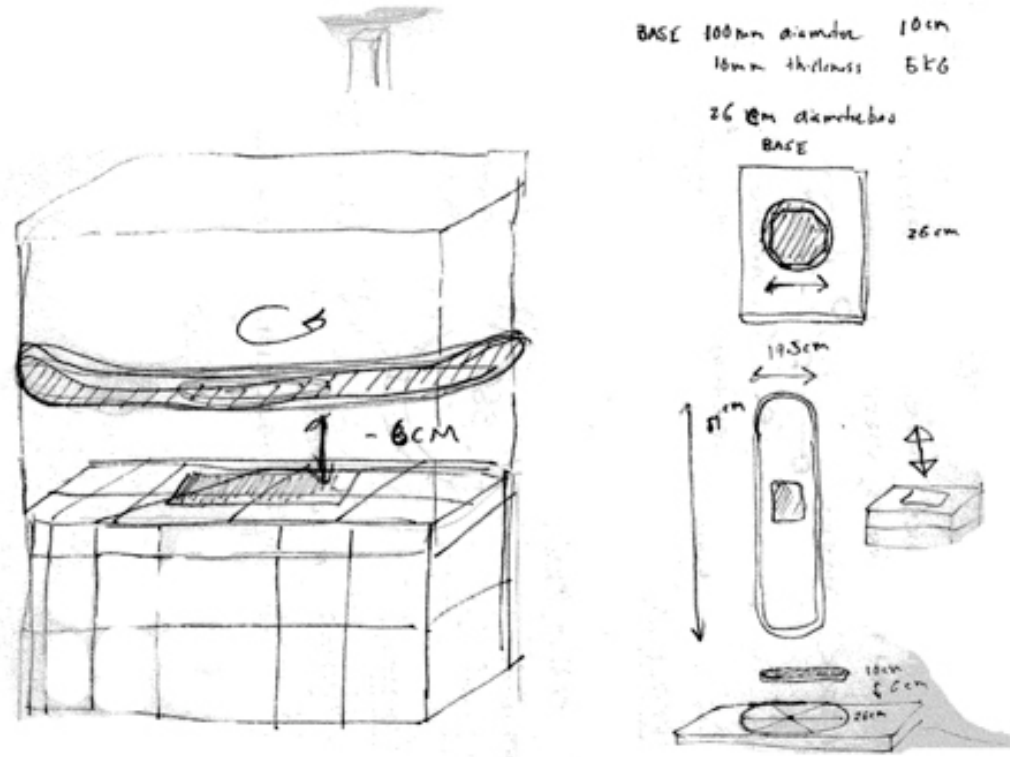
Sketches for *Invitation au Voyage*

Invitation au Voyage-skateboard deck suspended via magnetic levitation

Similar to Baudelaire's poem, *Invitation au Voyage* invites the viewer into a world of possibility, imagination and contemplation. Like the "floating vessels, we discover a

modern day magic carpet, a glimpse into the forces that bind us but also lift us to new territories. It is here where we can view a moment encapsulated in time, an experience which connects to both the ideals of skateboarding and to wider perspectives including the forces of resistance, gravitational pull and magnetic poles.

Paradoxically, the visual spectacle of the piece is centered on what we don't see: a six-centimeter invisible line stretching between the floating skateboard deck and the pedestal. Viewed at eye-level and positioned towards the horizon, this line represents negative space, the "anti-matter", or the converging paths towards negative gravity, the final frontier of skateboarding. In *Invitation au Voyage*, the line takes on a more conceptual form. It is something similar to a skyline or borderline: we may not clearly identify it, but we see its effects.

In *Invitation au Voyage* the spectator "falls into" the volume of the invisible line. Literally, the piece "draws us" toward it as if we are being pulled in by the forces of magnetism itself. It is little surprise, therefore that during the exhibition at Röda Sten, viewers were tempted to touch the piece, throwing if off its center. I was called in at least three times per week to reset its position. Guards have witnessed people both young and old reach for the "invisible line."

"If from the quattrocento onwards the visible spectacle gapes open in the intersection of vanishing lines, this is due to the force of earth's gravity and not solely to some convergence effect, the strabismus of a metric of tangible appearances so dear to the Italian artists. The organization of the new apparent horizon already depended on time, on that time freeze of the vanishing-point. Today, the reorganization of appearances that is under way and the approaching emergence of a last horizon of visibility constituted by the transparency of appearances instantaneously transmitted at a distance can only be achieved by overcoming the constraint imposed by the fore of gravity.[5]

The horizontal and vertical planes

We seem to favor relations on the horizontal plane. Conversations take place face to face and "tête à tête". Our eyes naturally gaze towards horizons rather than ceilings.

The Chinese character for "benevolence" or "humanity" consists of two parts. The first

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[5] Paul Virilio, <u>Open Sky</u> (London:Verso, 1997), p. 31-32.

part, "Ren" (man) is represented by two vertical legs. The second part "Er" consists of two horizontal strokes signifying the number two. Together, these characters signify "two persons", "solidarity", "benevolence" or "humanity". However, these symbols can also be interpreted as the representation of two fields of attraction, or the horizontal gravitational pull between two people. In Confucian thought, it is said that mastering horizontal gravity is the key to understanding human relations:

Chinese character for "benevolence"/"humanity"

"To be able to practice five things everywhere under heaven constitutes perfect virtue...[They are] gravity, generosity of soul, sincerity, earnestness, and kindness."
-Confucius (551 BC - 479 BC), The Confucian Analects

What about the vertical perspective? From Icarus to DaVinci, the desire to defy gravity has existed since beginning of our recorded history. The notion of flying has become so prevalent in the human psyche; it permeates into our dreaming minds. It is one of the most five common dreams that humans experience. In everyday rhetoric, we use words like "up" or "down" to describe our moods. Feeling "high" or depressed are degrees of emotions scaled on the vertical axis. One who feels "weight off their shoulders" is one who feels free from the confines of gravity.

The spatial production of skateboarding

Gravity, resistance, and rotation are inherent within the practice of skateboarding but they are also connected to wider perspectives.

"On earth, escape velocity is around 11, 200 metres a second. Below this acceleration, all speeds are affected by earth's gravity well, including the speed at which we see things. With centrifugal and centripetal forces on the one hand, and resistance to forward motion on the other, every movement of physical displacement, whether horizontal or vertical, thus depends on the force of gravity at the surface of the globe.[6]

Gravity

The desire to break free from the confines of gravity is arguably the goal of every skateboarder. Skateboard shoe brands like *Airwalk*, *Gravis* and *Fallen footwear* illustrate the notion of suspension. With the introduction of vertical ramps in the late 1970s, skateboarders began to perform maneuvers on a different spatial plane. Aerials and inverts were performed in mid-air causing the rider the experience momentary state of weightlessness.
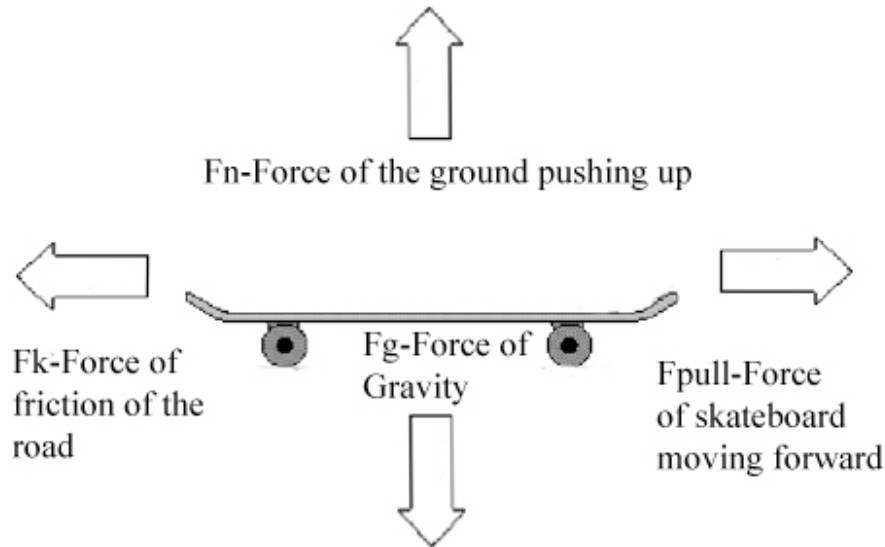
New Forms of Spatial Engagement

In skateboarding, the desire to reach toward the vertical is constantly growing. The largest known skateboard ramp, the Mega Ramps measures 59.1 meters tall. Skateboarders like Bob Burnquist and Danny Way have taken verticality to new levels setting world records, soaring over the Great Wall of

[6] Paul Virilio, <u>Open Sky </u>(London:Verso,

China, launching off of helicopters and propelling over the Grand Canyon.
For that one moment, the skater defies the laws of gravity and floats in space. [7]

The most widely used trick in skateboarding is the "ollie." It involves thrusting into the air while the board remains fixed to the feet of the rider. It is controlled by a delicate combination of speed, momentum and gravitation force.

Fn-Force of the ground pushing up

Fk-Force of friction of the road

Fg-Force of Gravity

Fpull-Force of skateboard moving forward

When a skateboarder prepares for an "ollie," several forces are in effect. These forces are illustrated in the diagram above. All of these forces add up to equal zero, so there is no net force. This means that the skateboarder is at a constant velocity.

Resistance

Resistance is a notion which is prevalent among skateboarders. They are often are identified as punks, rebels, anarchists associated with the underground and counter-culture movements. It is little surprise therefore that the practice of skateboarding has been banned in some areas throughout the world. Skateboarding is a sport without institutional support.

In the urban context, skateboarding consists of "the repetition of gestures and spaces.[8]"

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[7] Kevin Thatcher and Brian Brannon, Thrasher: The Radical Skateboard Book (New York: Random House, 1992), p. 10.

[8] Henri Lefebvre, The Production of space (Oxford: Blackwell, 1991), p.75

As Lefebvre points out, the practice of skateboarders can be viewed as "resistance to alienating behaviors marked by an economic and rationalist ideology.[9]"

Skateboarding is an individual practice which seems to valorize uniqueness and resistance. Like graffiti artists, skateboarders respond to the "ills of modernity" appropriating individual codes, writing "lines" within the city through the repetition of physical and performative movements. In the spatial production of skateboarding, we can interpret movements such as the ollie both as resistance to gravity and a refusal to be held down by certain ideologies.

Defying Gravity in Art

The desire to defy gravity in art can be traced back to the early twentieth century artists such as László Moholy-Nagy and Alex Caulder.

László Moholy-Nagy, Hungarian born Bauhaus painter and photographer, used techniques of compressed air to levitated objects including chisels and ping-pong balls. In *Mobiles,* American born sculptor, Caulder experimented with free-floating structures and suspension. In "Sphere in Oblique Air-Jet" (1967) German American conceptual artist Hans Haake floats a balloon stably with a constant jet stream of air.
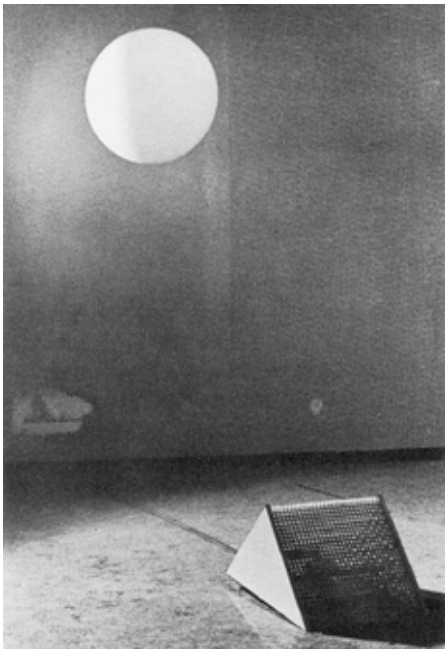

[9] Ibid. p.75

Sphere in Oblique Air-Jet (1967), by Hans Haake

Alberto Collie's *Spatial Absolutes (1964-1967)*

Artists exploring magnetic levitation include Tom Shannon. His floating spaceship-like stainless steel sculptures hover in air evoking our relationship to cosmic and planetary movements, Alberto Collie's work consists of objects made of aluminum, copper, magnesium floating freely over a magnetic base. In a series called "Spatial Absolutes", electromagnetic levitators made of titanium disks allowed objects to defy gravity. A feedback system which strengthened the magnetic field was integrated in the work, keeping the disks in a constant state of equilibrium.

In architecture, perhaps one of most ancient greatest displays of a floating like structure is the Byzantium church Hagia Sophia. The most spectacular element of the construction is a giant dome measuring thirty-one meters in diameter resting on the top of the edifice. Light, which floods through the circumference of the dome gives the impression as if it is floating in air.
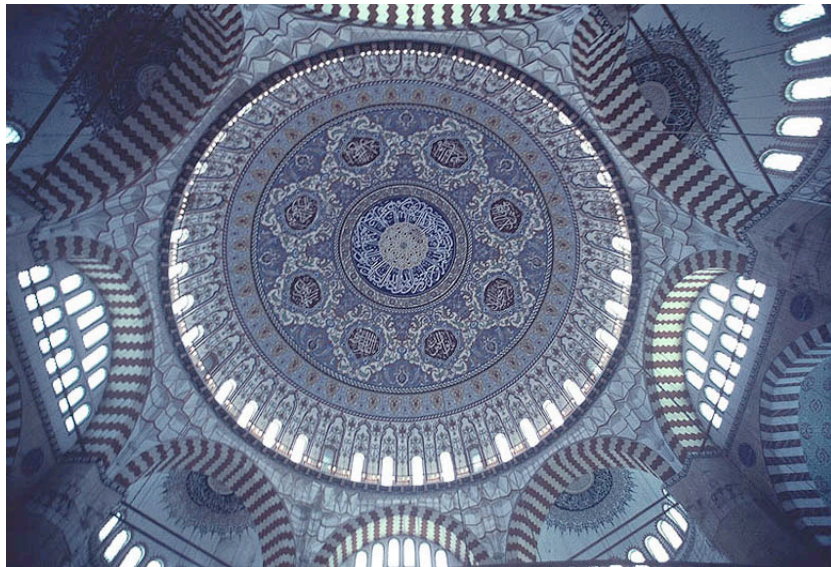
Dome of Hagia Sophia

In dance, a practice introduced by a mystical sect of Sufis, (appropriately called) the "Whirling Dervishes" involves spinning in circles in precise rhythm. Using rotational force, the Dervishes, whose traces date back to the thirteenth century poet Rumi, lower their center of gravity as a way to "turn towards the truth. It is believed that these centrifugal motions are the key to accessing higher states of conscious, placing the dancer in a trance as he/she is released from ego and conquers dizziness. Like a ballet dancer twirling on its axis, the Whirling Dervishes appear to defy gravity itself personifying the actions of planets spinning in orbit and revolving around the sun.

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Whirling Dervishes

CONCLUSION

What does skateboarding, music, magnetism, architecture, running, and poetry all have in common? Perhaps the answer could be found among lines. In trying to describe my own path, I've presented the notion of a line as a way to connect to three specific works. In a world of borderlines, horizon lines, latitude lines, skylines, cloud lines, ley lines, pressure lines, and other non-permanent lines, we are forced to reckon with our inner boundaries. Euclid stated wisely over two thousand years ago "a line has length but no breadth.[10]" Although areas of demarcation may sometimes be fuzzy, we take these lines seriously when cueing at the bank, driving a car, playing music or writing a poem.

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[10] Robert Simson, <u>The Elements of Euclid</u> (Philadelphia:Desilver, 1821), p. 296.

In the paper, I have discussed the line as medium to express the physical forces at of gravity, magnetism, velocity and sound and how they are connected to the artistic practice. Furthermore, I have compared other art practices in relation to these works and how they extend to a larger context.

The presented works have followed a certain "parcours", tracing the path of a skateboarder, an artist, a runner, and a skateboarder. This is not to imply that the path I've described is a closed loop or a palindrome. On the contrary, the artistic process has allowed me to reach out to new dimensions, new perspectives and new territories. It is a path which I like to describe as curved.

Life on the spot surely cannot yield an experience of place of being somewhere. To be a place, every somewhere must lie on one or several paths of movement to and from places elsewhere. Life is lived, I reasoned, along paths, not just in places, and paths are lines of a sort. It is along paths, too, that people grow into a knowledge of the world around them, and describe this world in the stories they tell.[11]

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[11] Tim Ingold, Lines: a brief history, (New York: Routledge 2007), p.2.

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