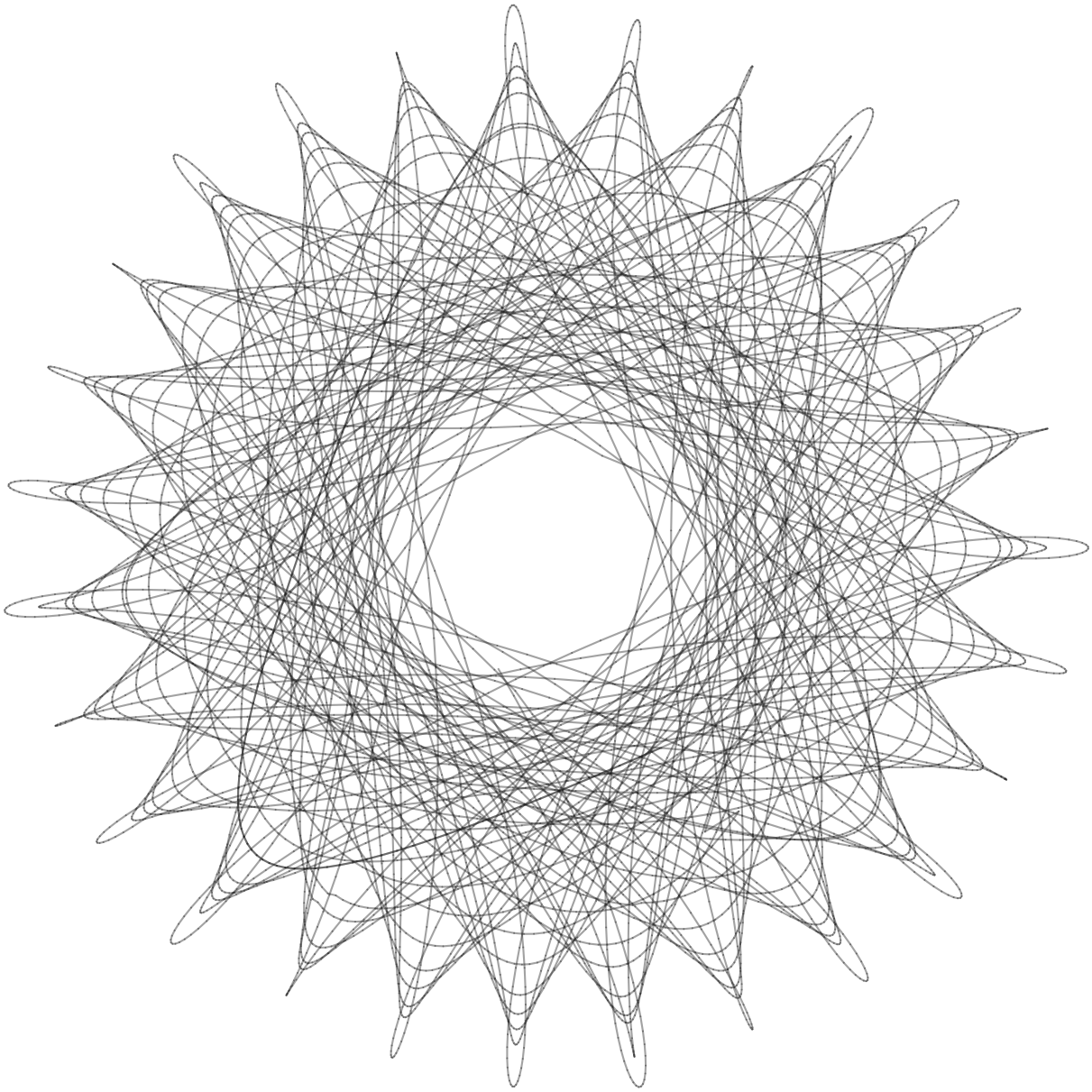

SOUND KINETICS

By Noha Ayoub

SOUND KINETICS

By **Noha Ayoub**

Major | Media Design

ID | 16 - 7310
9th Semster

Supervised By
Jochen Braun

Pre-Master Project
An interactive, experimental pattern generator translating motion into visuals.

Publication
German University In Cairo.
January 2013.

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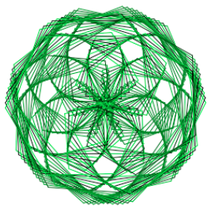
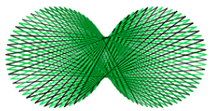
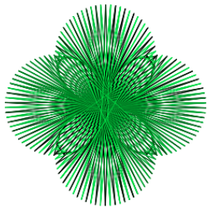
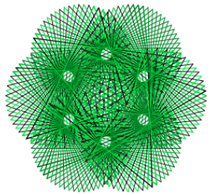
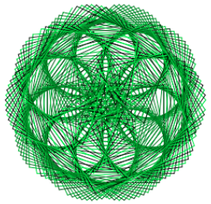
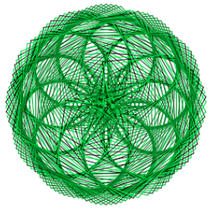
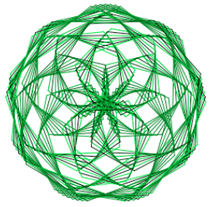
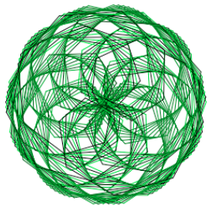
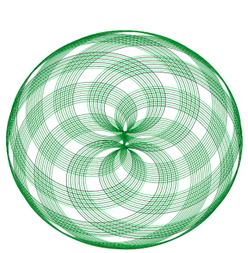
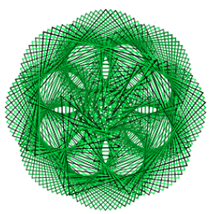
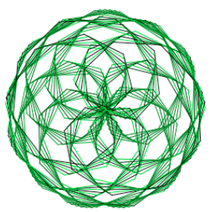
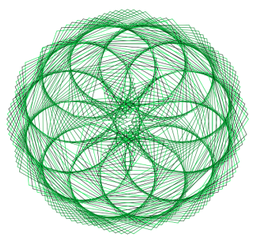
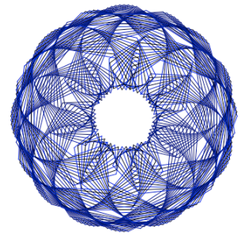
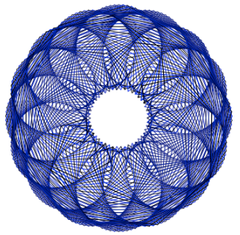
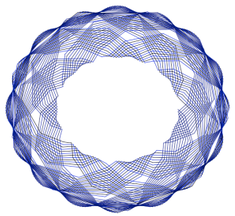
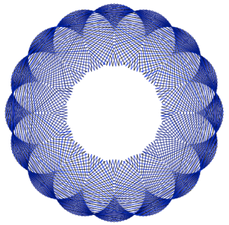
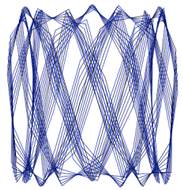
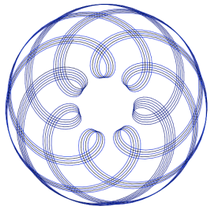
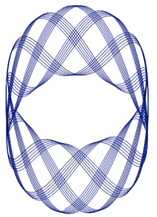
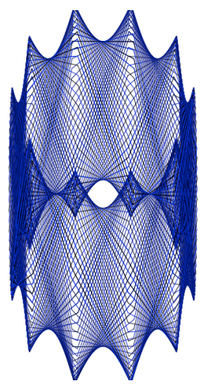
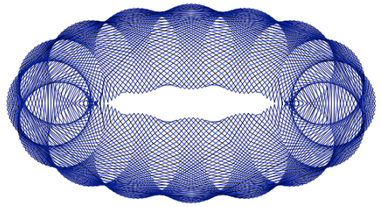
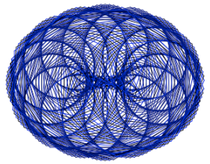
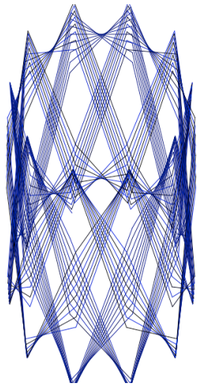
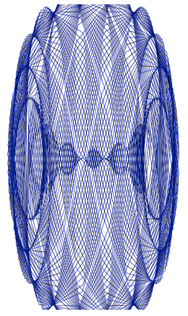











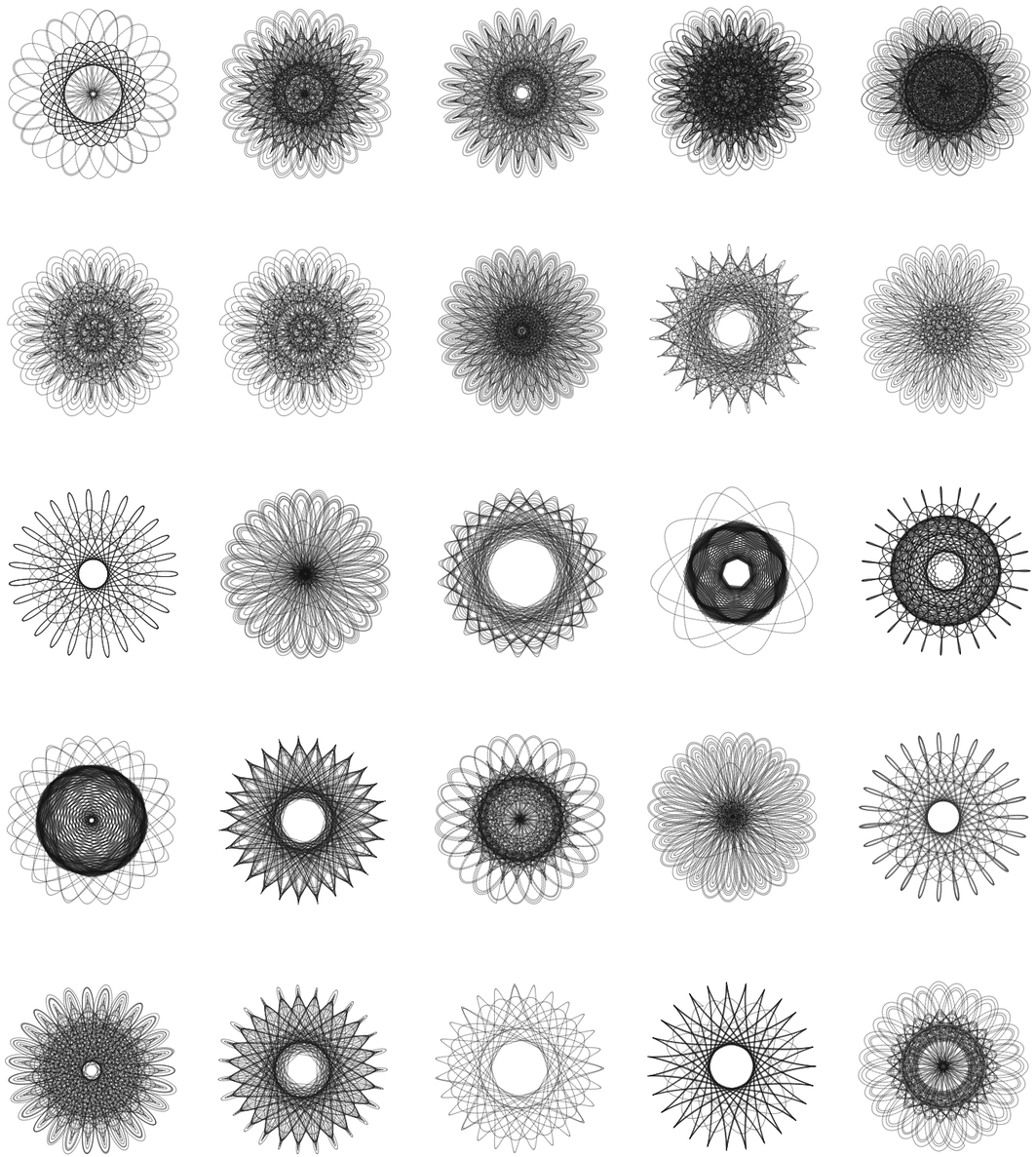





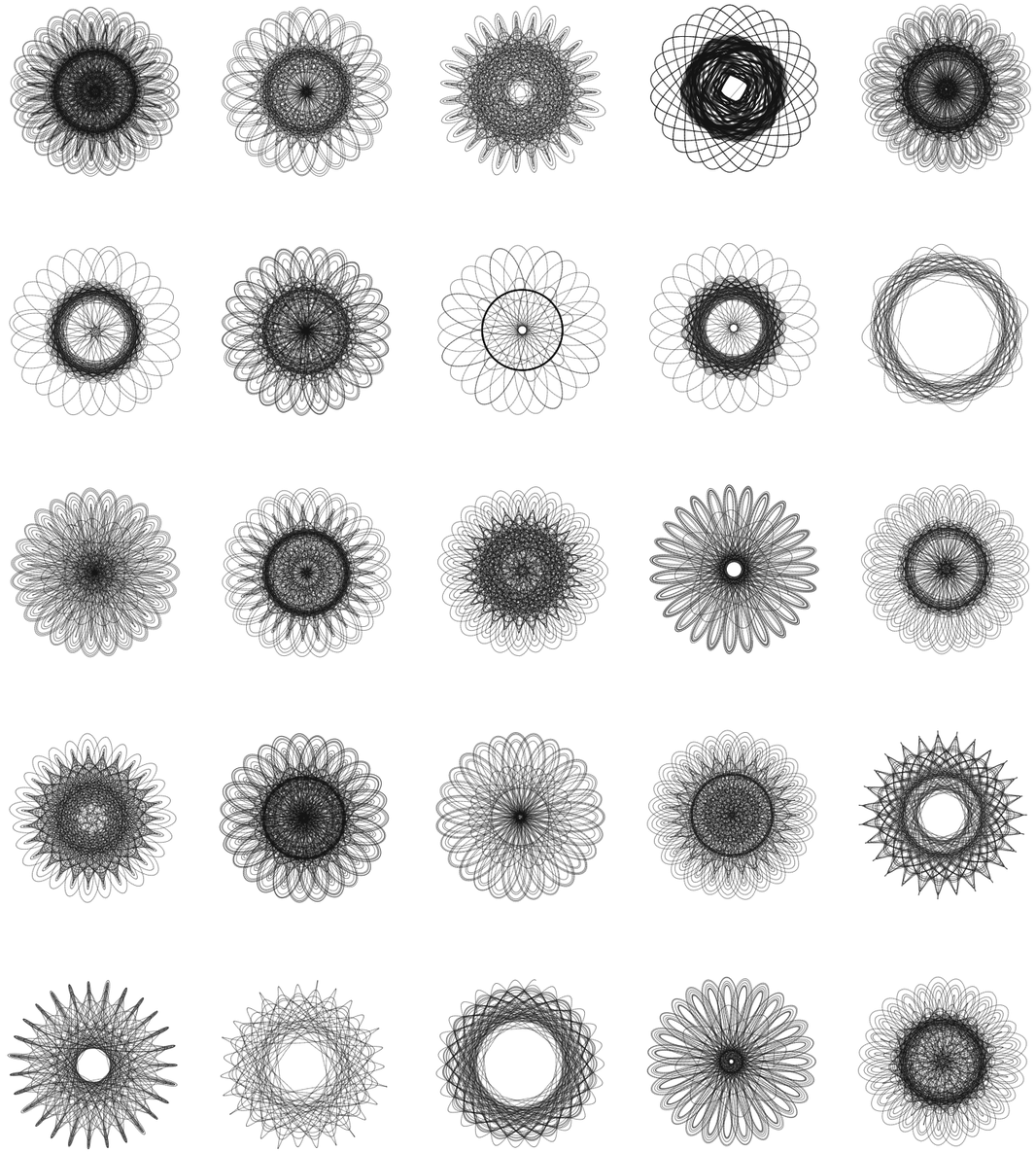






Trial Outcomes | Radius
& Pattern Variation.

Trial Outcomes | Color & Shape Variation.





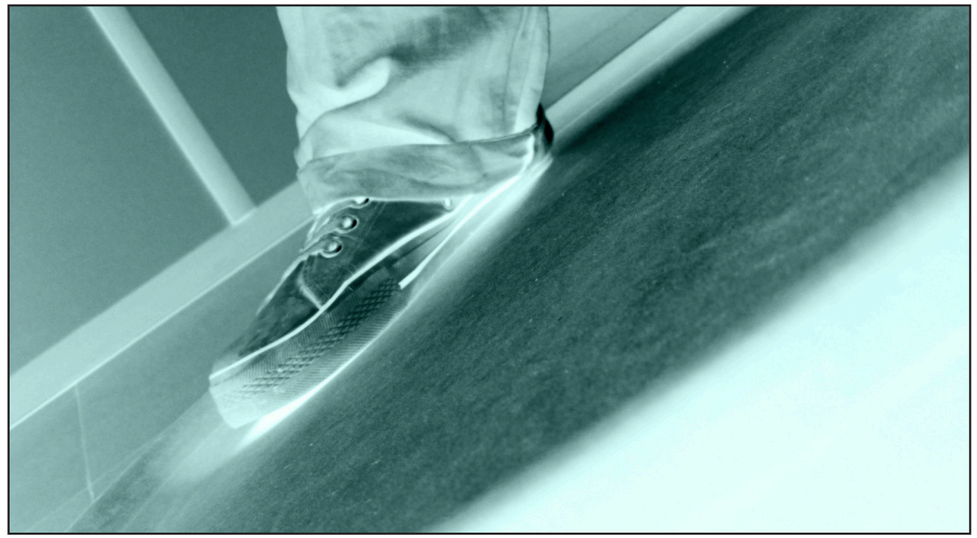
Final Outcomes

A. Introduction

Sound Kinetics

A generative pattern interactive project that translates motion into visuals. The user is subjected to a certain type of audio which enables him to move accordingly to the rhythm while standing on a surf board known as the Woo!Board. Results produce spirographical pattern outcomes applicable for the user to print and apply it to various applications (e.g. posters, coasters, booklet covers, bookmarks, etc.) .

Keywords | Interactivity - Interaction Design - Fun - Interesting - Motion - Sonification - Spirograph - Harmonographs -Visualization - Woo!Board.



A USER STANDING ON THE WOO!BOARD

Woo!Board

By Frederic Fendrich, Yacoub Yassin & Noha Ayoub

A wooden semi-spherical surf board device, that contains a WiiMotionPlus-Controller to act as a physical interaction interface that controls sound via a bluetooth connection with Max/MSP.

http://everydayinterfaces.x-projekte.de/?Woo%21Board

The board gives affordances to the user such as; tilting, balancing, sitting, and even walking with it.

B. Research I Previous Related Projects.

Drawing Machine No.1 (To Your Heart's Content)

By Joseph L. Griffiths

A mixed media installation project consisting of a stationary bike, which when pedalled by a user becomes a tool for drawing on a canvas. The spinning front wheel of the bike powers a special apparatus that draws circles on the surface using coloured marker. Another drawing element attached to the bike's handle bars draws based on the side to side motion of the handle bars.

The whole system creates art through the user, but each piece is completely random and unpredictable.

Images are from the book 'A Touch Of Code: Interactive Installations and Experiences'.

http://josephlgriffiths.com

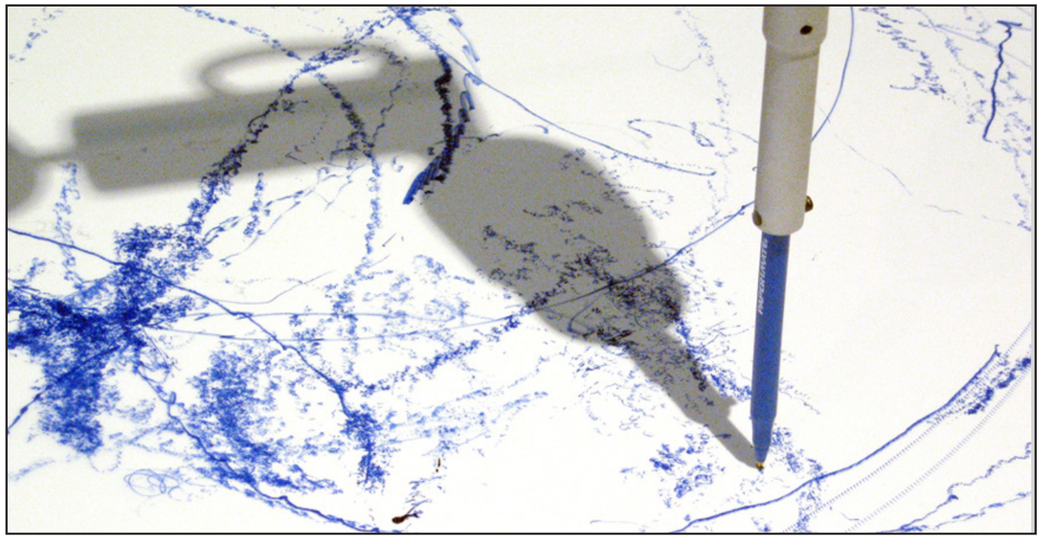
VARIOUS OUTCOMES PRODUCED

Drawing Machine
By Eske Rex

A two towers weighted with pendulums installation creates elaborate ink spirograph images on display at the mindcraft 11 exhibit of danish craft during Milan design week 2011.

http://www.designboom.com/design/eske-rex-/drawing-machine

The installation consists of two nine-foot (2.7m) tall pyramidal structures, from the center of each of which is suspended a weighted pendulum. As the weight increases, smaller circles are drawn and vise versa. Once it is set into motion by hand, the pendulums, linked together at the site of the pen, continue in motion from the transfer one another's kinetic energy.



A CLOSER LOOK AT THE PRODUCED OUTPUT

Drawing Machine 3.1415926 V.2

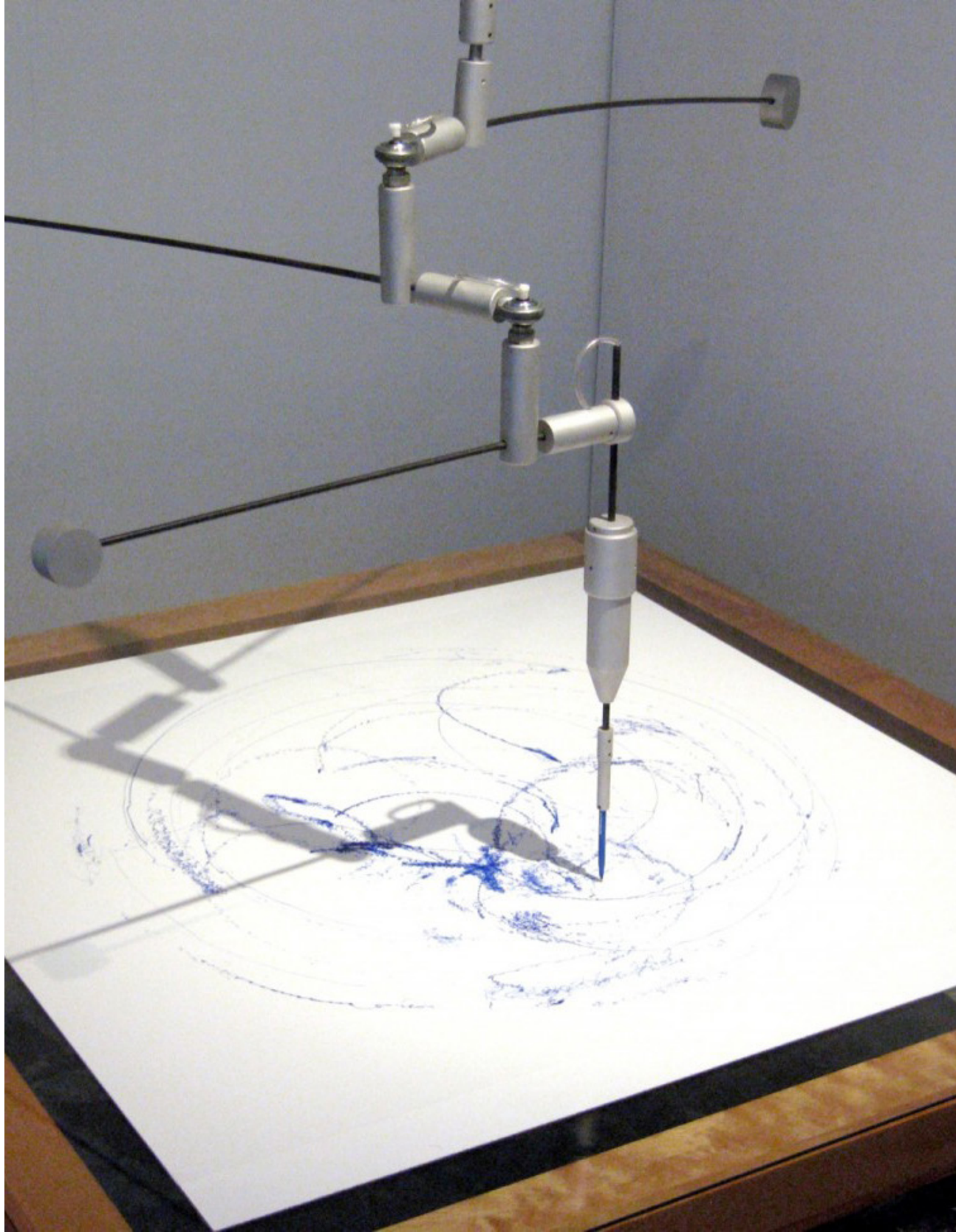
By Fernando Orellana

A notion of generative art exploration. The installation consists of a three tiered mobile sculpture that is driven by the vibration of a motor. This vibration is controlled in two ways. First by the machines programming, essentially a set of instructions on how to draw. Secondly by monitoring one or two microphones, giving it the ability to "listen" to its environment.

When it hears something loud enough it uses that information directly to create marks. In this way the machine collaborates with its environment; sometimes using its program and sometimes using what it hears to make drawings.

A Touch Of Code: 'Interactive Installations and Experiences'. P.126

http://fernandoorellana.com/projects/drawing-/machine-v2



EACH DAY IS MARKED BY A DIFFERENT COLOR

SideTrack

By Jacek Barcikowski, Jennifer Kay & Martina Pagura

Images are from the book 'A Touch Of Code: Interactive Installations and Experiences'. P.127

http://ciid.dk/education/portfolio/idp09/courses/tangible-user-interface//projects/sidetrack

A project aimed to help separate home-life from work-life.

The Sidetrack table peripherally records you as you work at home, tracing a pattern as you move from space to space. Marker pens plot this pattern as the table spins, oscillating in time with your movement between rooms. Sensors are placed in the areas you want to observe. By placing tags on the table, you purposefully work towards set tasks, with the patterns reflecting the journey towards these objectives. In this way, giving value to the intangible effort and pockets of time you devote whilst working from home

EXPERIMENTING WITH GEAR SIZES

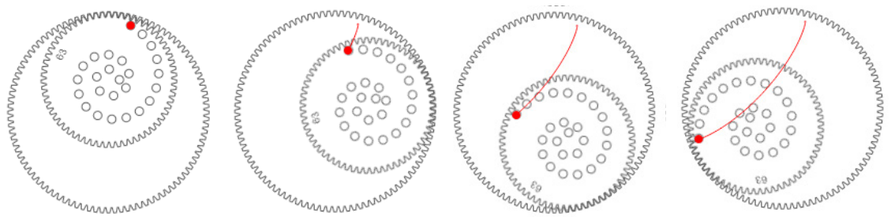
B. Research I Research Through Design

EXPERIMENTING WITH NEGATIVE SHAPE OUTCOMES

Analogue Experimentation

Grasping the concept of a spirogaph and its aesthetics, further research was conducted. Understanding how a spirograph is drawn required understanding the mechanism of the process. Taking that into account, going back to the basics of the simple 1969 Kenner super spirograph analogue toy was undergone.

The pattern gets drawn by pinning the pin inside the whole and spinning with the gear rotation



Understanding the Mechanism

After a lot of trials and experimentation, it was concluded that; (a) no pen-angle manipulation after inserting and pinning the pen inside the whole. The pen automatically moves along with the gear's rotation. (b) The whole process is built on two circular motion coinciding each other. (c) Each gear size applies various diameters which influences the outcome of the shape. And finally (d) over 50 different patterns were created taking into account different starting positions and combinations of diameter sizes.

EXPERIMENTING WITH VARIOUS GEARS PRODUCING VARIOUS
SHAPE OUTCOMES

C. Design Concept

Converting Analogue into Digital

After understanding how the analogue mechanism works the following step was how to convert this analogue mechanism into digital providing the factors of agility, flexibility, excitement and entertainment while maintaining the experiment findings factors.

3-DIAMETER VARIATION PATTERNS

Concept

An entertaining way to designing tangible spirographical pattern applications via body-audio movement translation using the Woo!board. By subjecting the user to a dark room standing on the board, he is assigned to one simple task which is 'move according to the rhythm of the music'. Depending on how the user moves, these movements are manipulating certain attributes (e.g. diameter and the gear size). These attributes are responsible for the outcome of the spirographical patterns that are projected. As follows, these patterns get printed and applicable for the user to apply it however he pleases on various types of applications (e.g. Ceramic Tiles, Bookmarks, Coasters, etc.).

User to Board Interaction

To see how a user would normally interact with board, a test-user was asked to simply interact with the board not giving him any further instructions. The user approached the board and was a bit hesitant to stand on it fearing instability.

After the first attempt to stand on the board, the user adapted to it and started testing its limitations. He tried balancing on it. Standing in a Yoga position. Sitting and swinging on it. And even walking with it.

After seeing the user adapt well on the board, he was given a simple task of moving according to what he hears as an audio input. Thus the observation of how a user would move according to audio input began.

Technicality | Audio

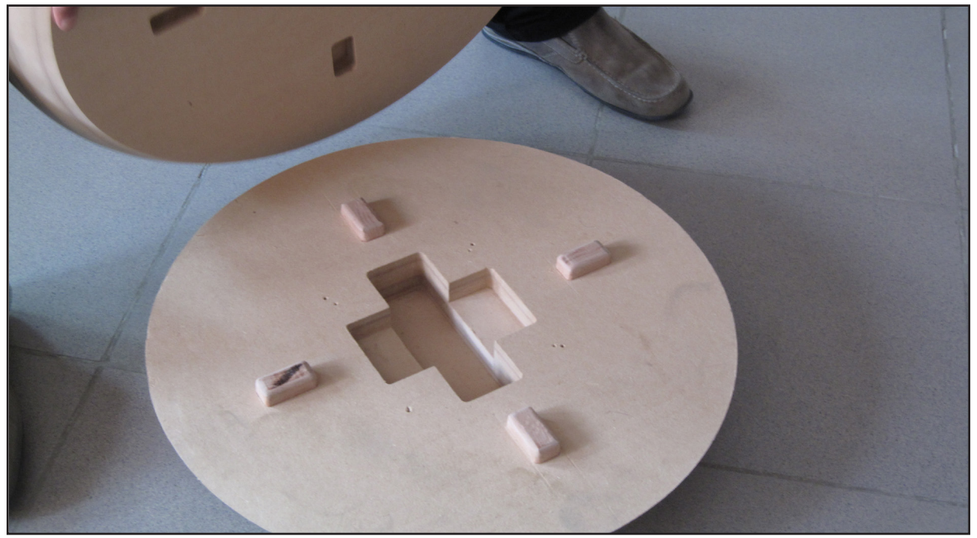
After the Audio gets initiated, it plays two roles in the process.

First role
Making the user start moving according to the rhythm.

These movements that are mapped are broken down to two movements:
- Tilt + Hold
- Frequent Tilting

Each acceleration axis x & y manipulates specific attributes that exist in Processing.

Second role
Manipulating the color stroke
by the analysis of the tempo via Max/MSP.



WOO!BOARD DISASSEMBLED

Technicality | Wii- Remote

A Wii Remote is located inside the Woo!Board. The remote calibrates
the x and y accelerations which plays the main role in the mapping between Max/MSP
and Processing.

Movements that are mapped are broken down to two movements:
- Tilt + Hold
- Frequent Tilting

Technicality | Processing

Processing receives messages from Max/MSP via OpenSoundControl.

Messages are received by an Event-listener that distributes them according to their assigned places thereby achieving a responsive mapping connection.

a= deviation angle

Radius

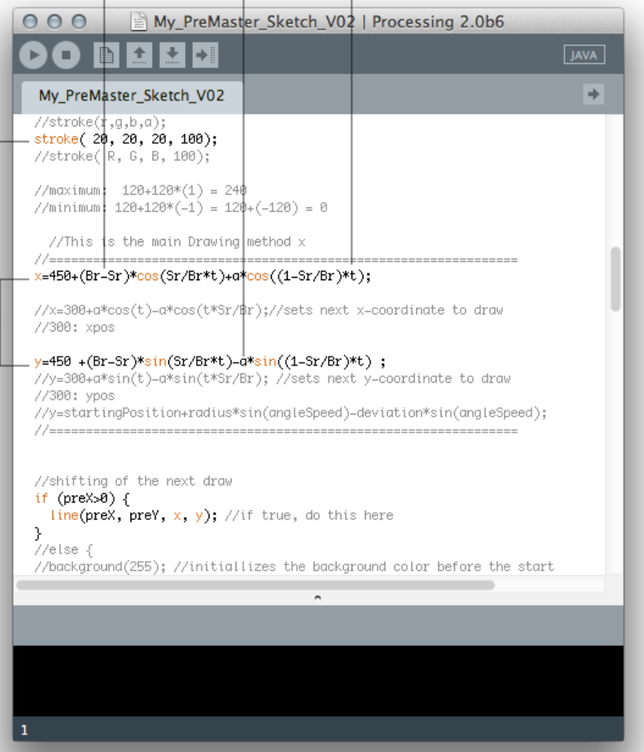
t= angle speed

Color Stroke manipulation via RGB and alpha channels

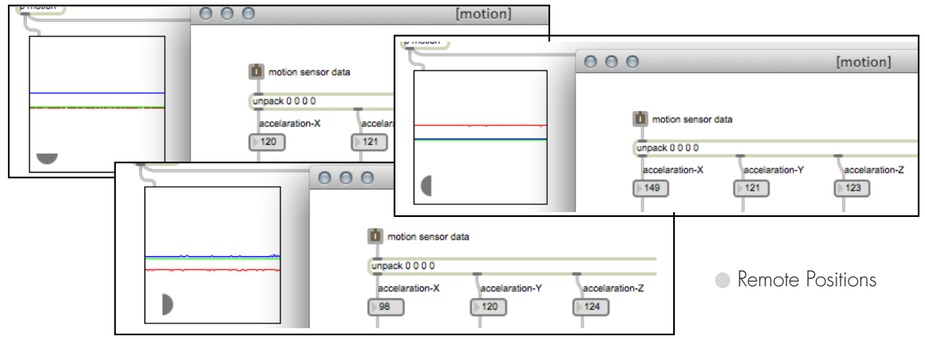
The mathematical equation for drawing a spirograph in both the x and y axis

x=Starting Position + Radius*cos(angle Speed) - deviation angle *cos (angle Speed)

y=Starting Position + Radius*Sin(angle Speed) - deviation angle *sin (angle Speed)



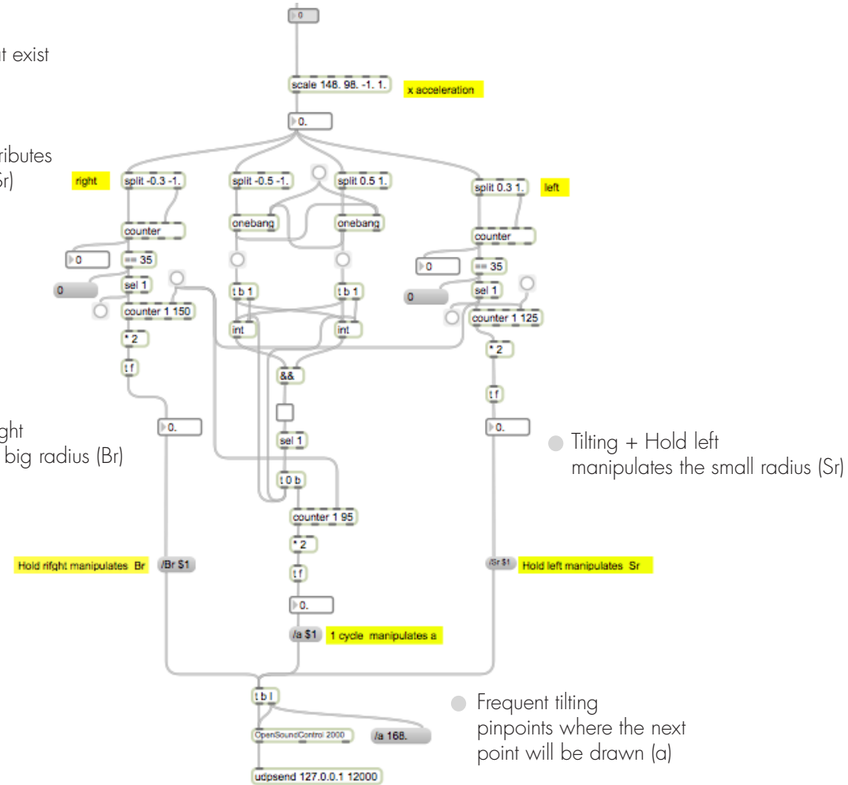
Technicality | Max/MSP



Remote Positions

Each x and y acceleration axis manipulates specific attributes that exist in Processing.

Each movement is calibrated , mapped, and assigned to the attributes of Big Radius (Br), Small Radius (Sr) and Starting Drawing Position (a).



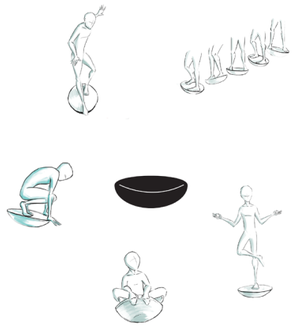
Tilting + Hold right manipulates the big radius (Br)

Tilting + Hold left manipulates the small radius (Sr)

Frequent tilting pinpoints where the next point will be drawn (a)

SOUND KINETICS

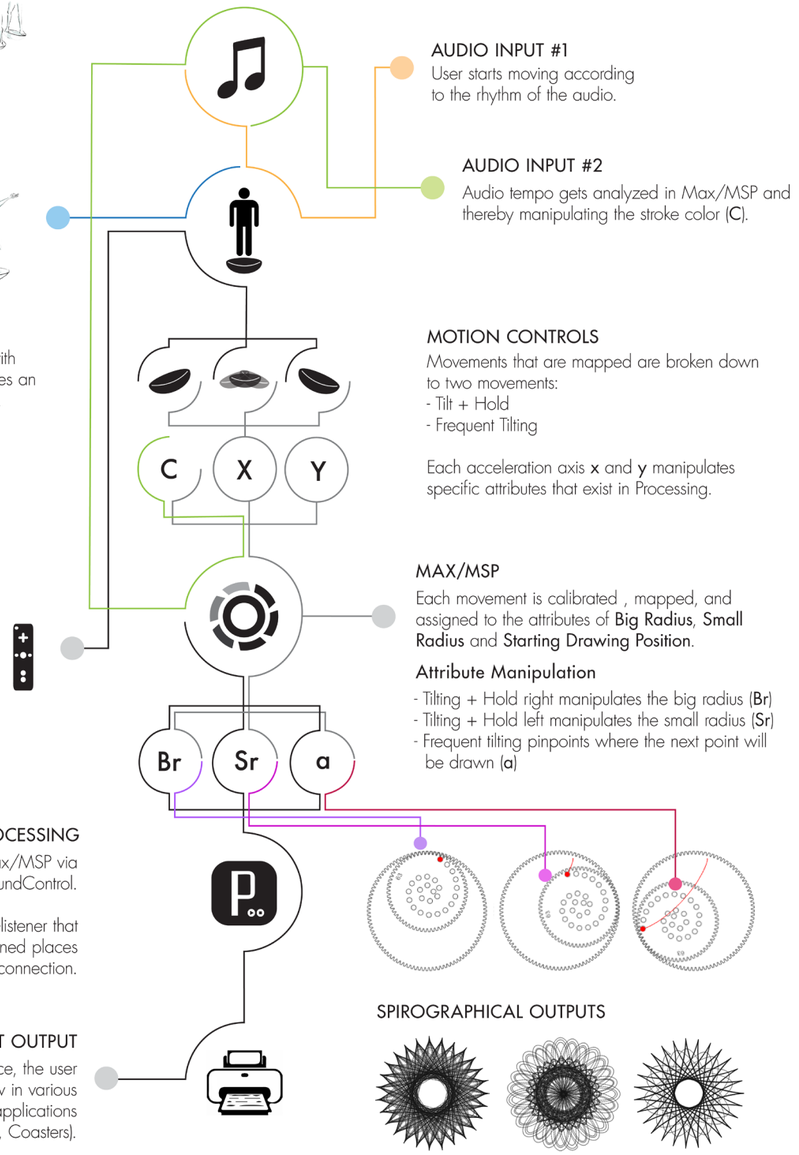
Generative patterns translating motion into visuals



WOO!BOARD

A semi - spherical surf board designed with the aesthetics of a skateboard that includes an oscillator-baring device (e.g. Wii Remote).

The user has the affordances of:
- Walking
- Balancing
- Sitting
- Moving/Tilting



AUDIO INPUT #1

User starts moving according to the rhythm of the audio.

AUDIO INPUT #2

Audio tempo gets analyzed in Max/MSP and thereby manipulating the stroke color (**C**).

MOTION CONTROLS

Movements that are mapped are broken down to two movements:
- Tilt + Hold
- Frequent Tilting

Each acceleration axis **x** and **y** manipulates specific attributes that exist in Processing.

Wii REMOTE

A Wii Remote is located inside the Woo!Board.

The remote calibrates the **x** and **y** accelerations which plays the main role in the mapping between Max/MSP and Processing.

MAX/MSP

Each movement is calibrated , mapped, and assigned to the attributes of **Big Radius**, **Small Radius** and **Starting Drawing Position**.

Attribute Manipulation

- Tilting + Hold right manipulates the big radius (**Br**)
- Tilting + Hold left manipulates the small radius (**Sr**)
- Frequent tilting pinpoints where the next point will be drawn (**a**)

PROCESSING

Processing receives messages from Max/MSP via OpenSoundControl.

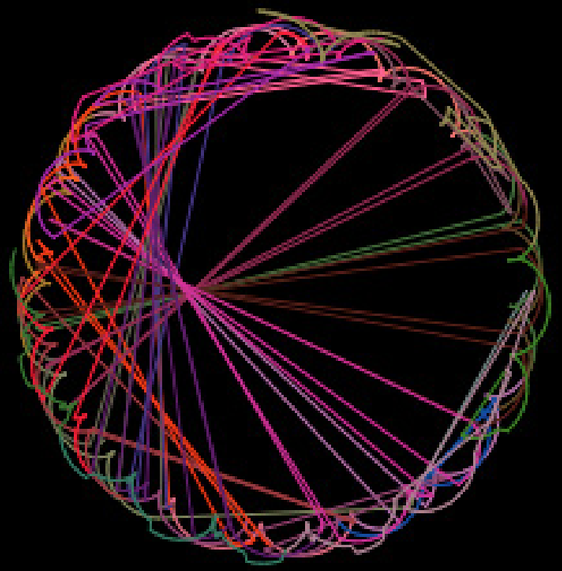
Messages are received by an Event-listener that distributes them according to their assigned places thereby achieving a responsive mapping connection.

PRINT OUTPUT

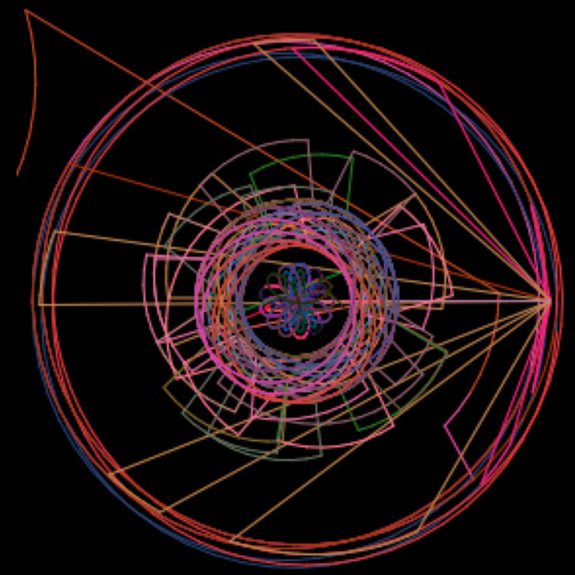
After going through the experience, the user will be able to print what they drew in various sizes applicable to various applications (e.g. Ceramic Tiles, Bookmarks, Coasters).

SPIROGRAPHICAL OUTPUTS

D. Trial Attempts



Trial Attempt #1



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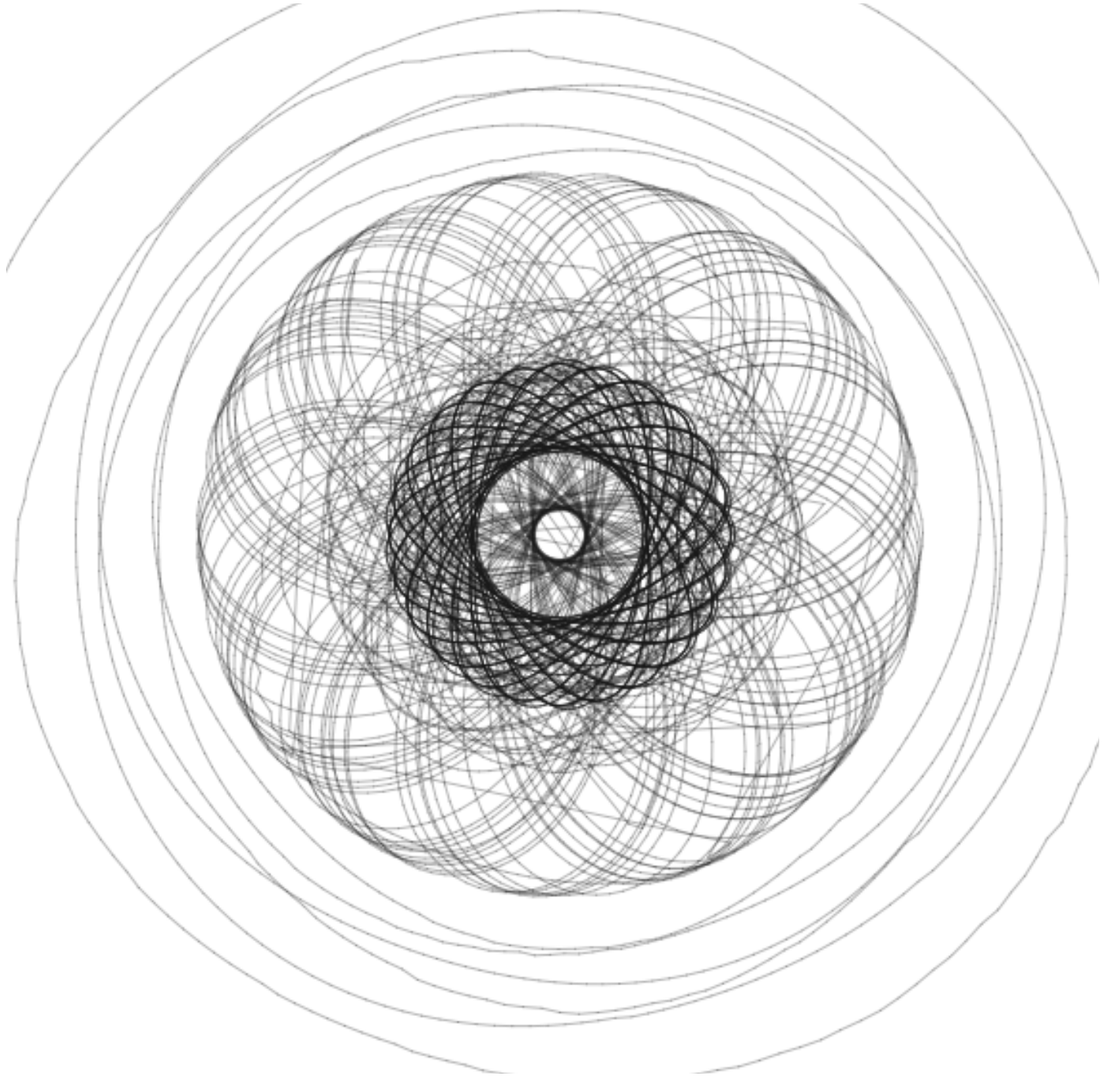

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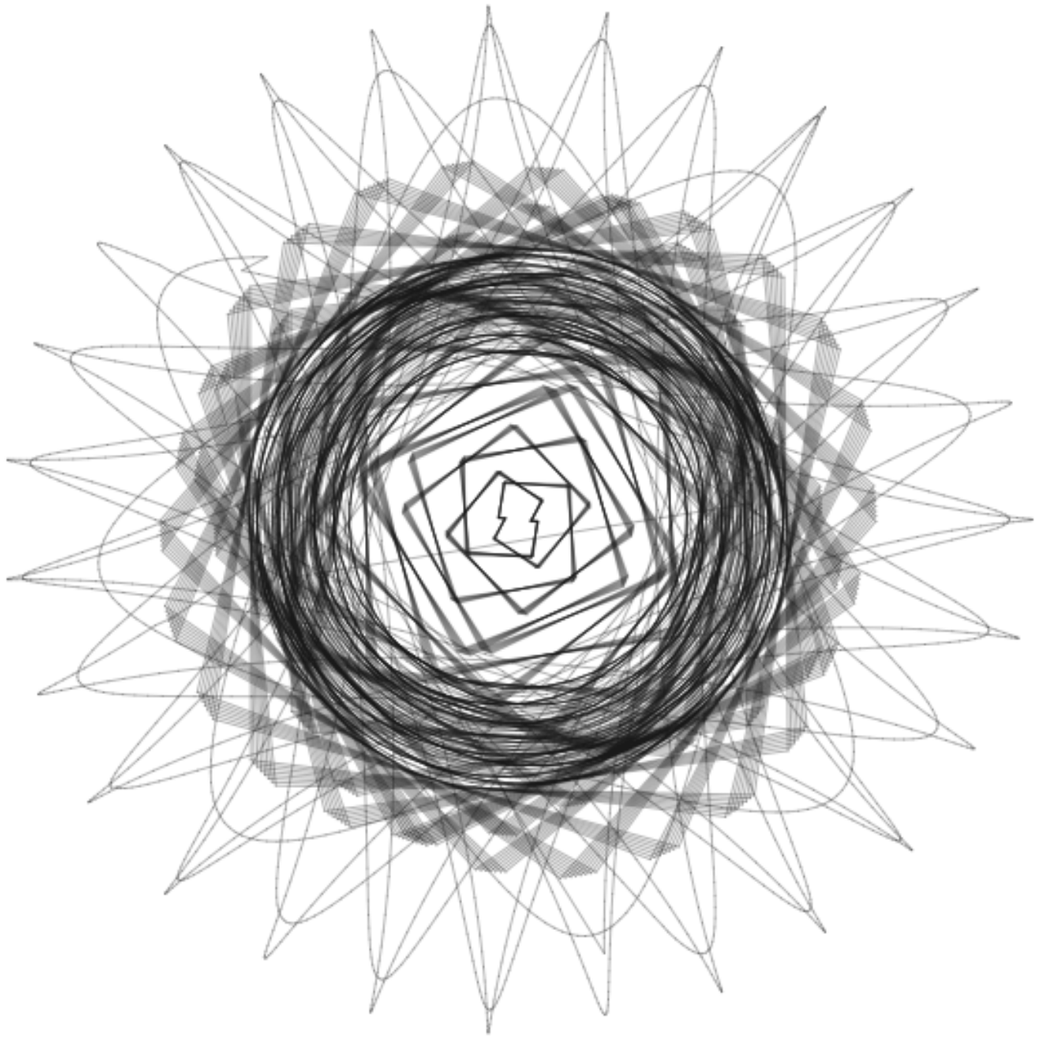
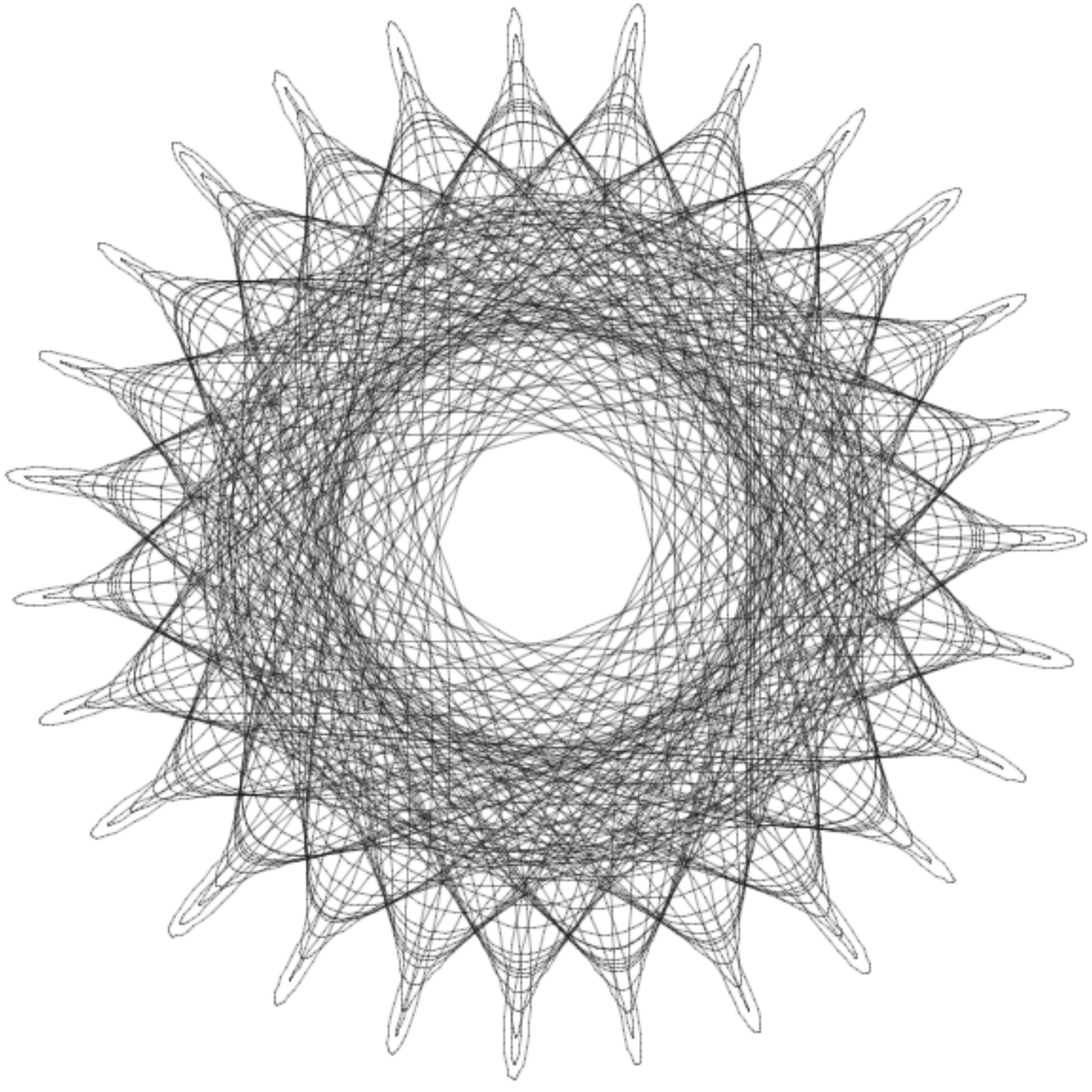
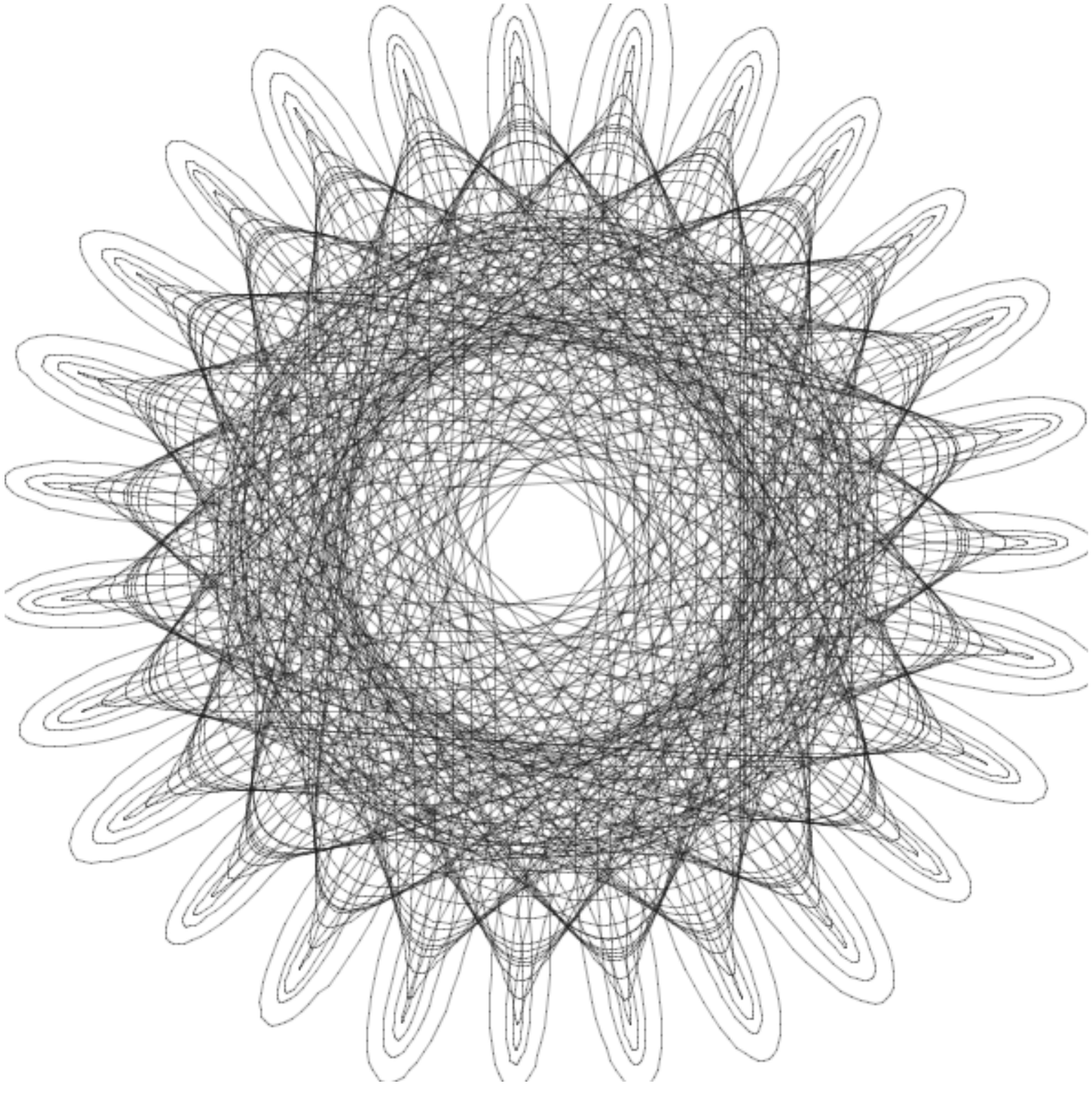


Trial Attempt #4



Trial Attempt #5



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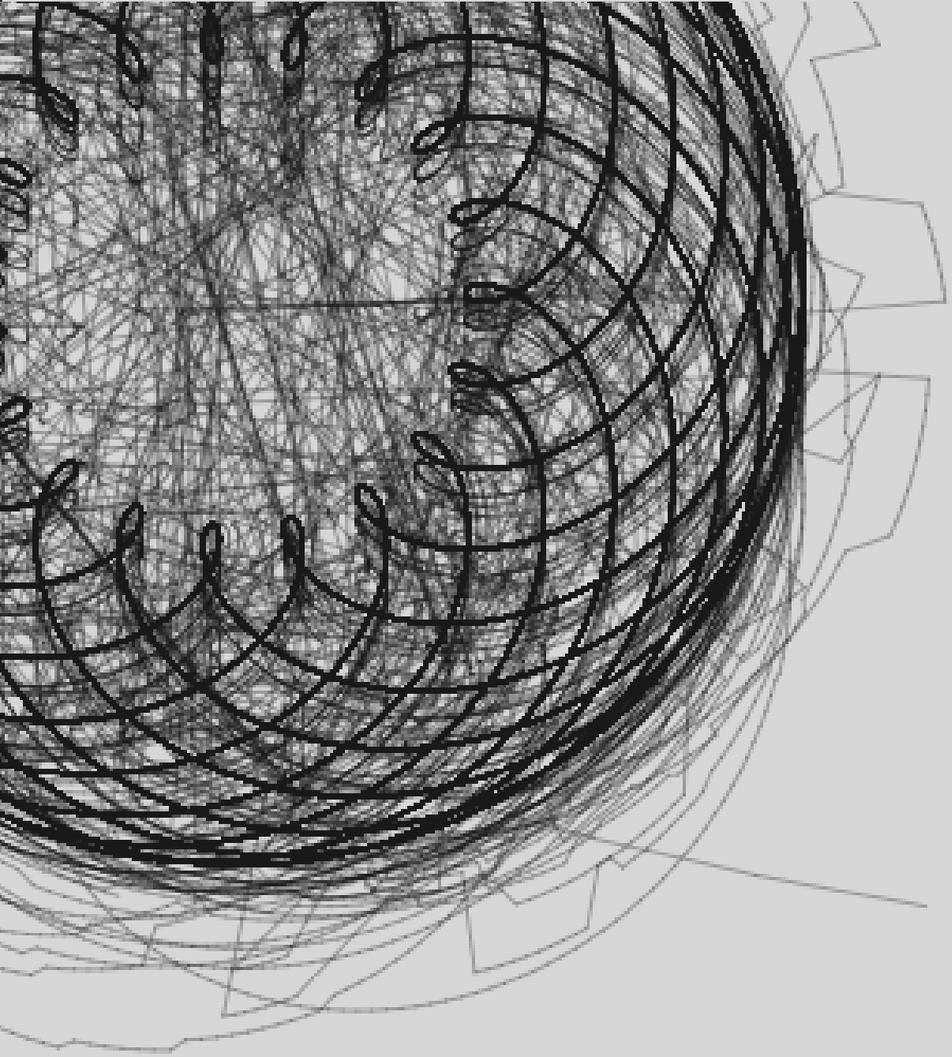

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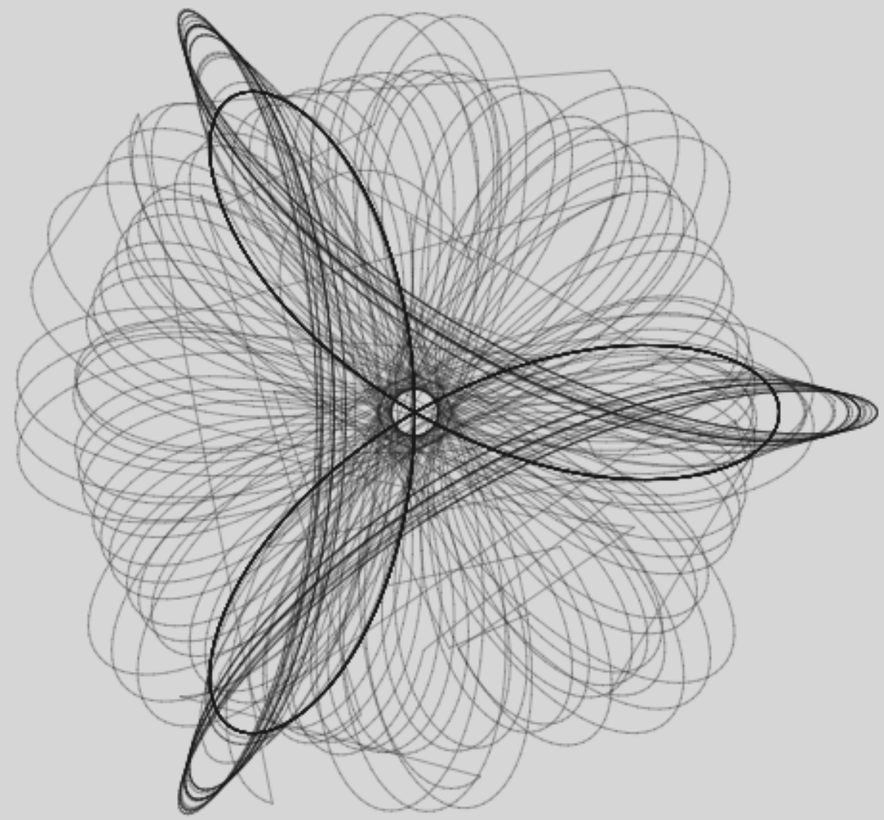

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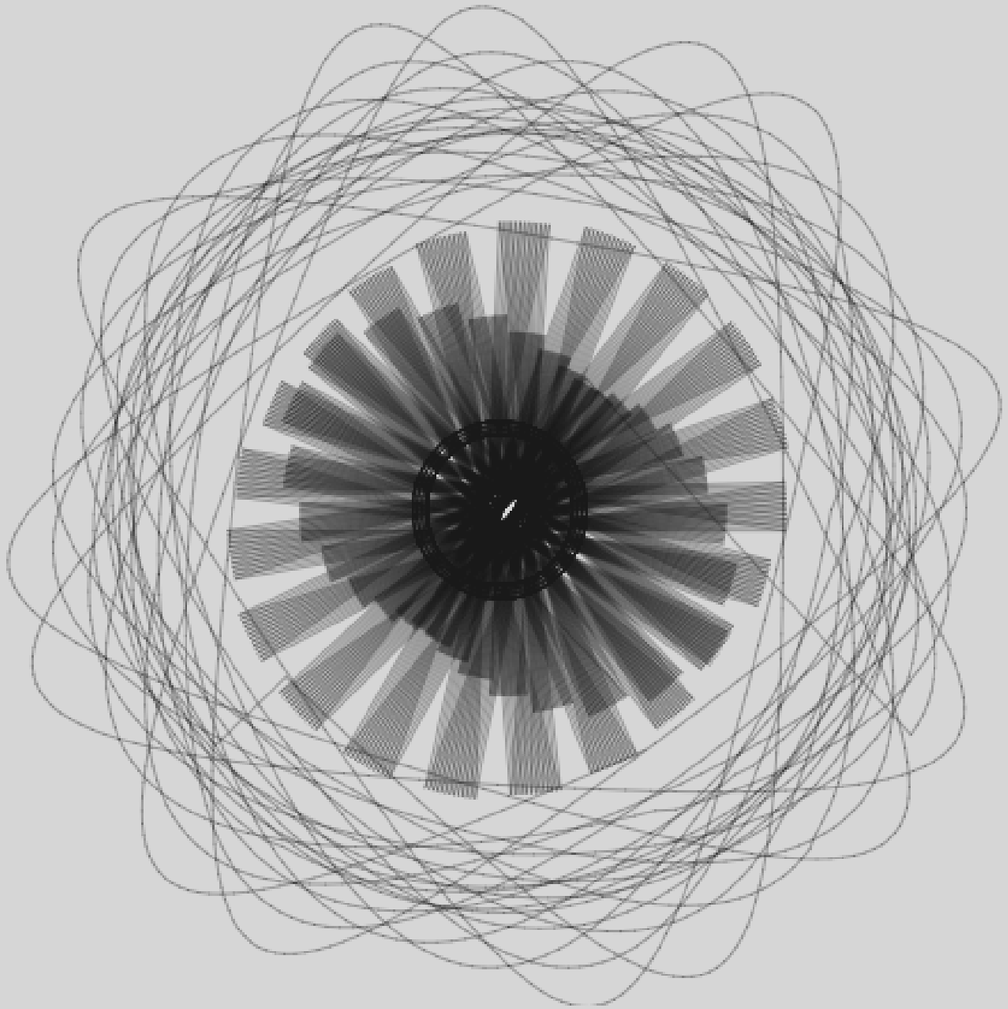

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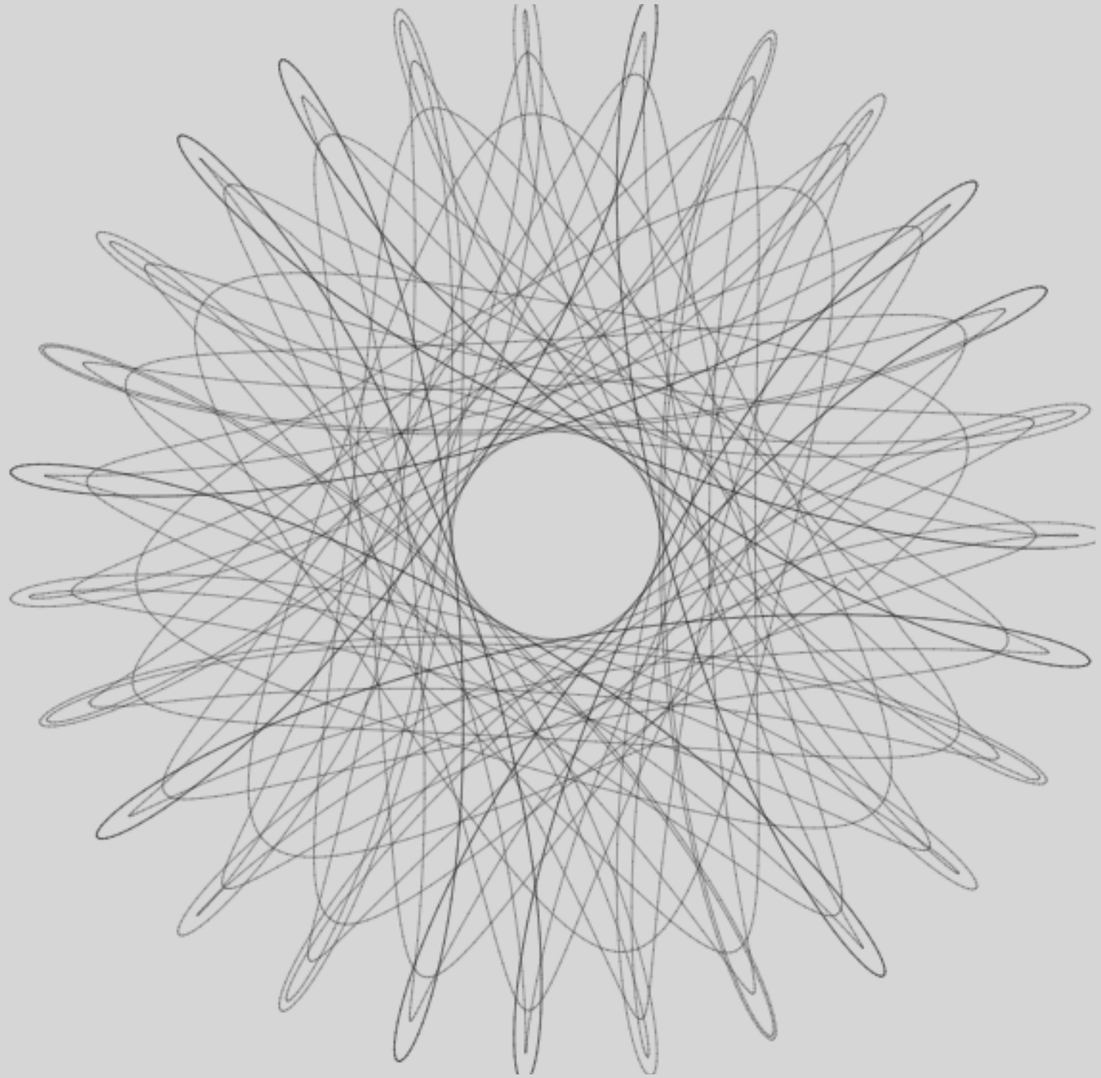

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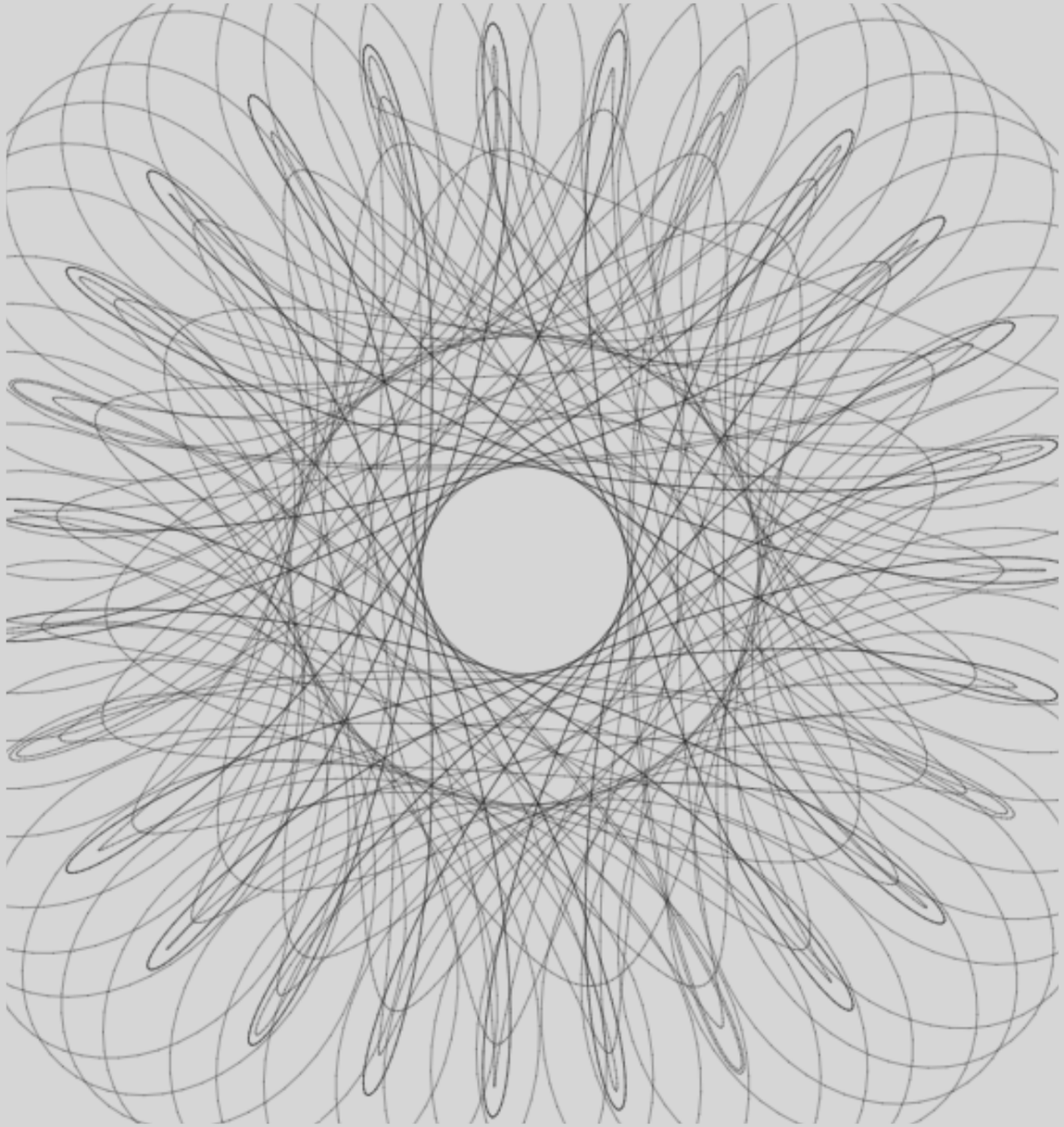
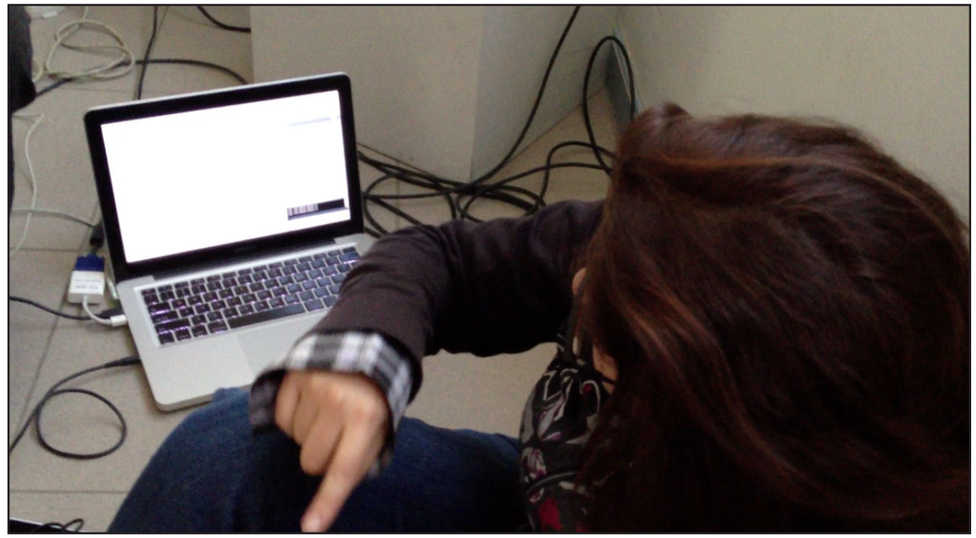


Trial Attempt #11

E. Public Testing



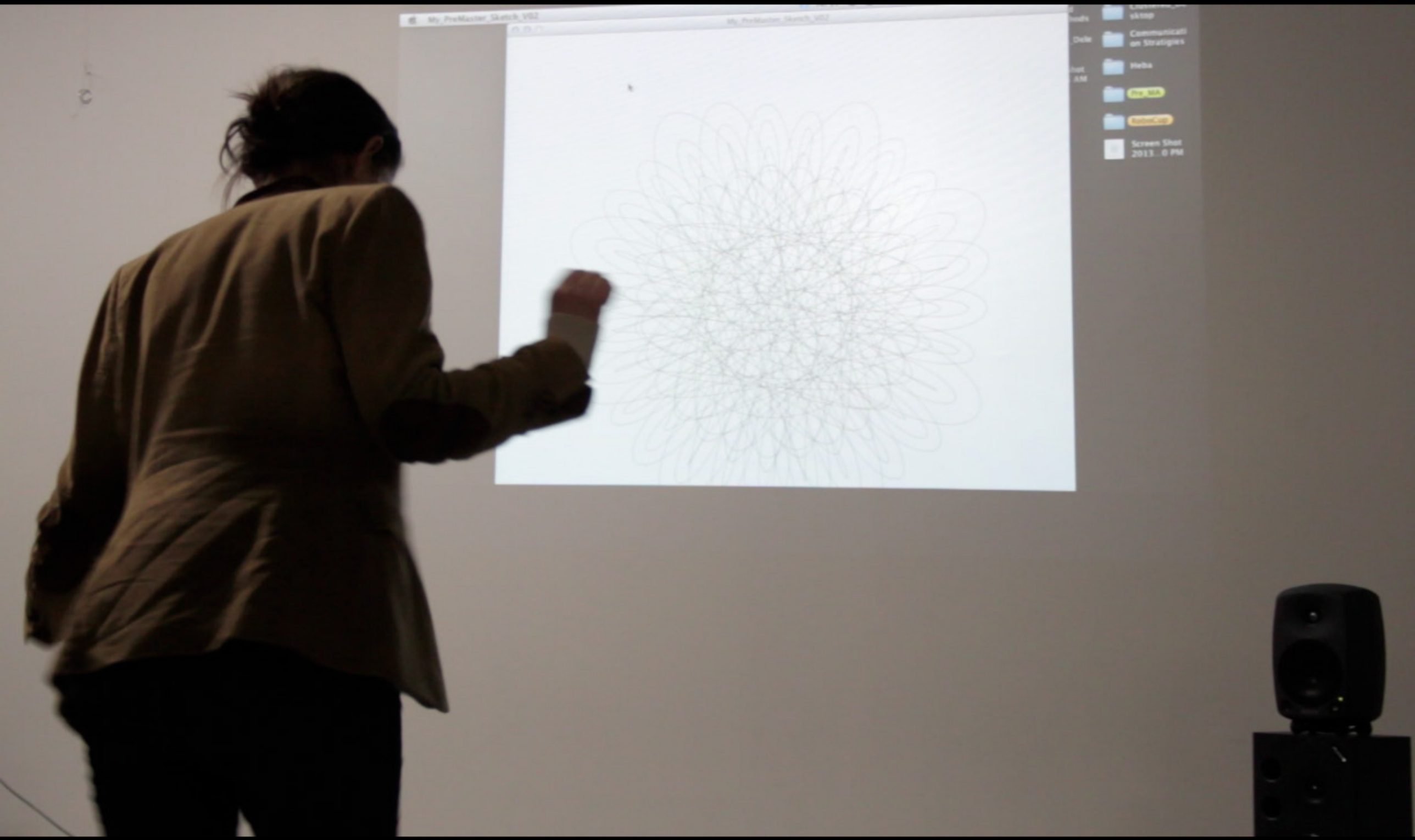
Public Testing

A public testing was held on the 10th of January 2013 at the German University in Cairo.

Participants

Approximately 20 to 30 people.

F. Exhibition


My_PreMaster_Sketch_V02
My_PreMaster_Sketch_V02
Communicati
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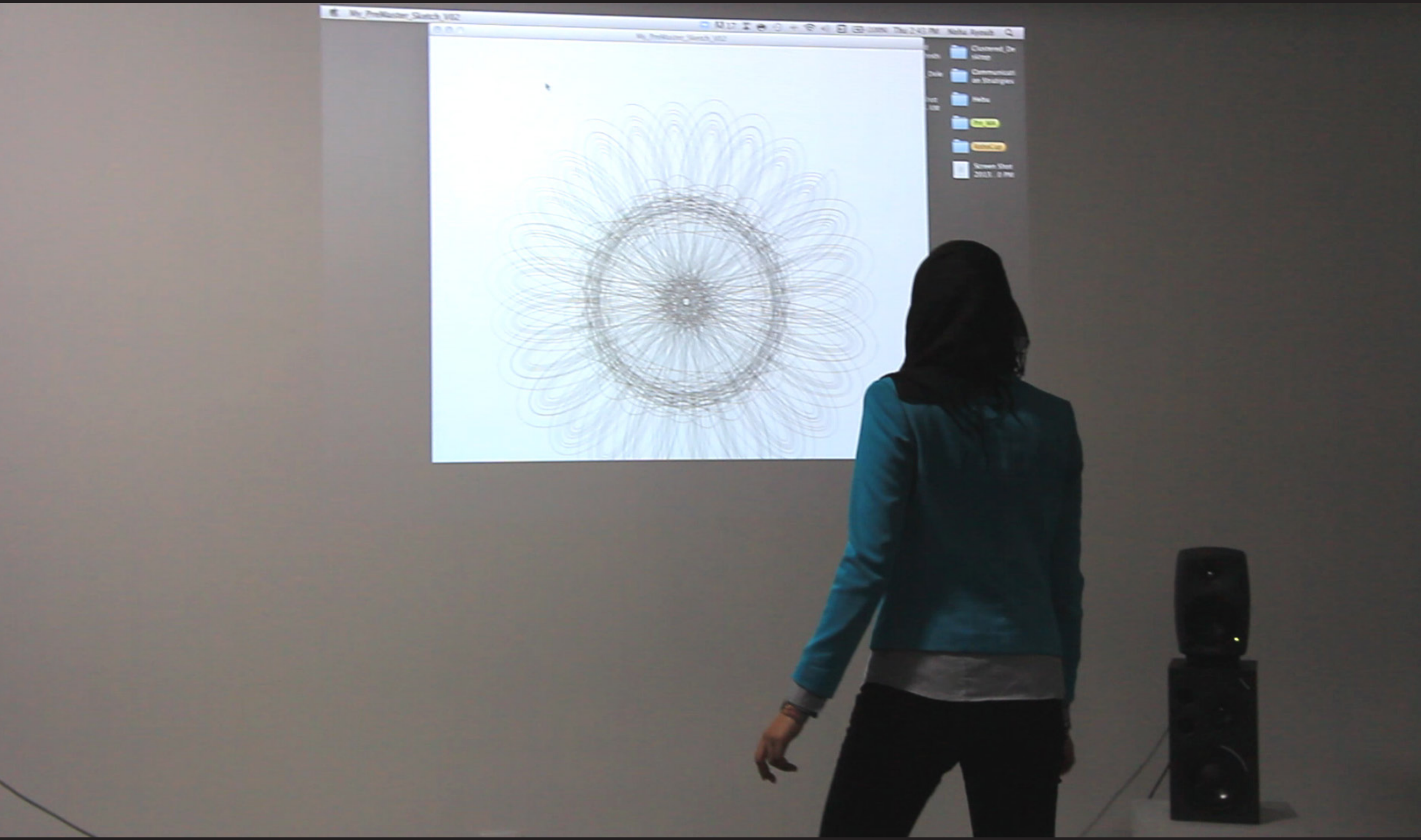
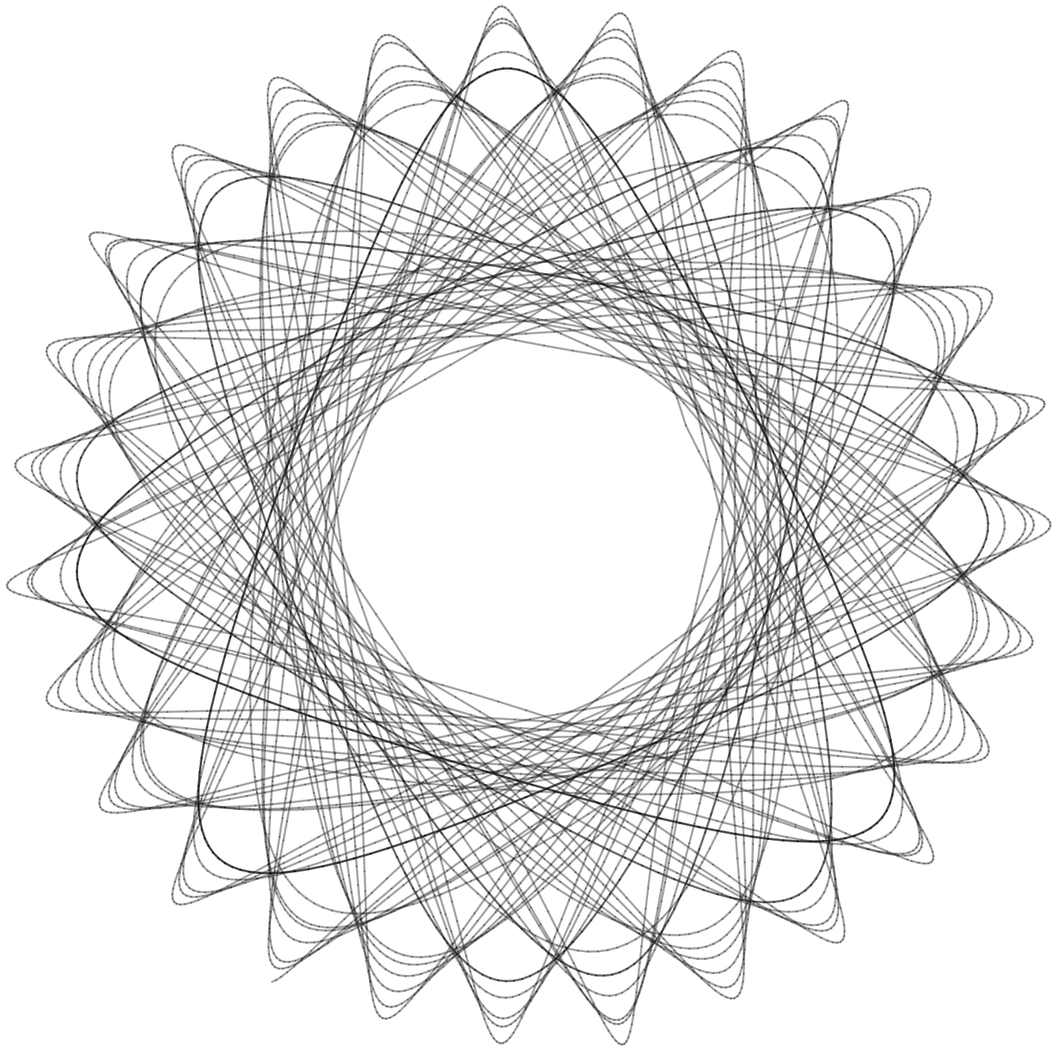
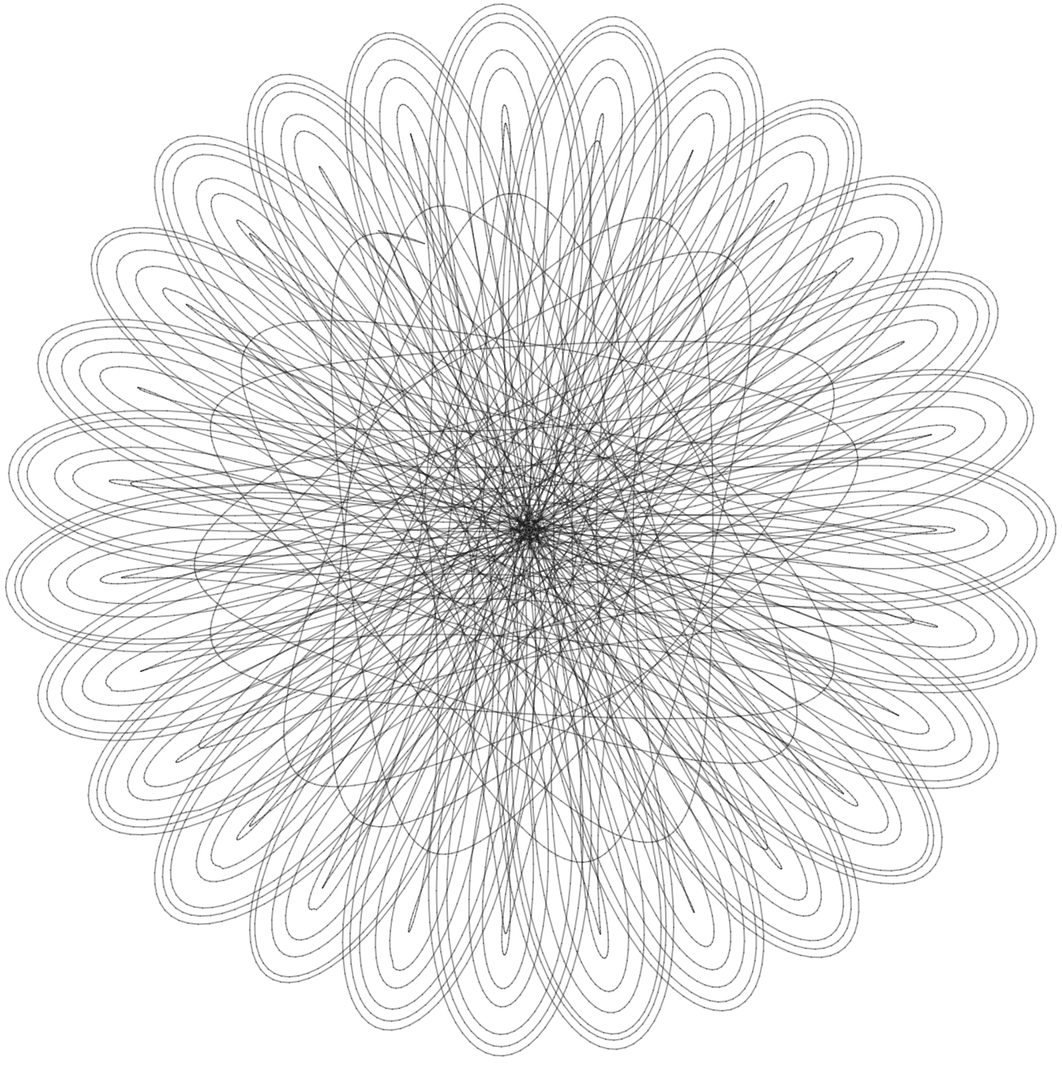
Helix
Screen Shot
2013...0 PM



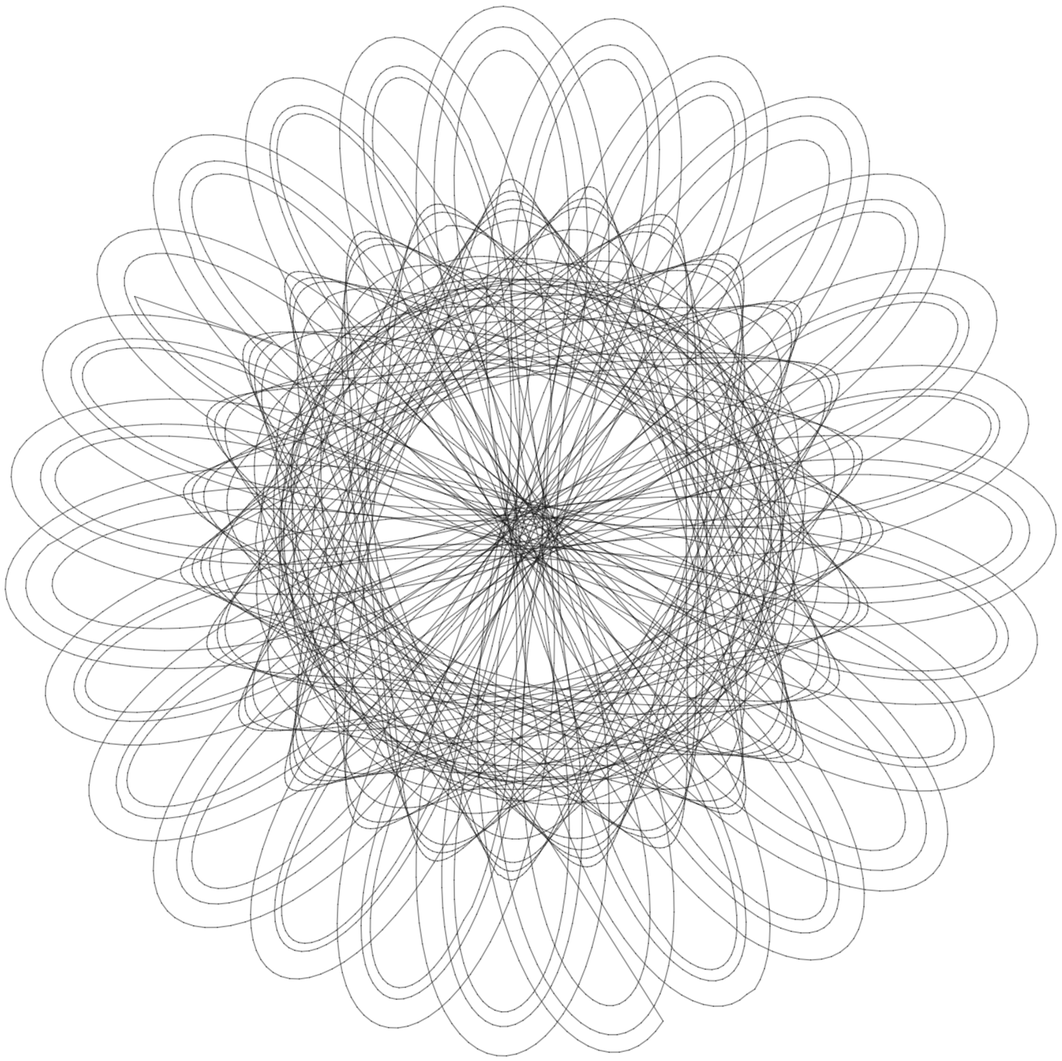
G. Final Outcomes



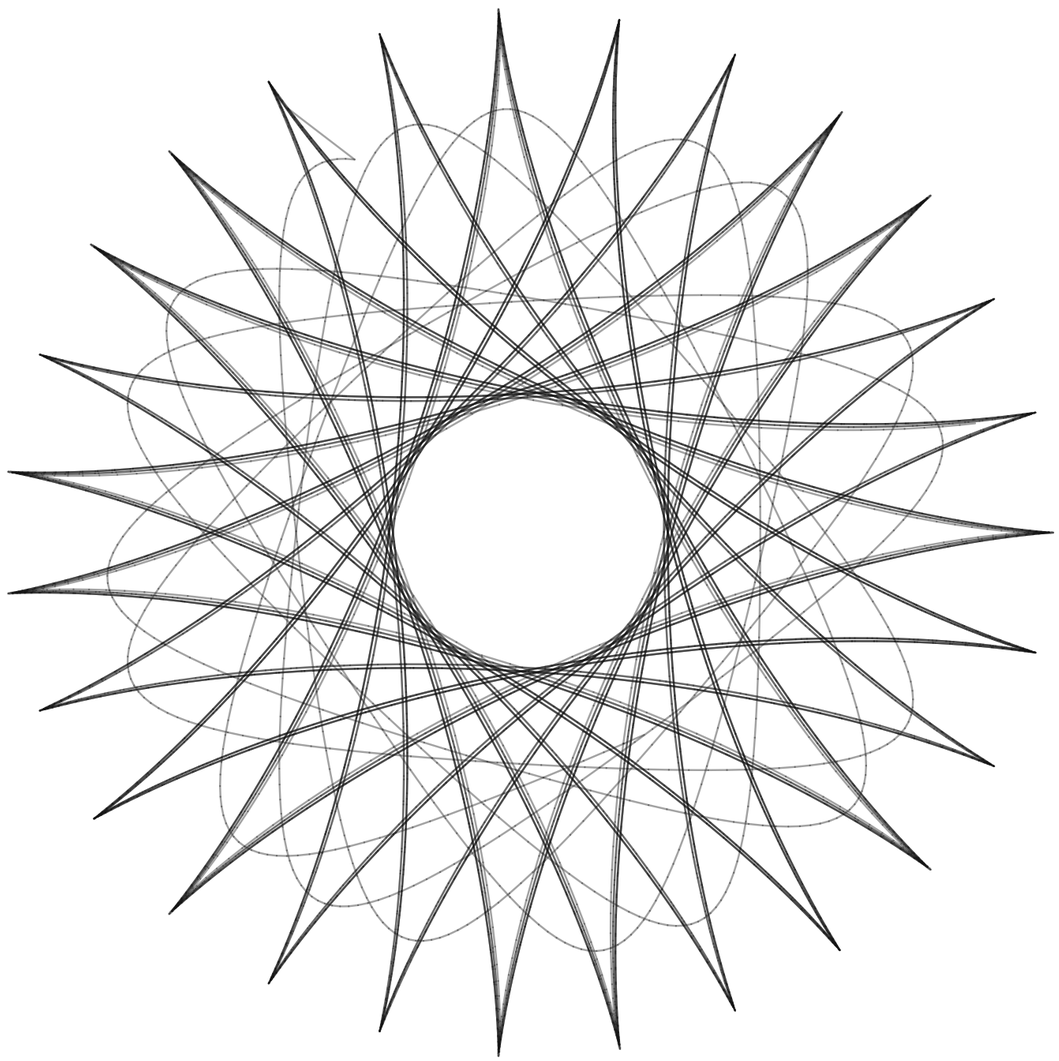
Sound Kinectics
By **Mona Diab**



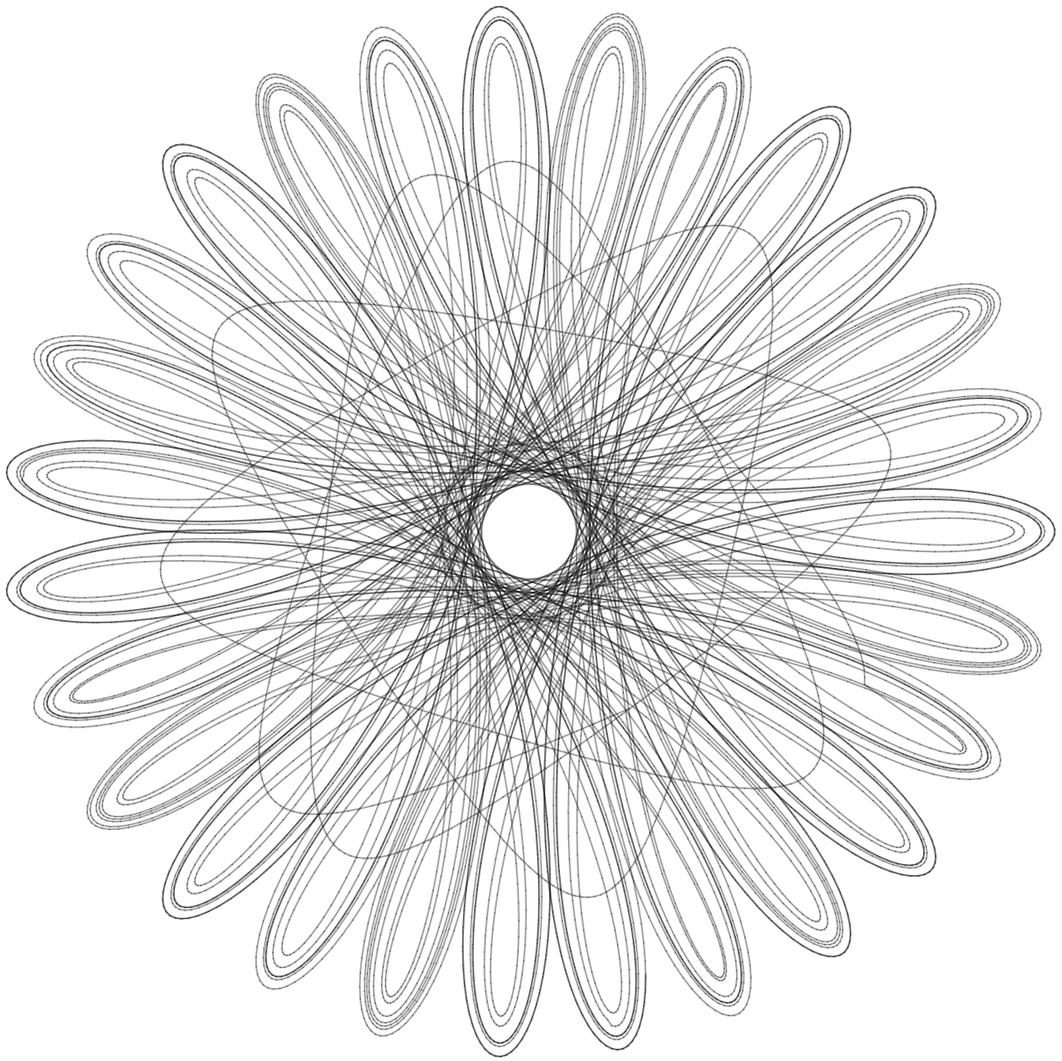
Sound Kinectics
By **Ayman Abo El Kheir**



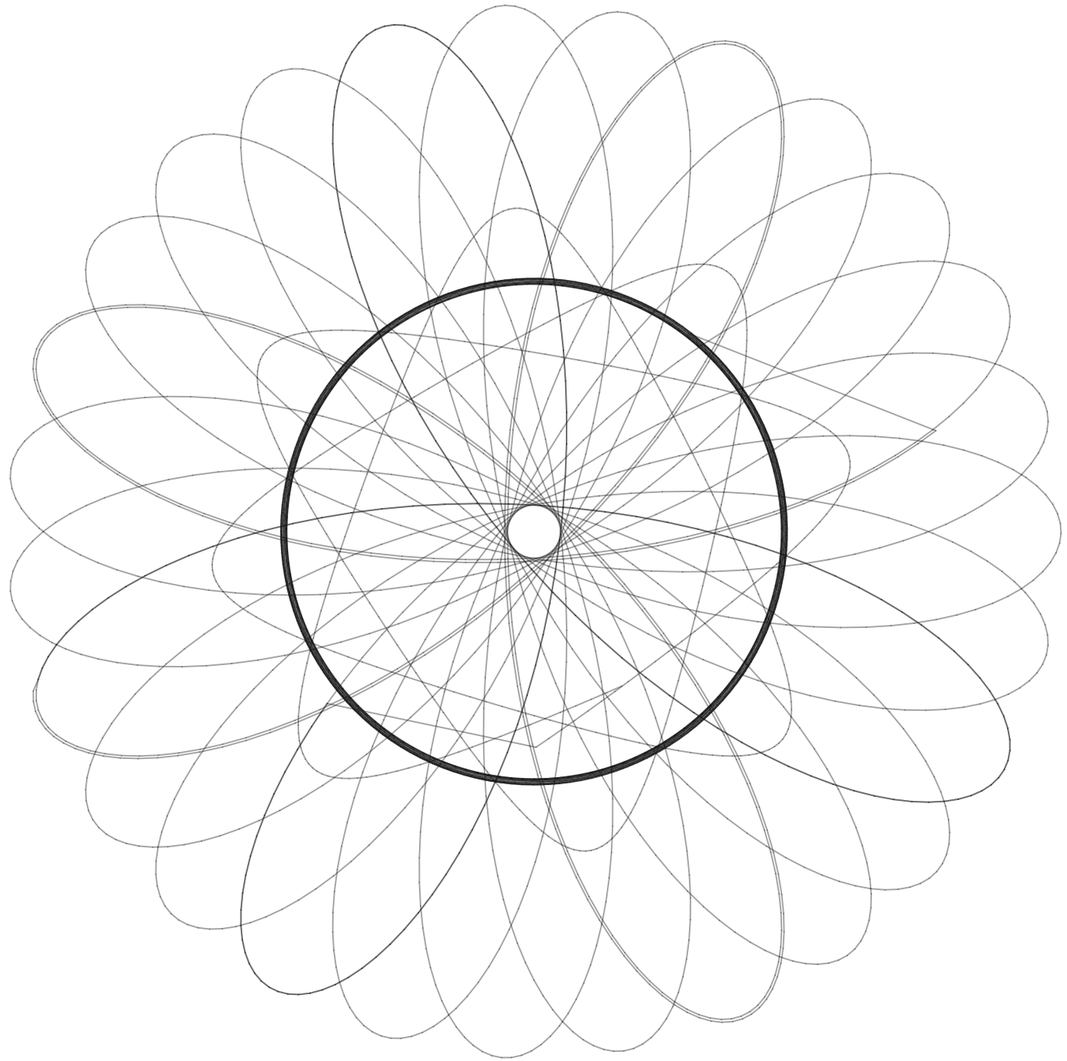
Sound Kinectics
By **Lama**



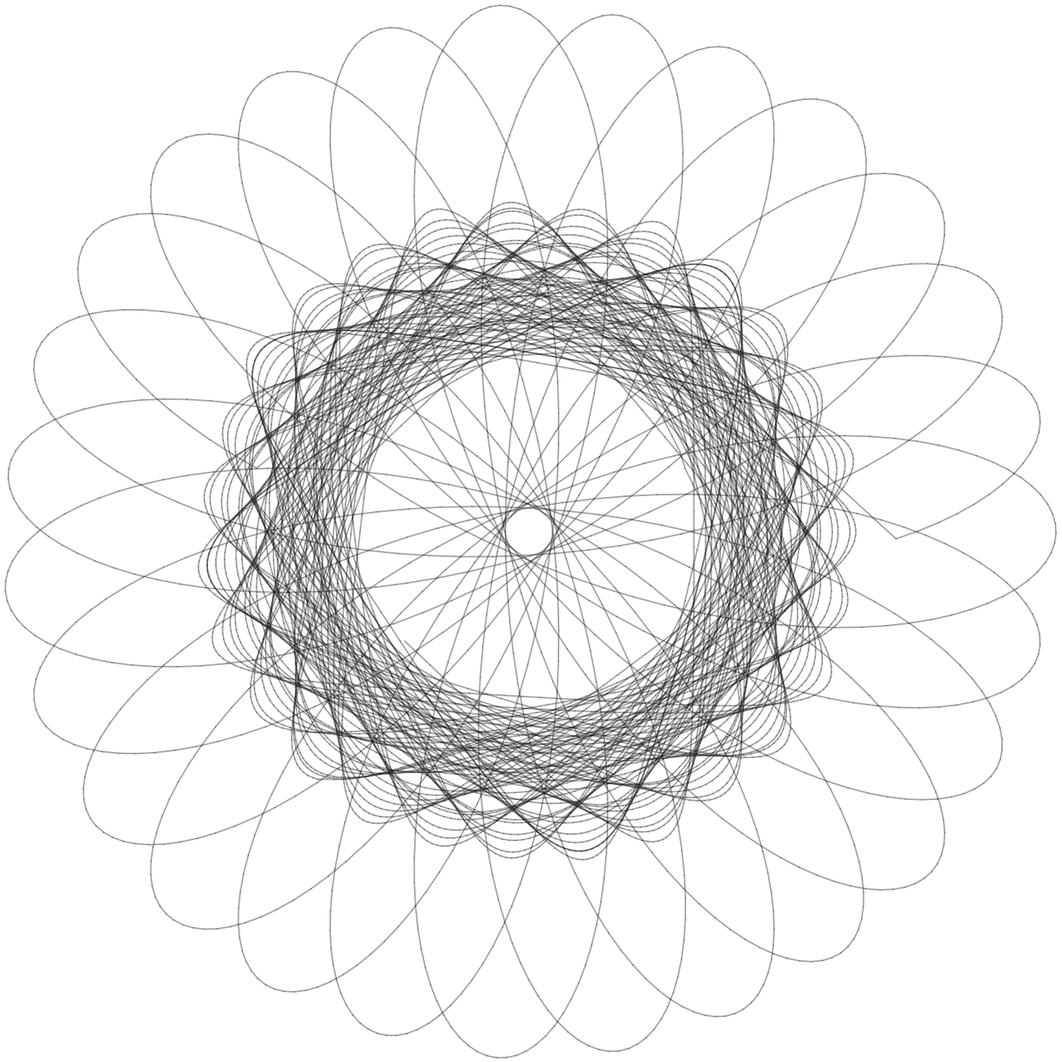
Sound Kinectics
By **Mariam Abo El Nasr**



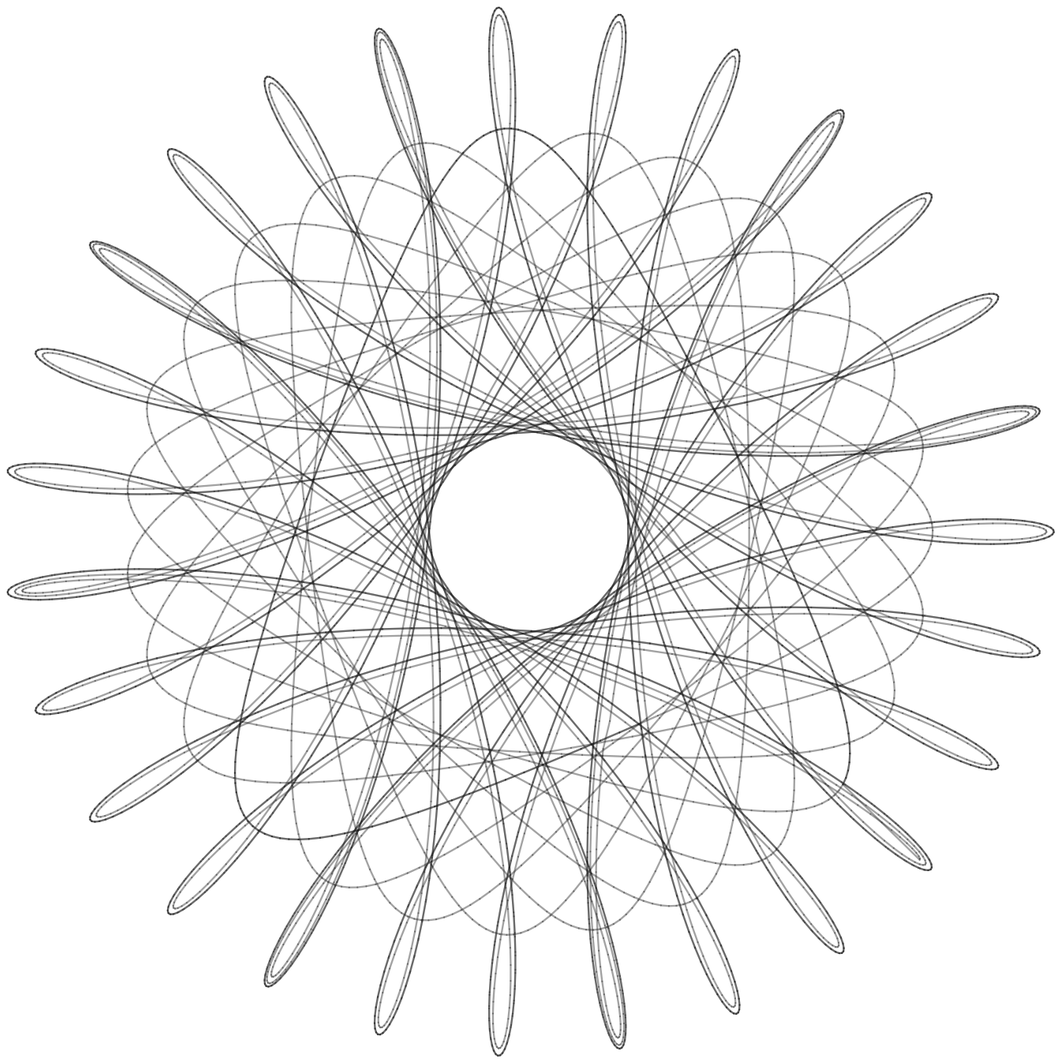
Sound Kinectics
By **Anonymous**



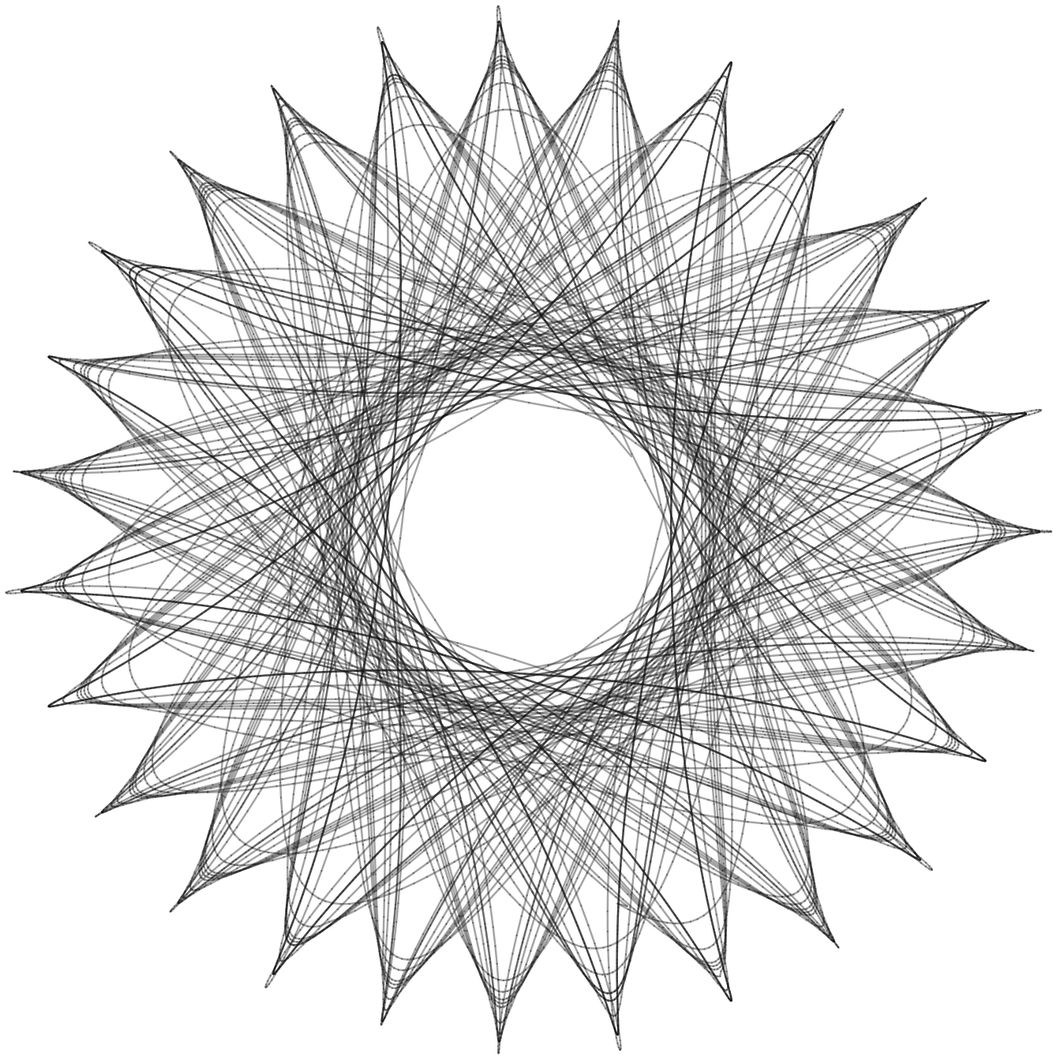
Sound Kinectics
By **Caroline Shoushanianv**



Sound Kinectics
By Nahla El Gizawy



Sound Kinectics
By Marynet Adel



Sound Kinectics
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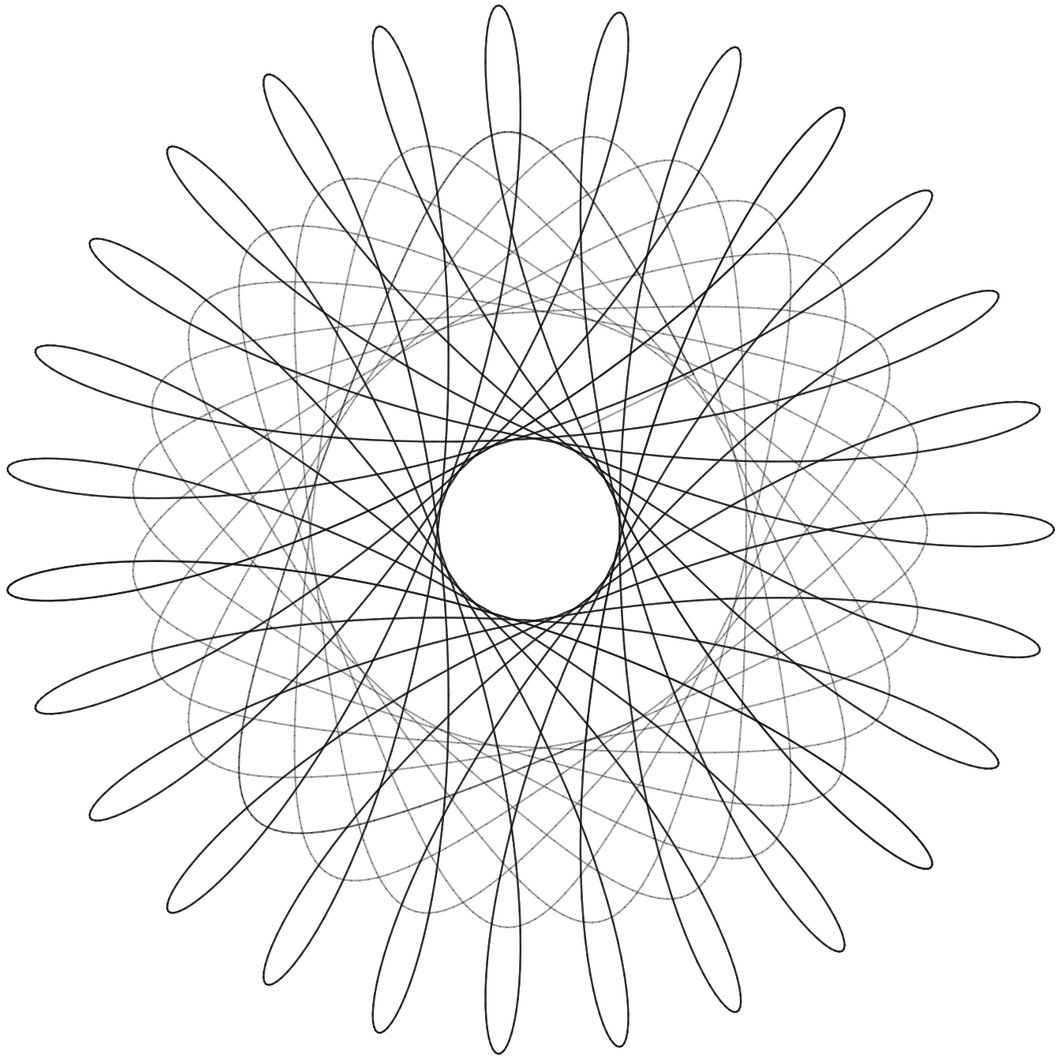
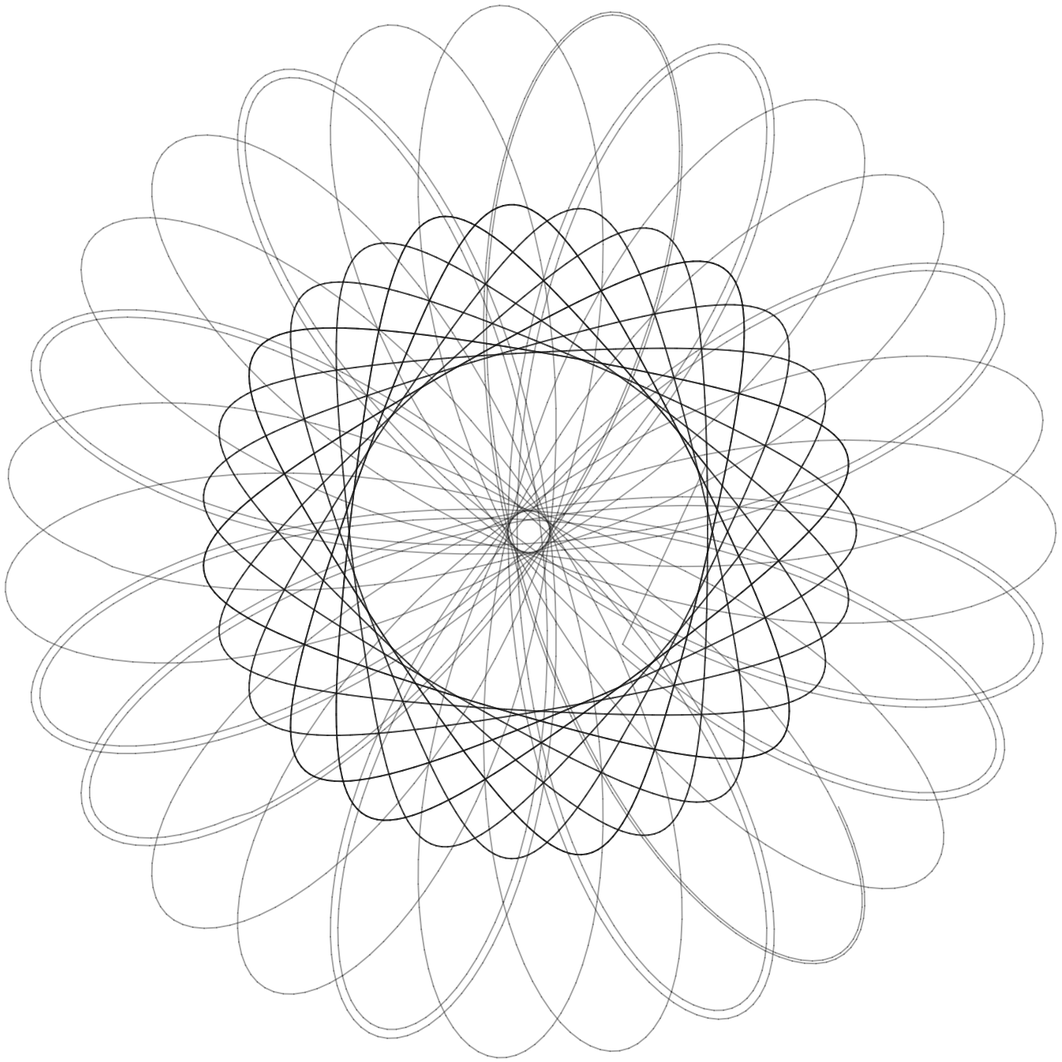
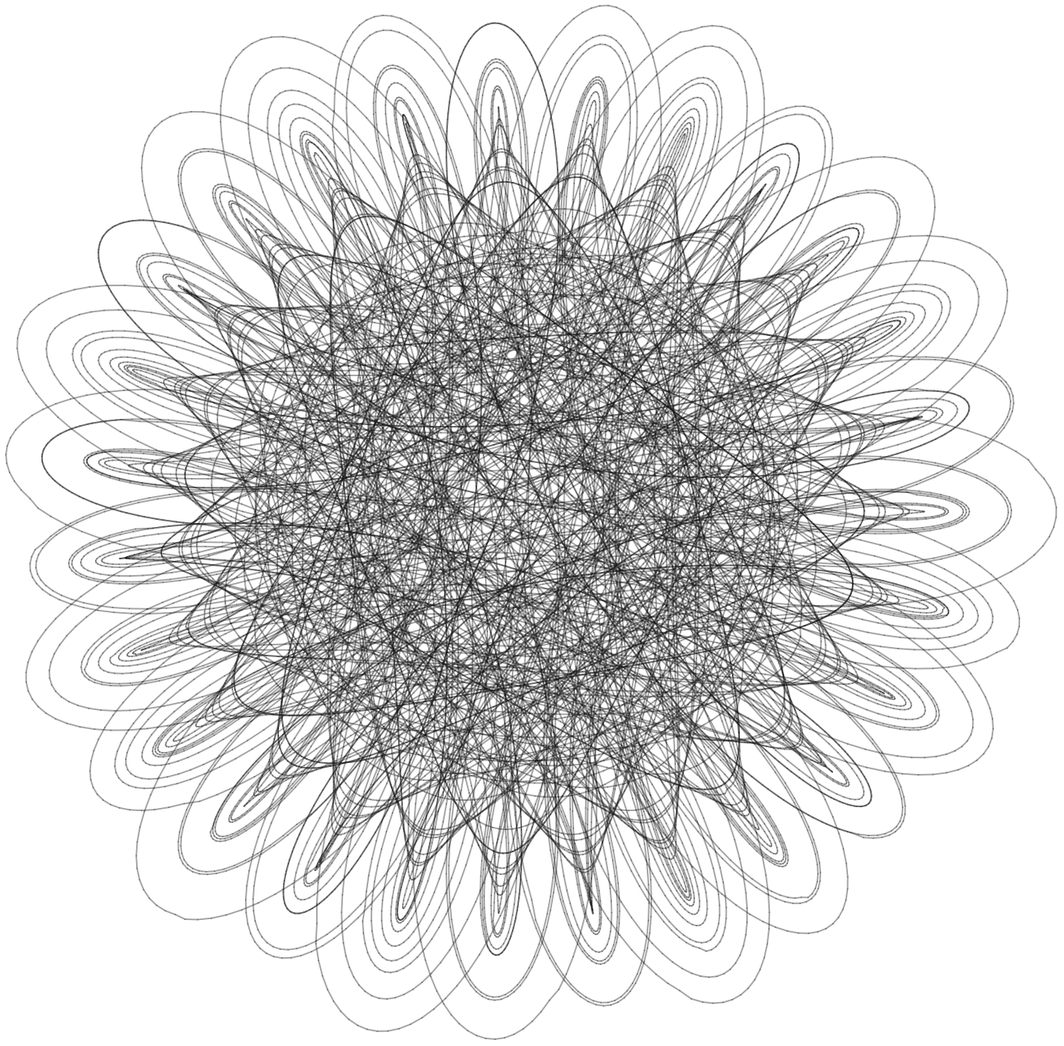


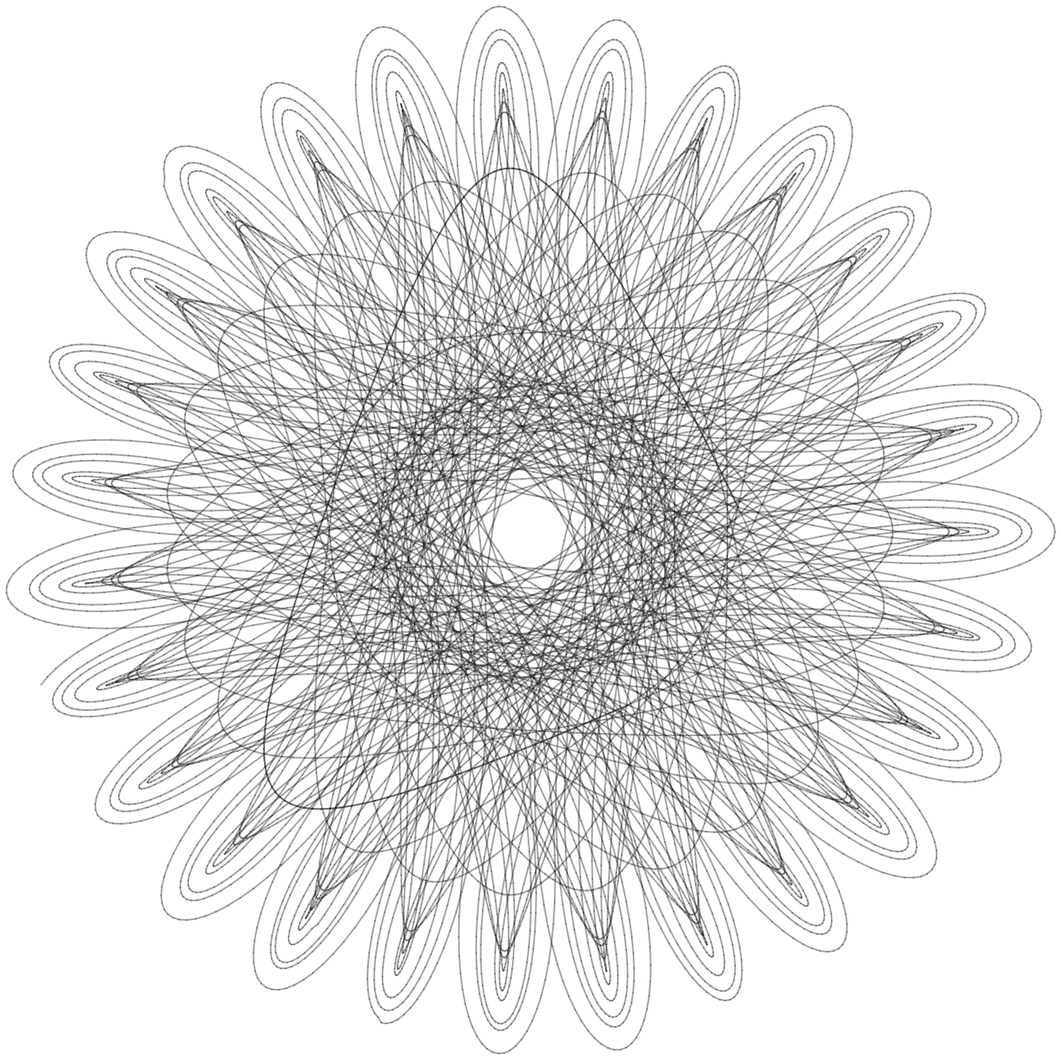
Sound Kinectics
By **Mona Marie**



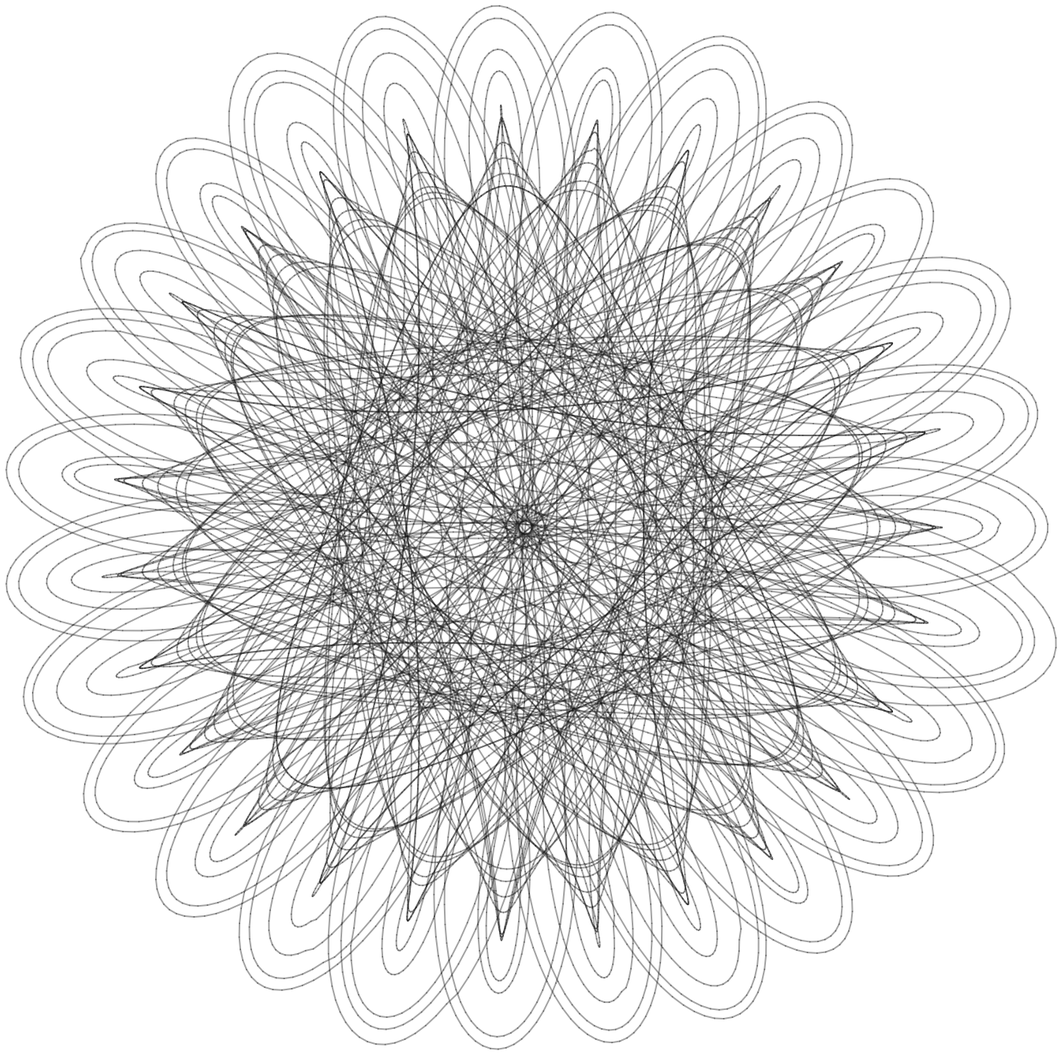
Sound Kinectics
By Yasmin Shehab



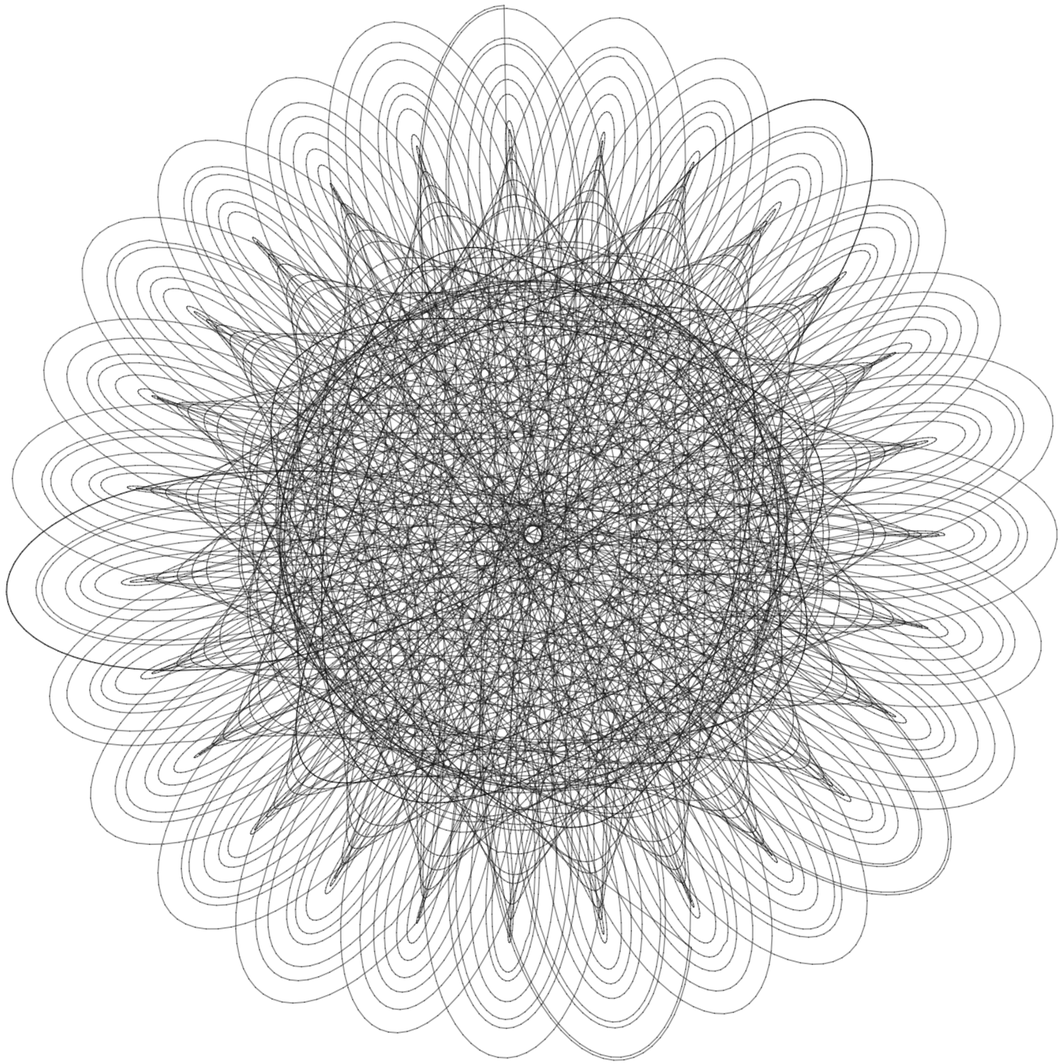
Sound Kinectics
By Yara Yassin



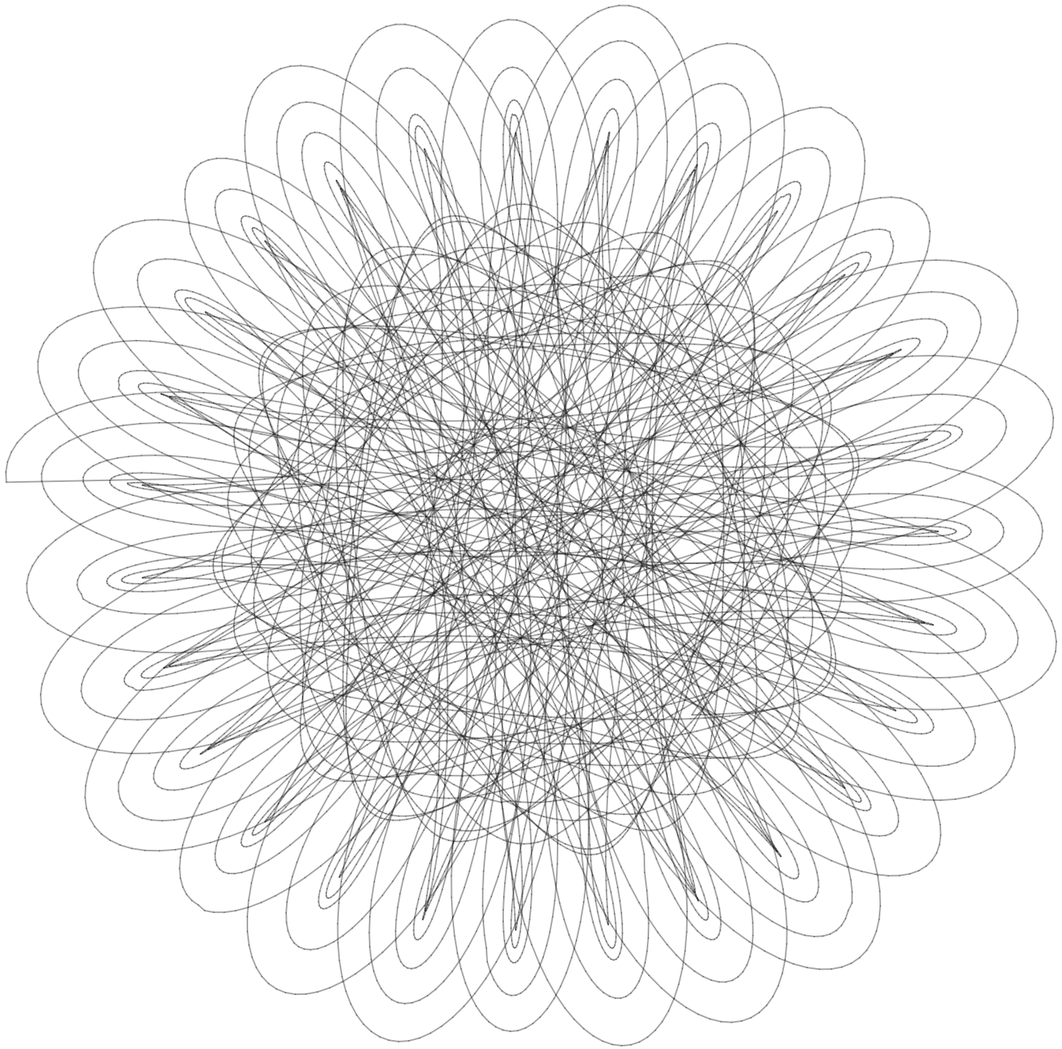
Sound Kinectics
By **Taha**



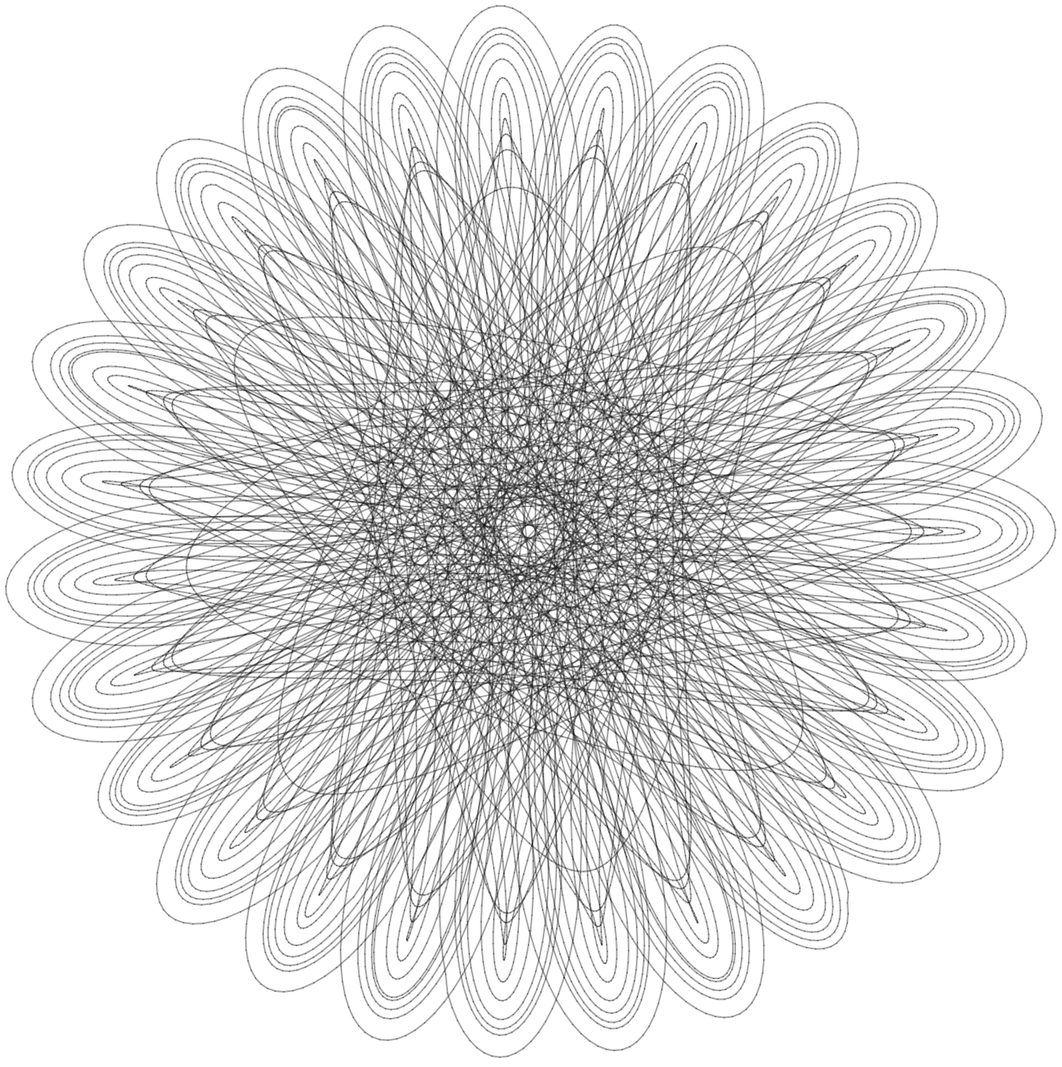
Sound Kinectics
By **Sherif Bishara**



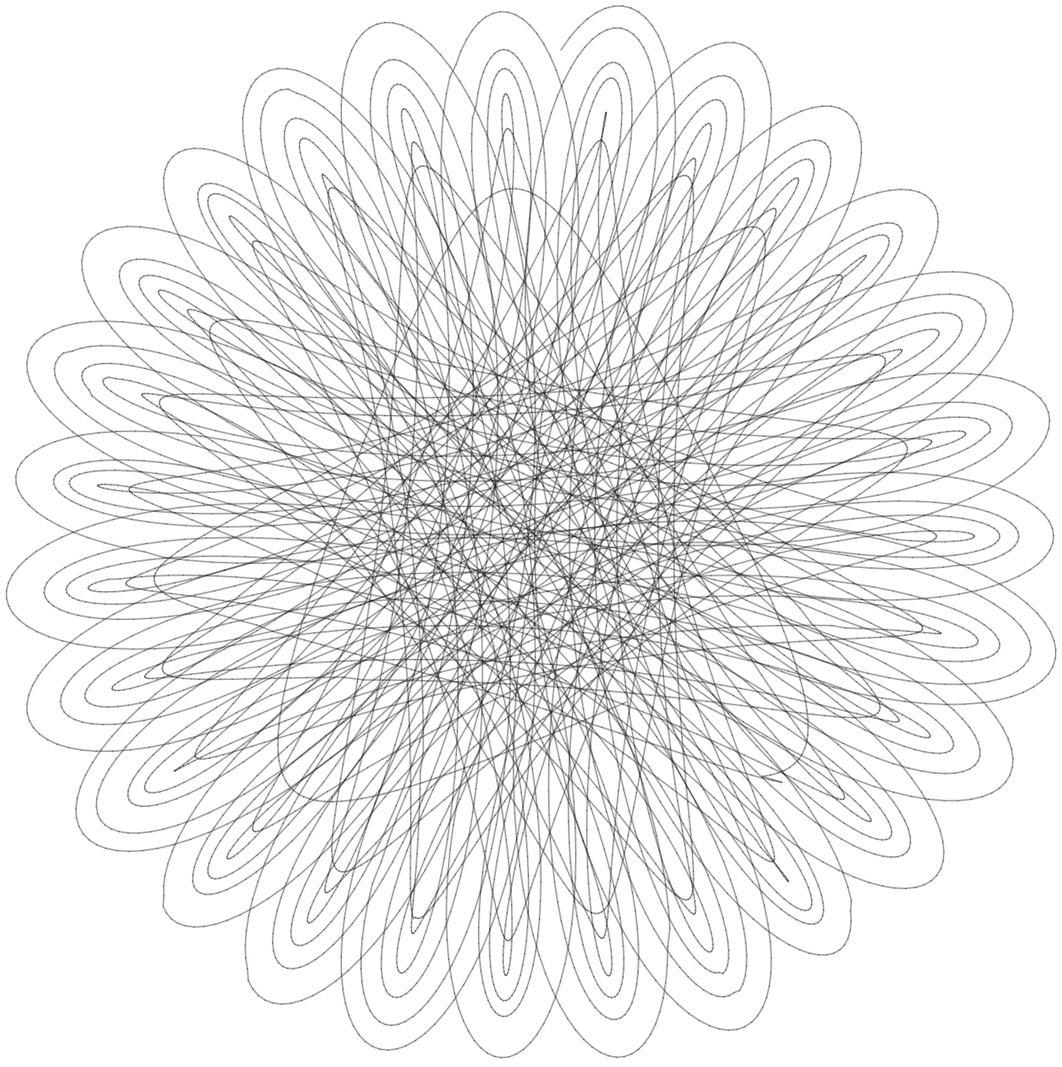
Sound Kinectics
By **Robert Pelz**



Sound Kinectics
By **Regine Ritz**



Sound Kinectics
By **Rania Kamel**



Sound Kinectics
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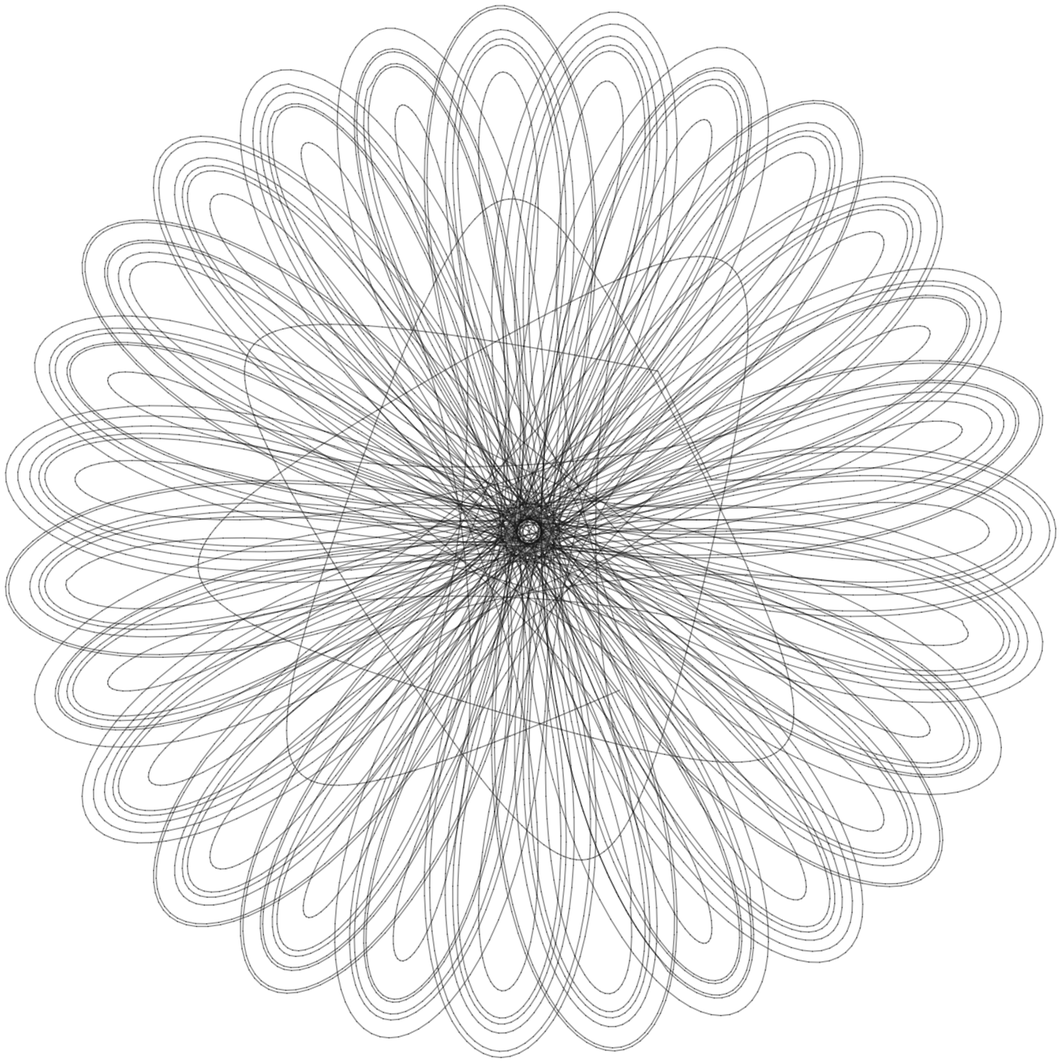
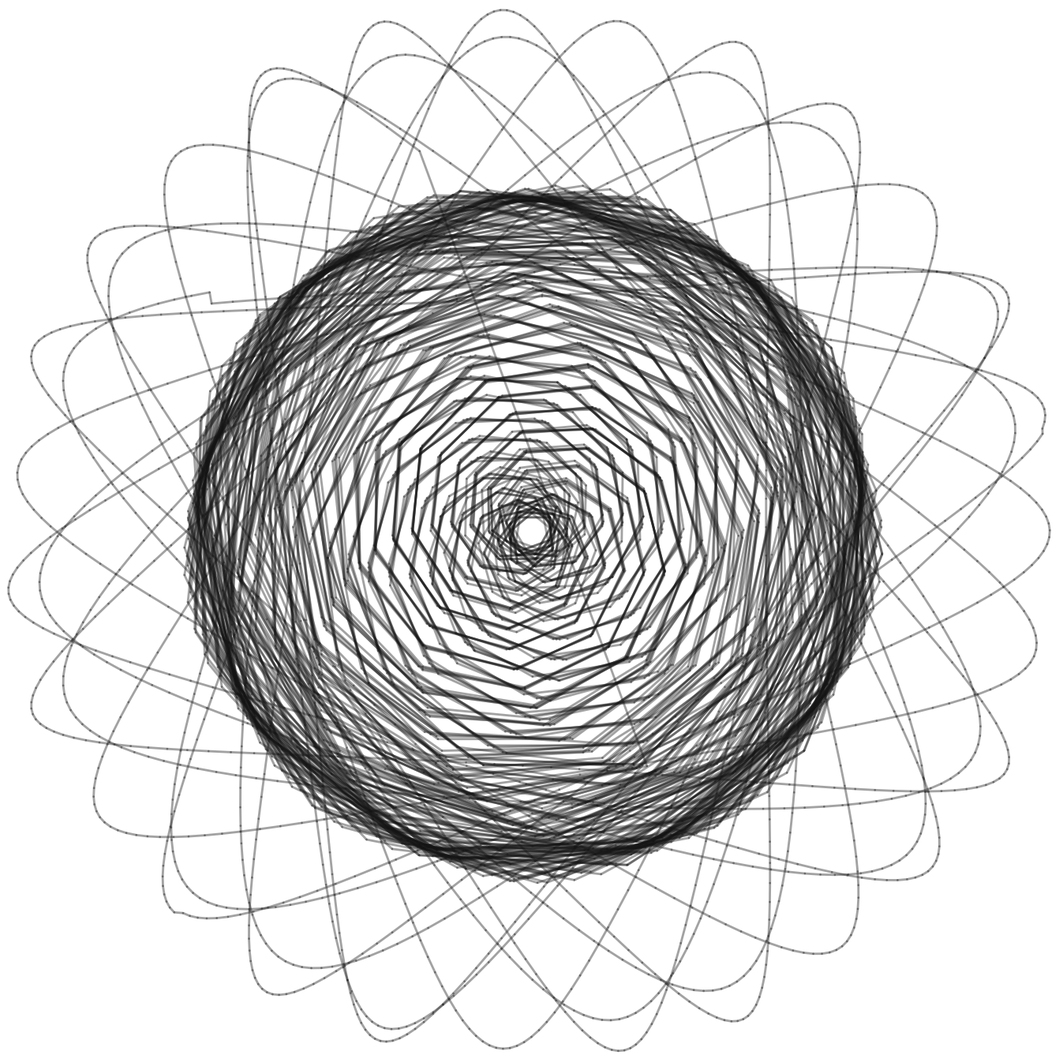


Sound Kinectics
By **Mona Marie**



Sound Kinectics
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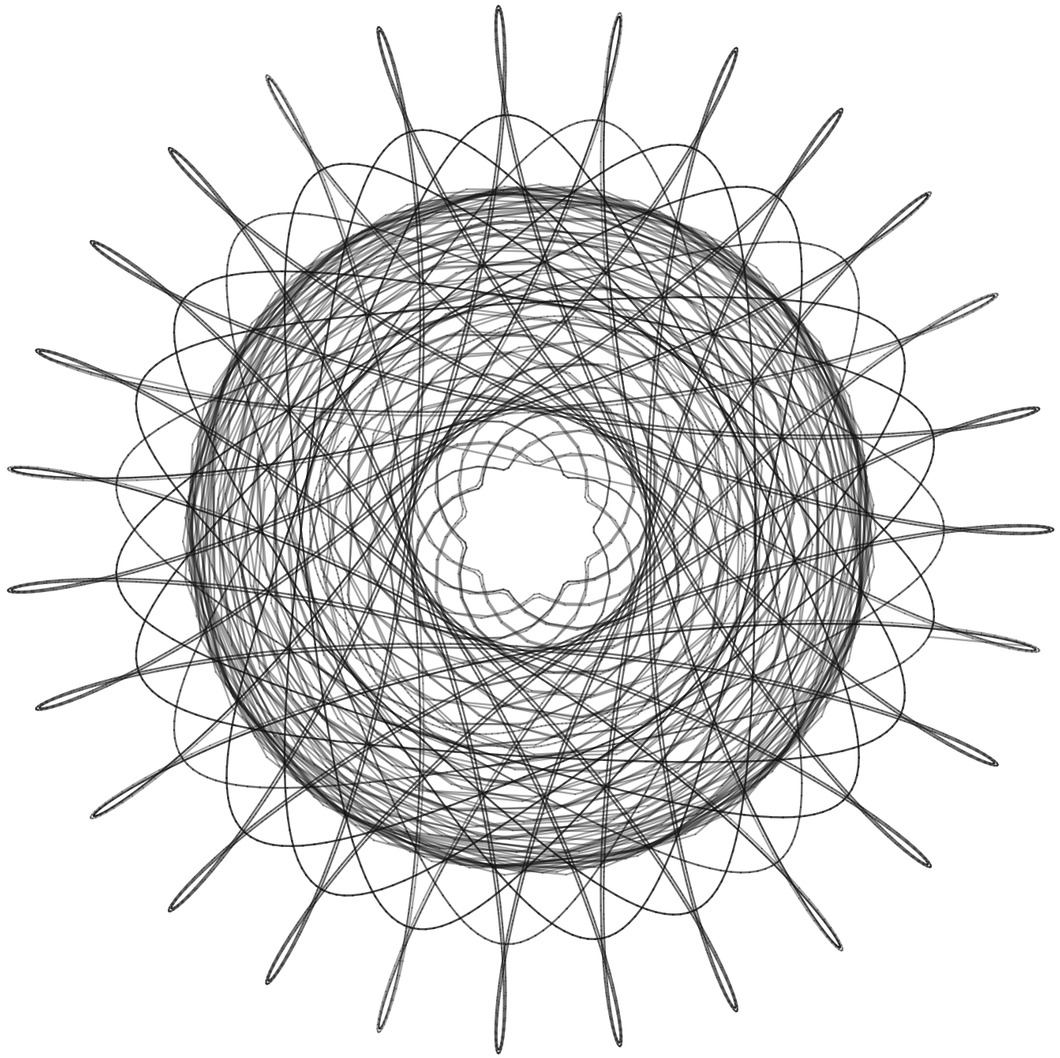

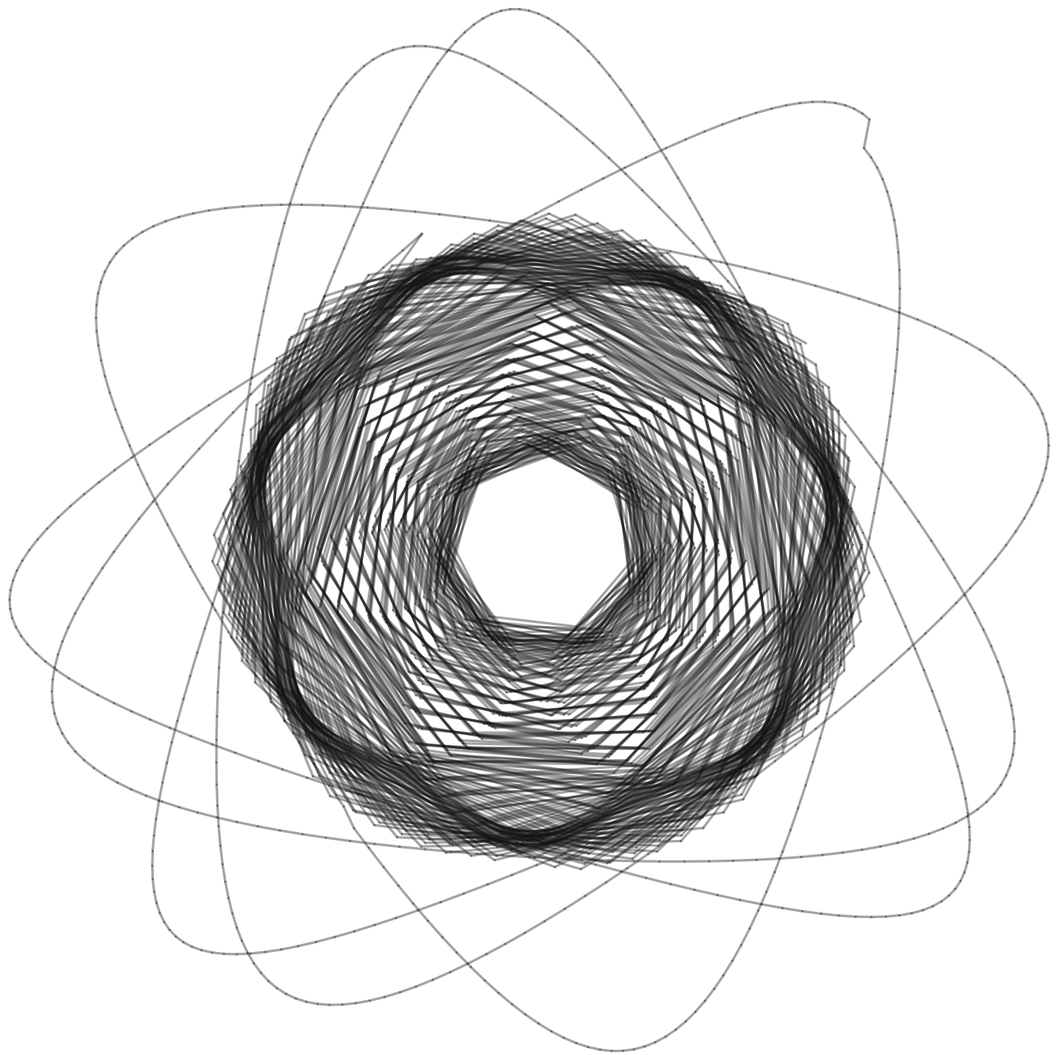

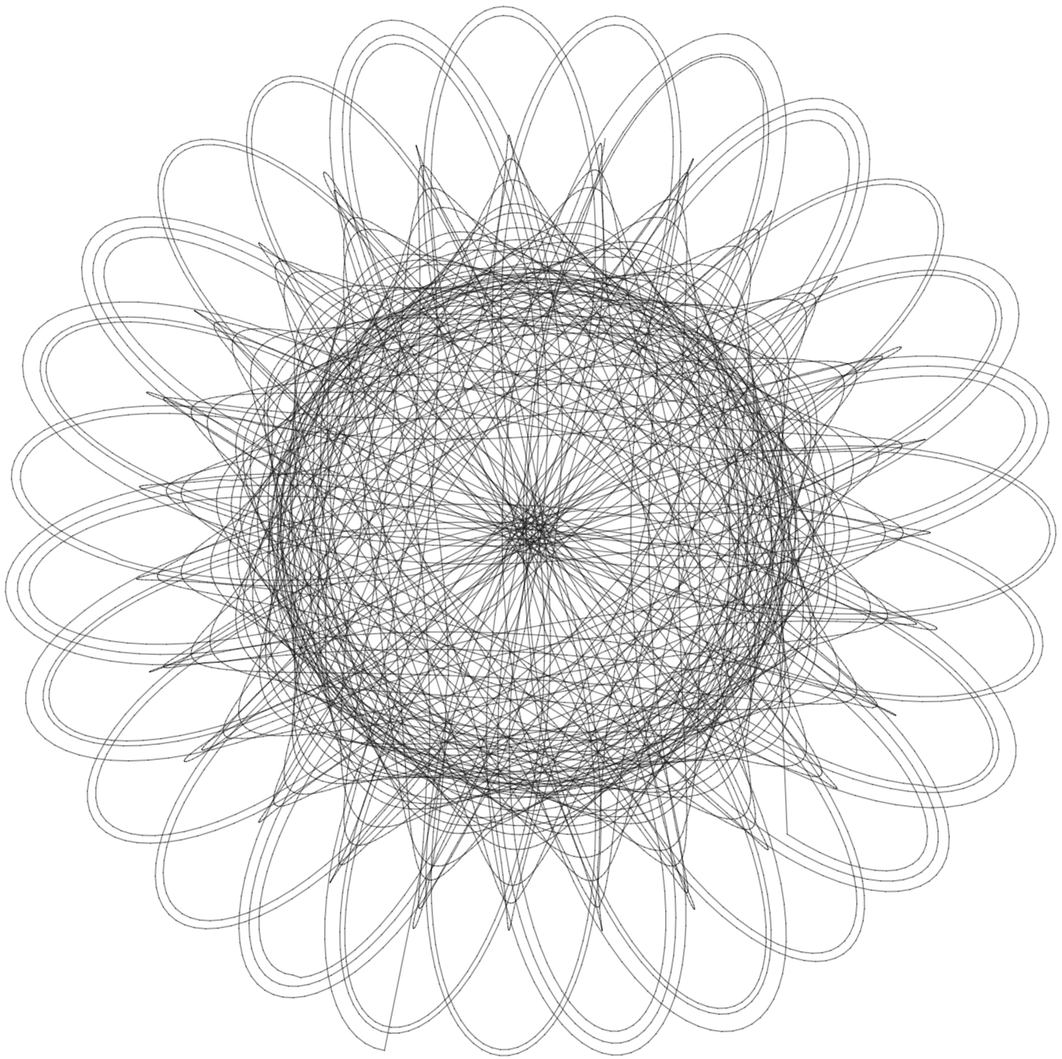

Sound Kinectics
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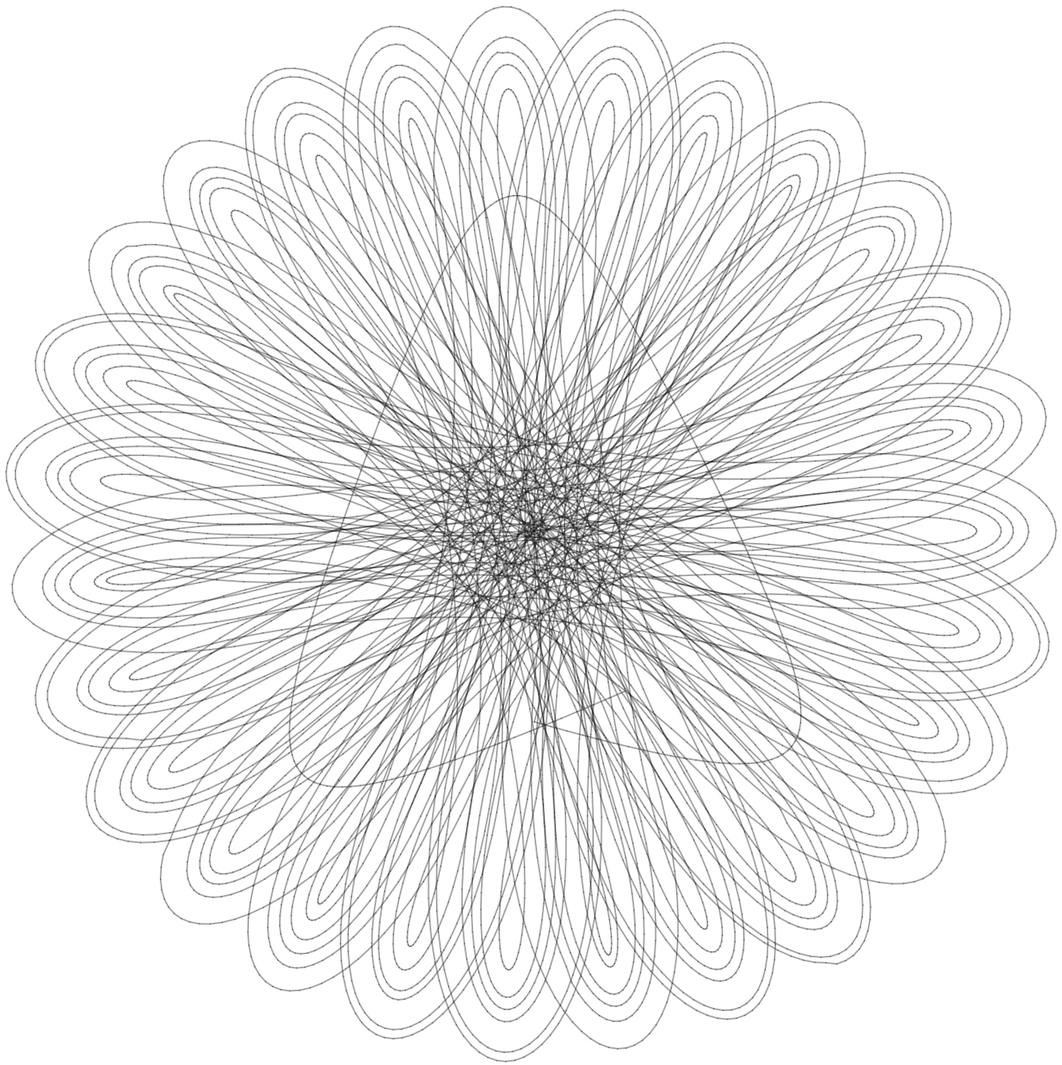
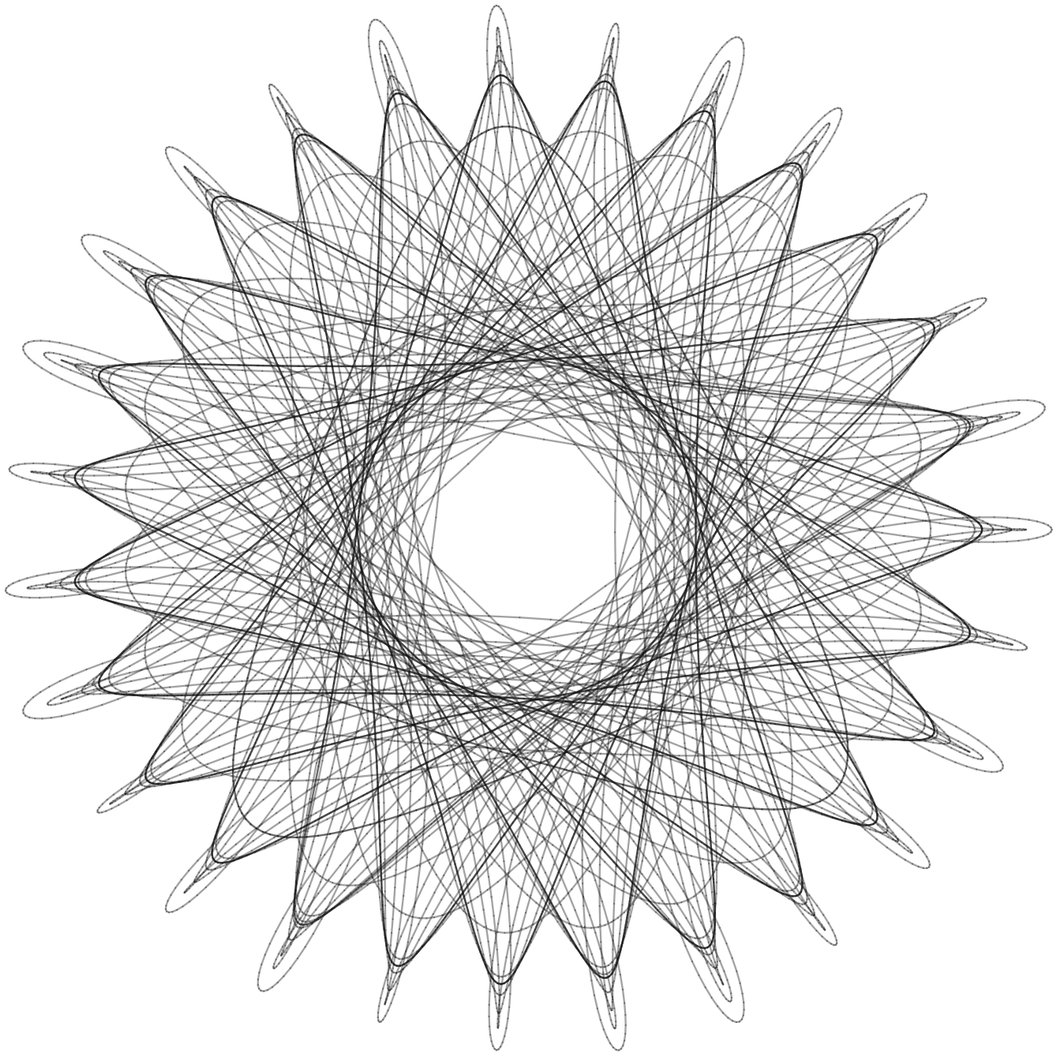


Sound Kinectics
By **Mina Youssef**



Sound Kinectics
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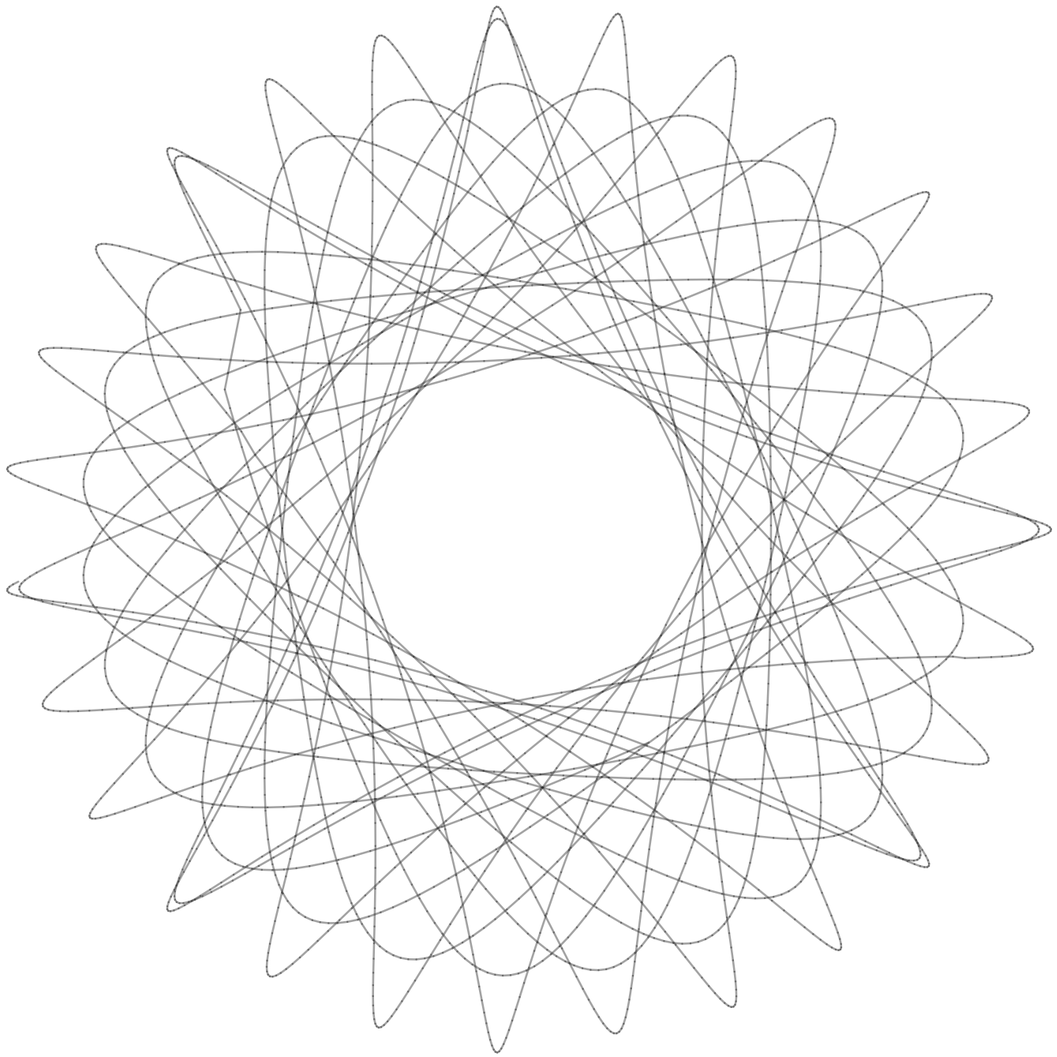
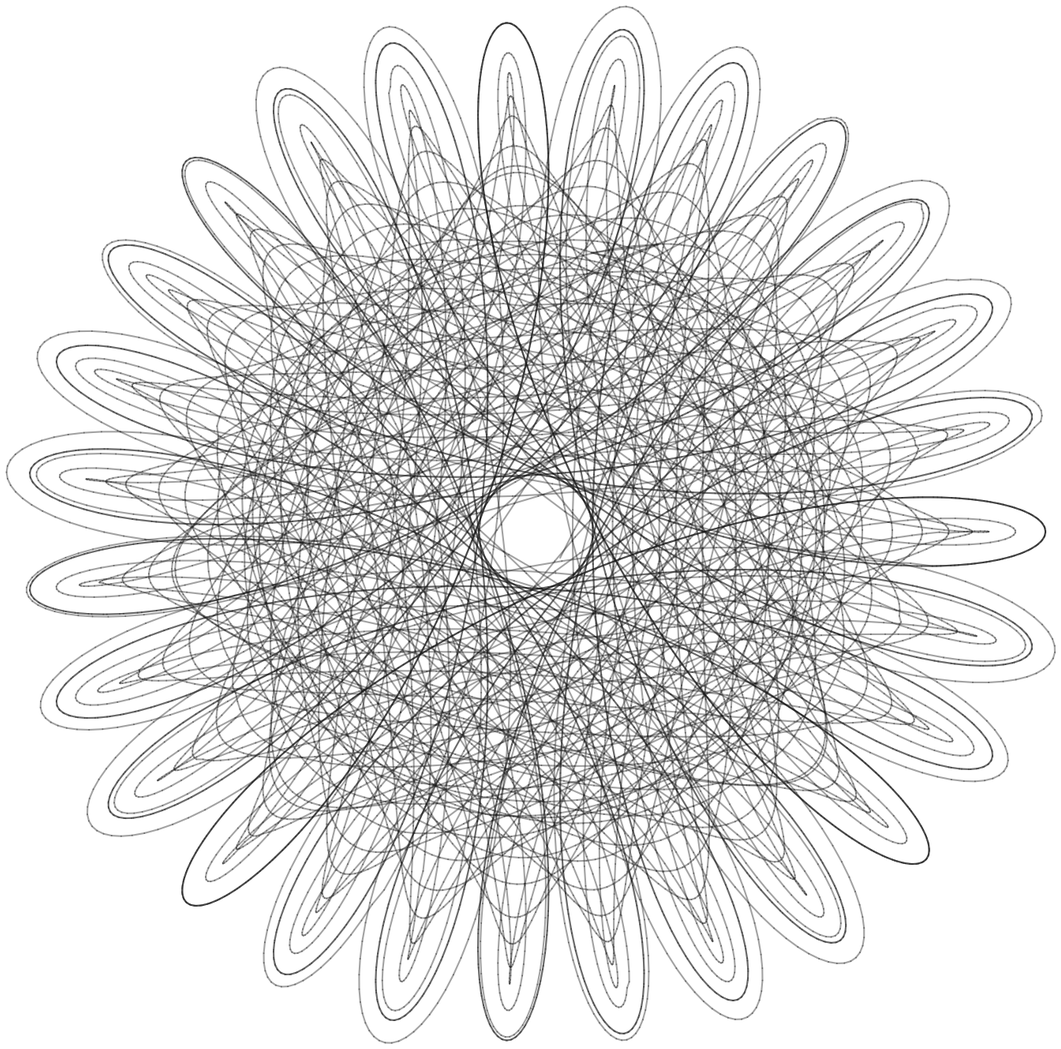
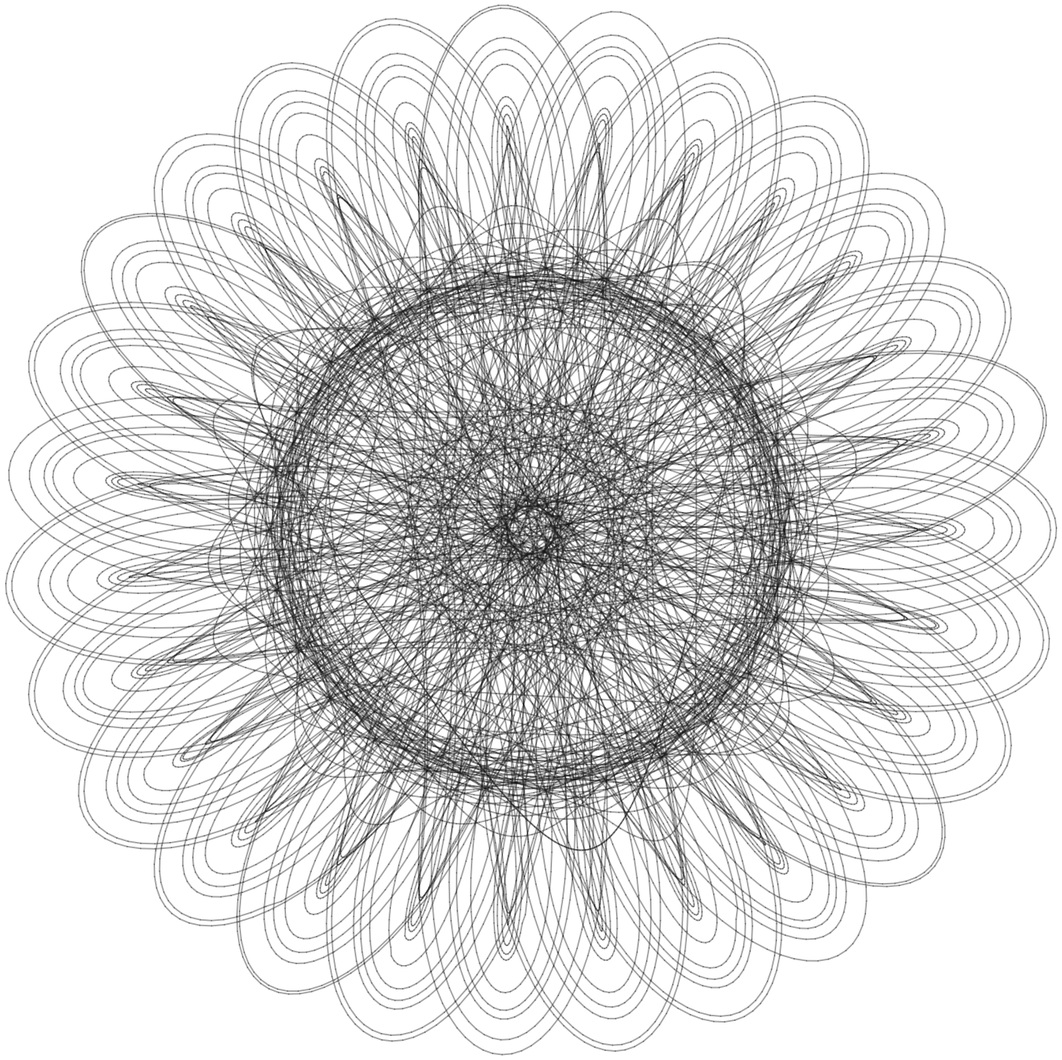


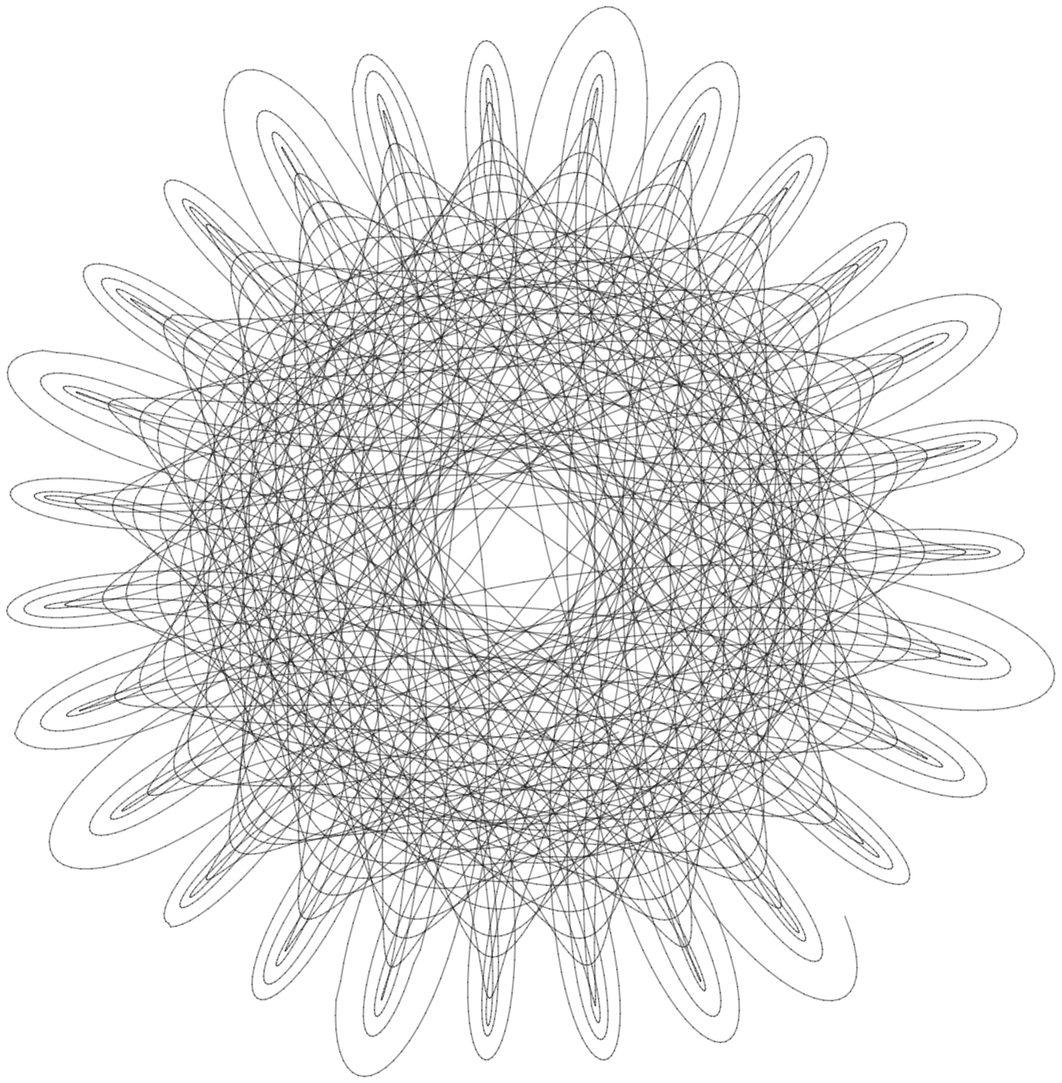
Sound Kinectics
By **Malak Hassan**

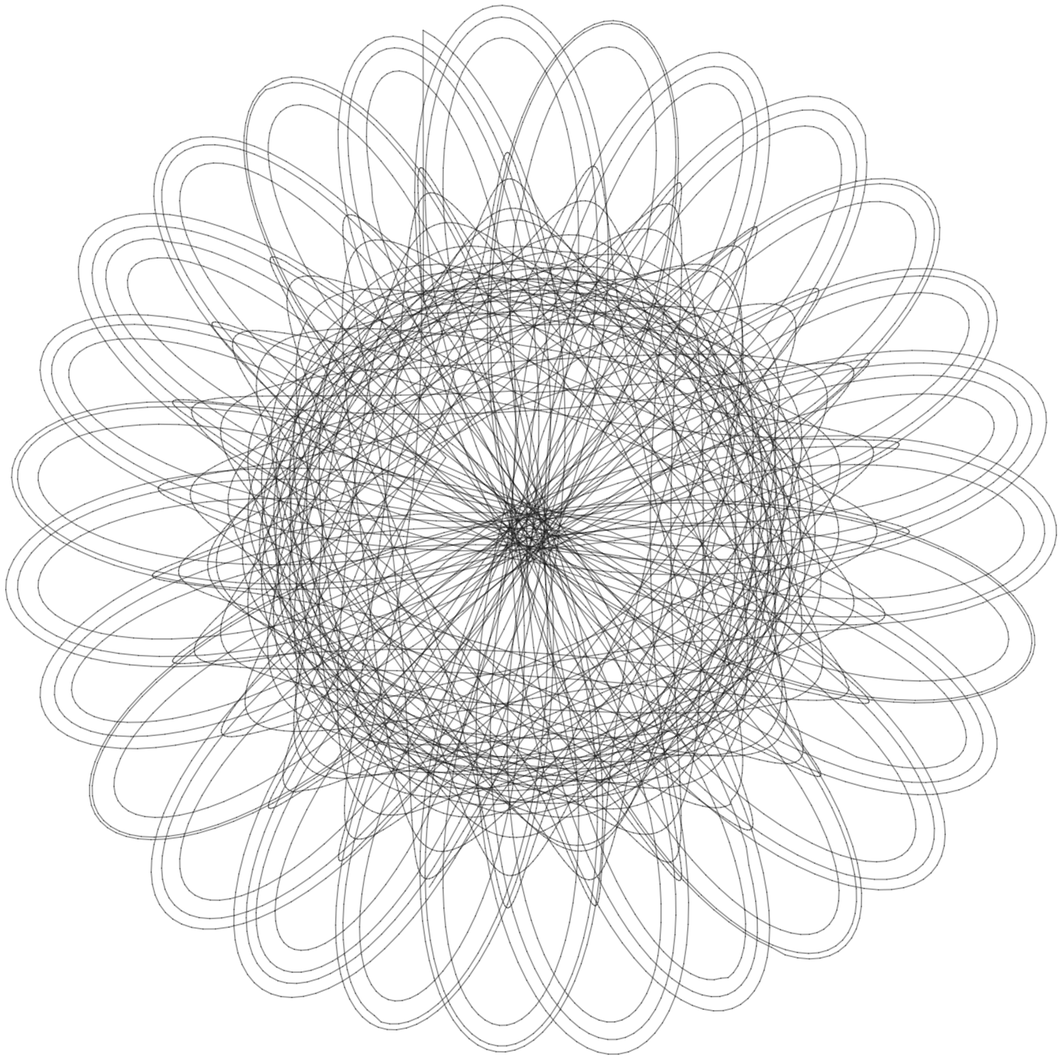


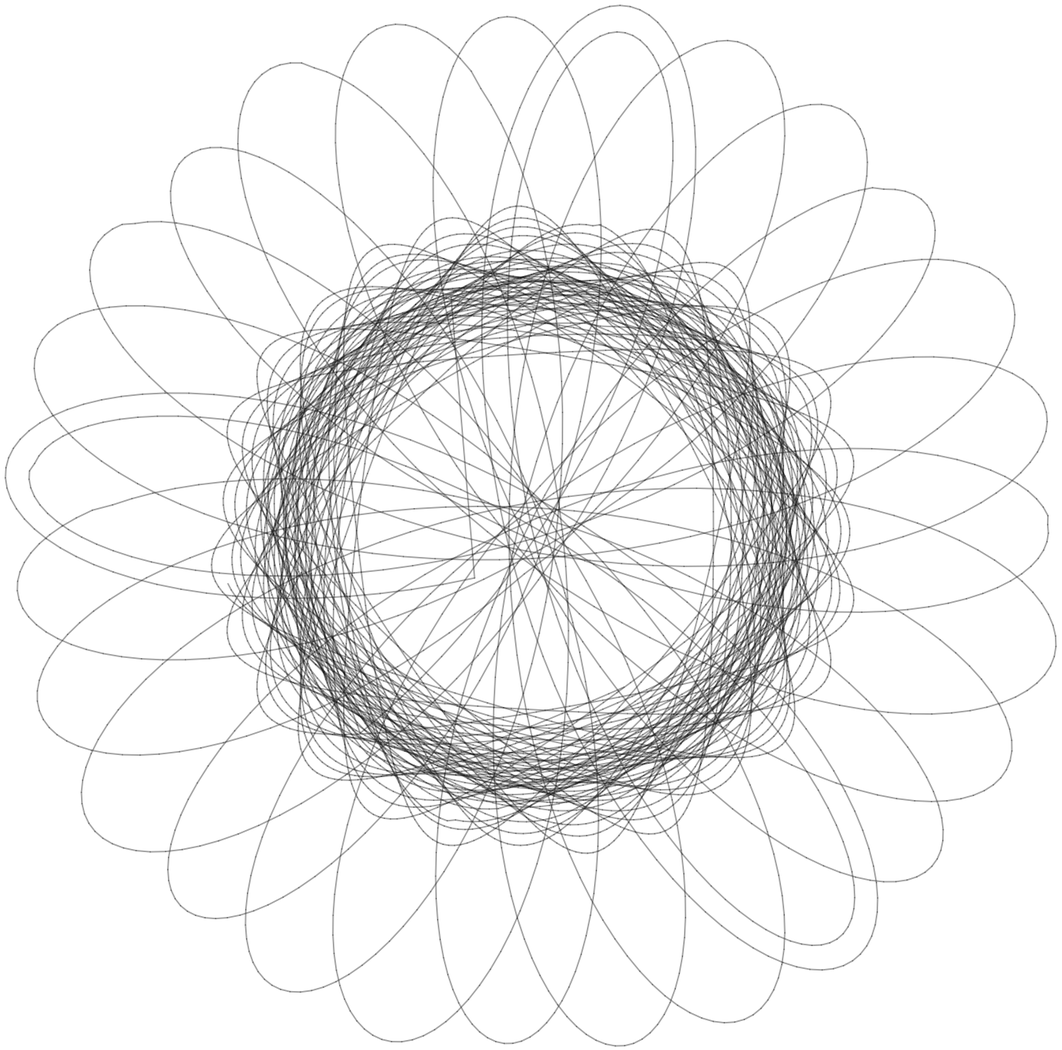
Sound Kinectics
By **May Ashmawi**



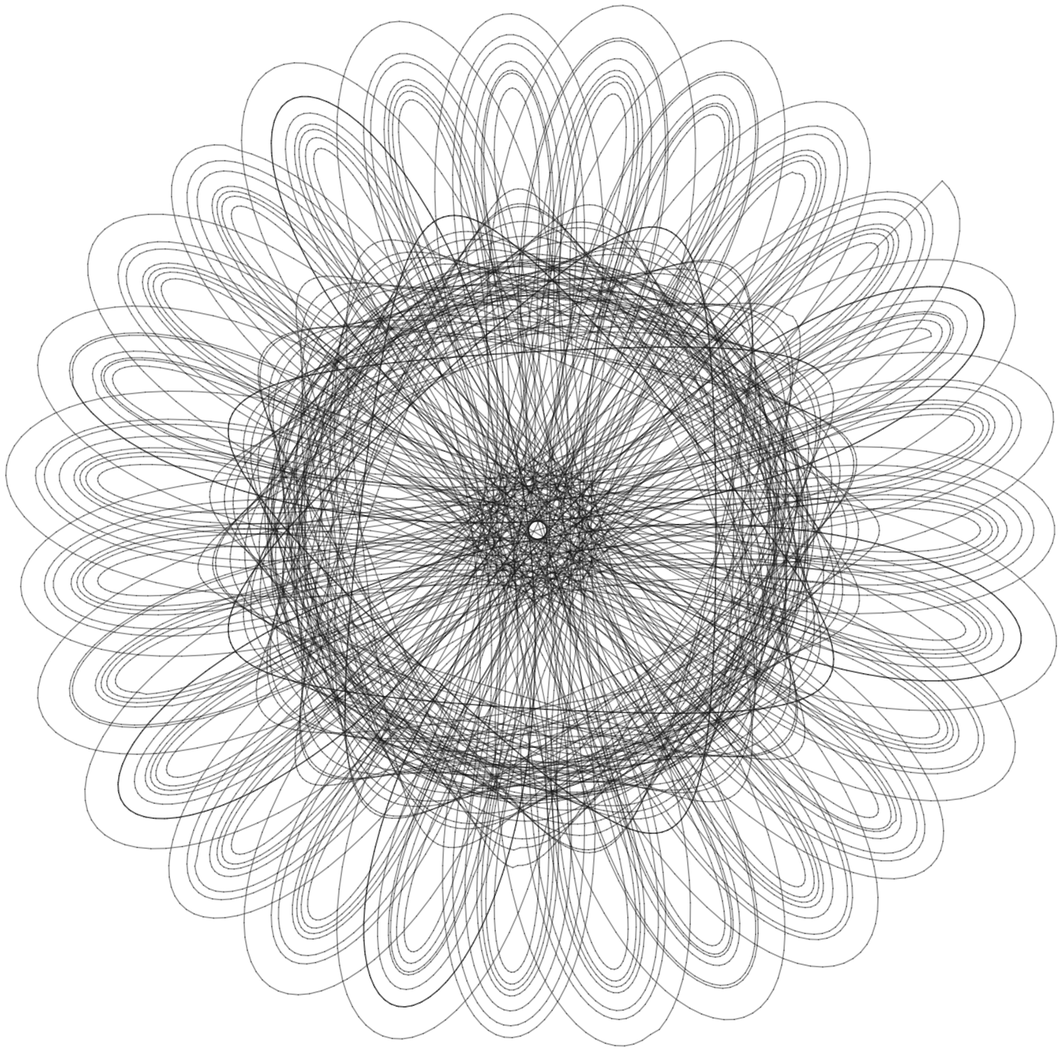
Sound Kinectics
By **Khadiga**



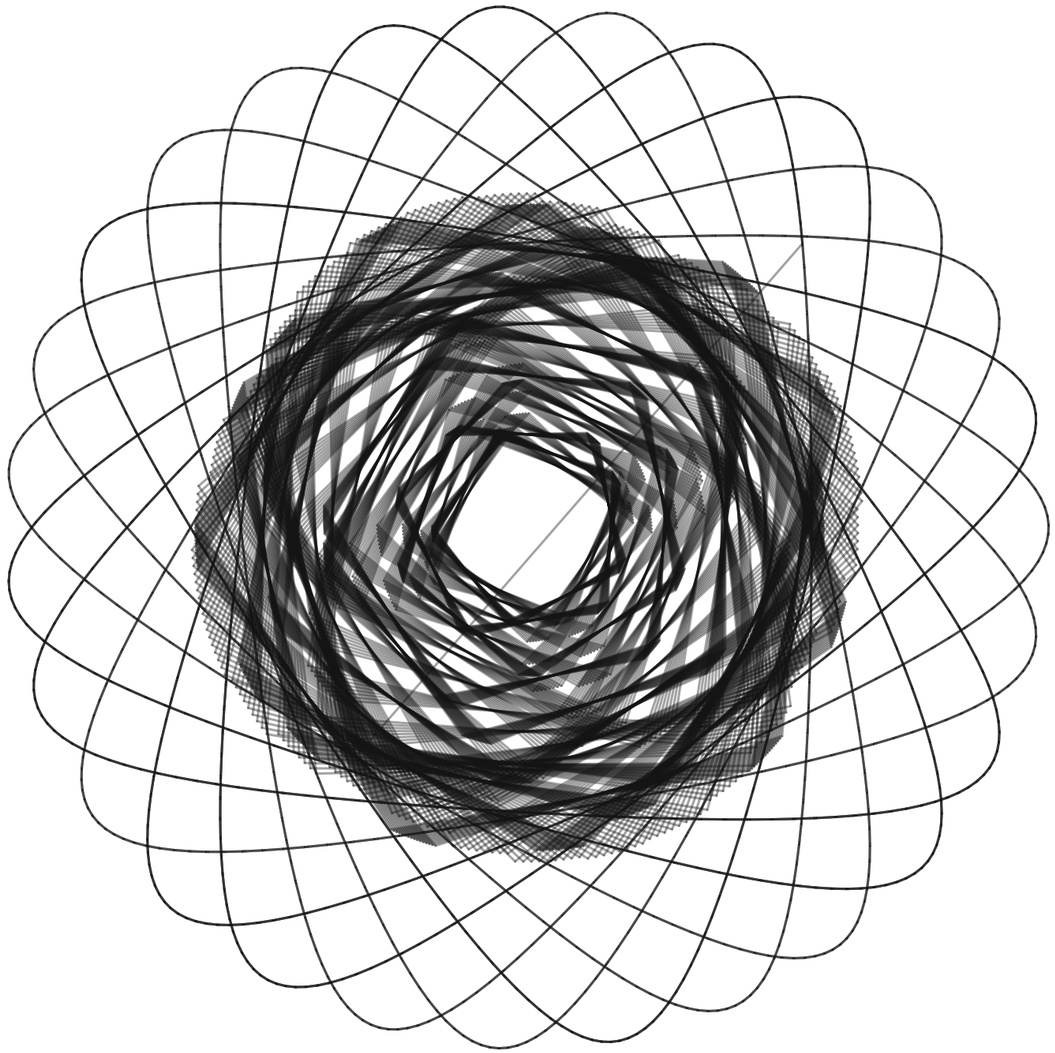




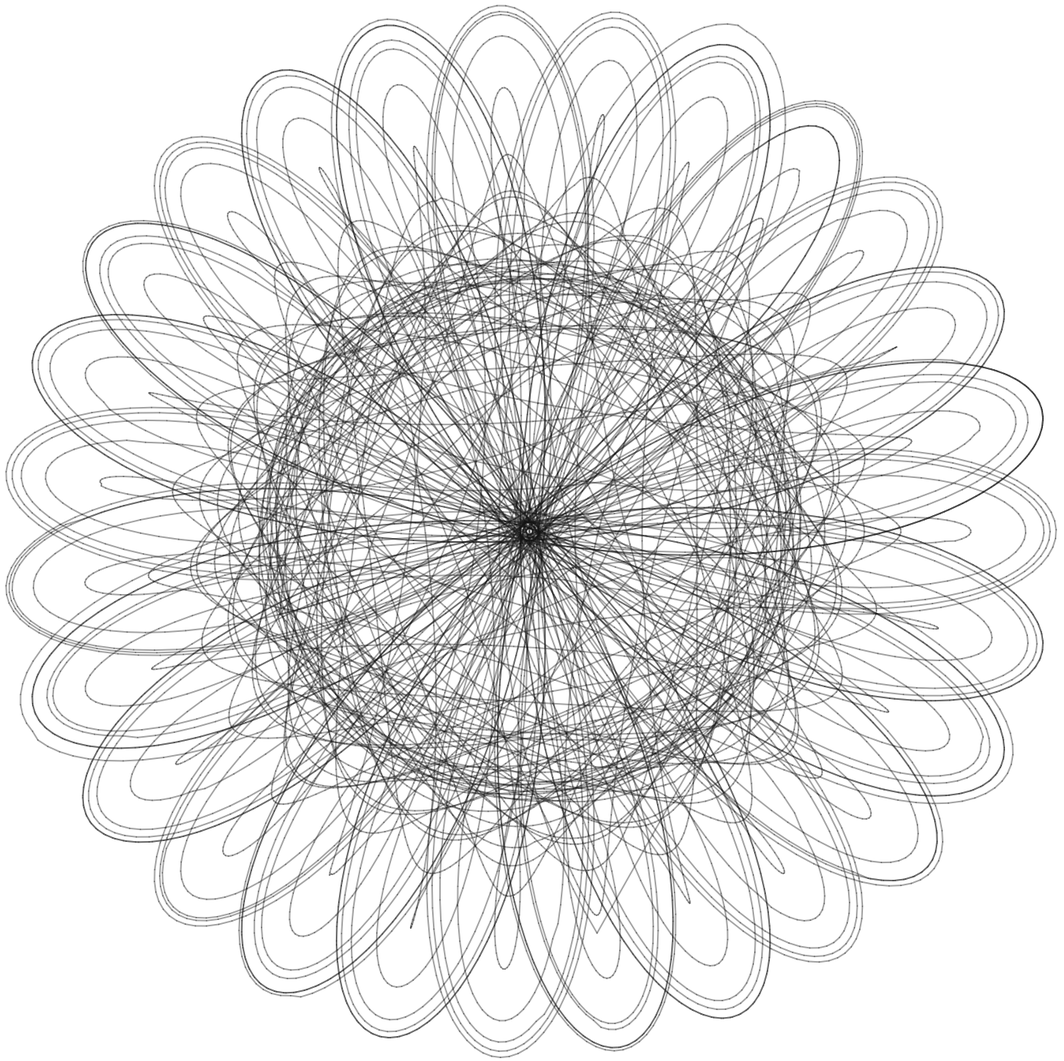
Sound Kinectics
By **Oliver Morcos**



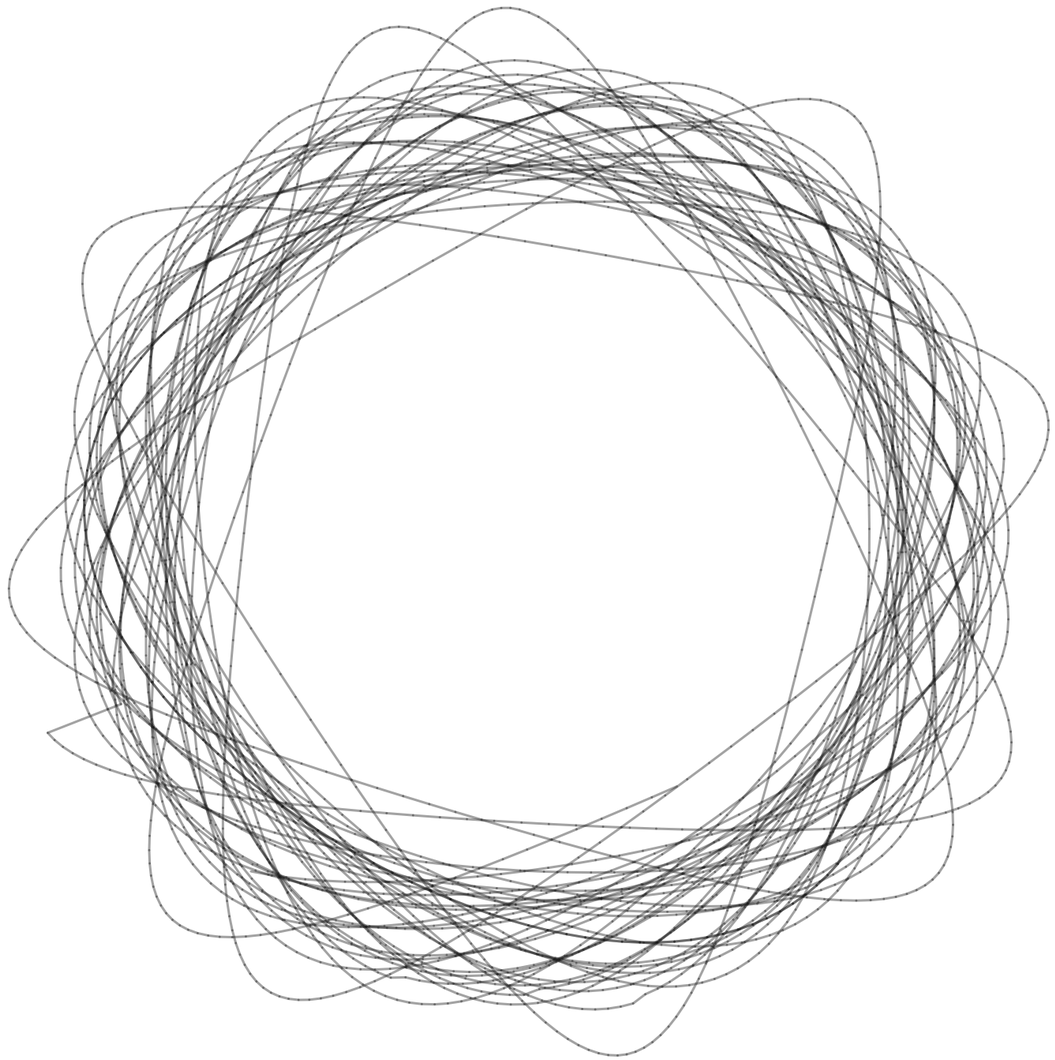
Sound Kinectics
By **Ghada Fikri**

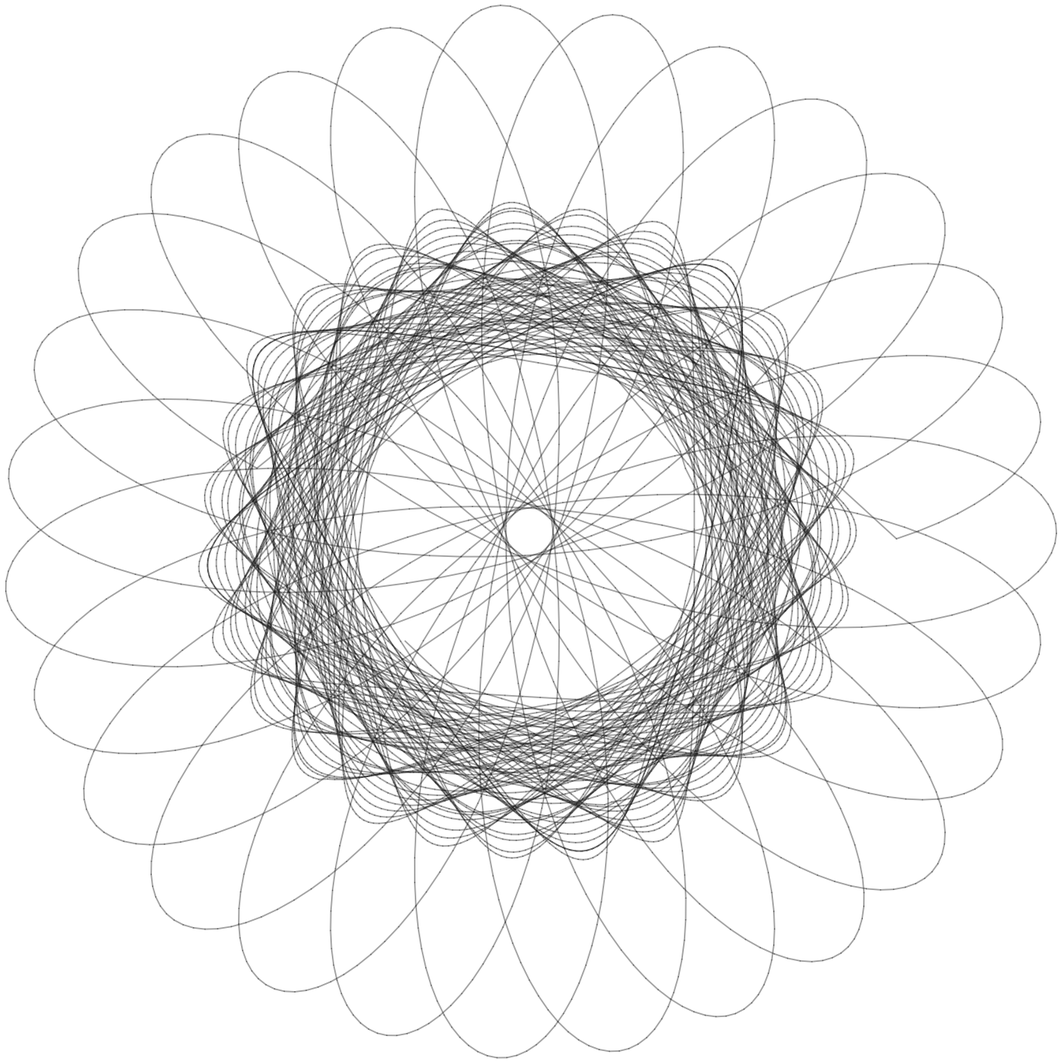


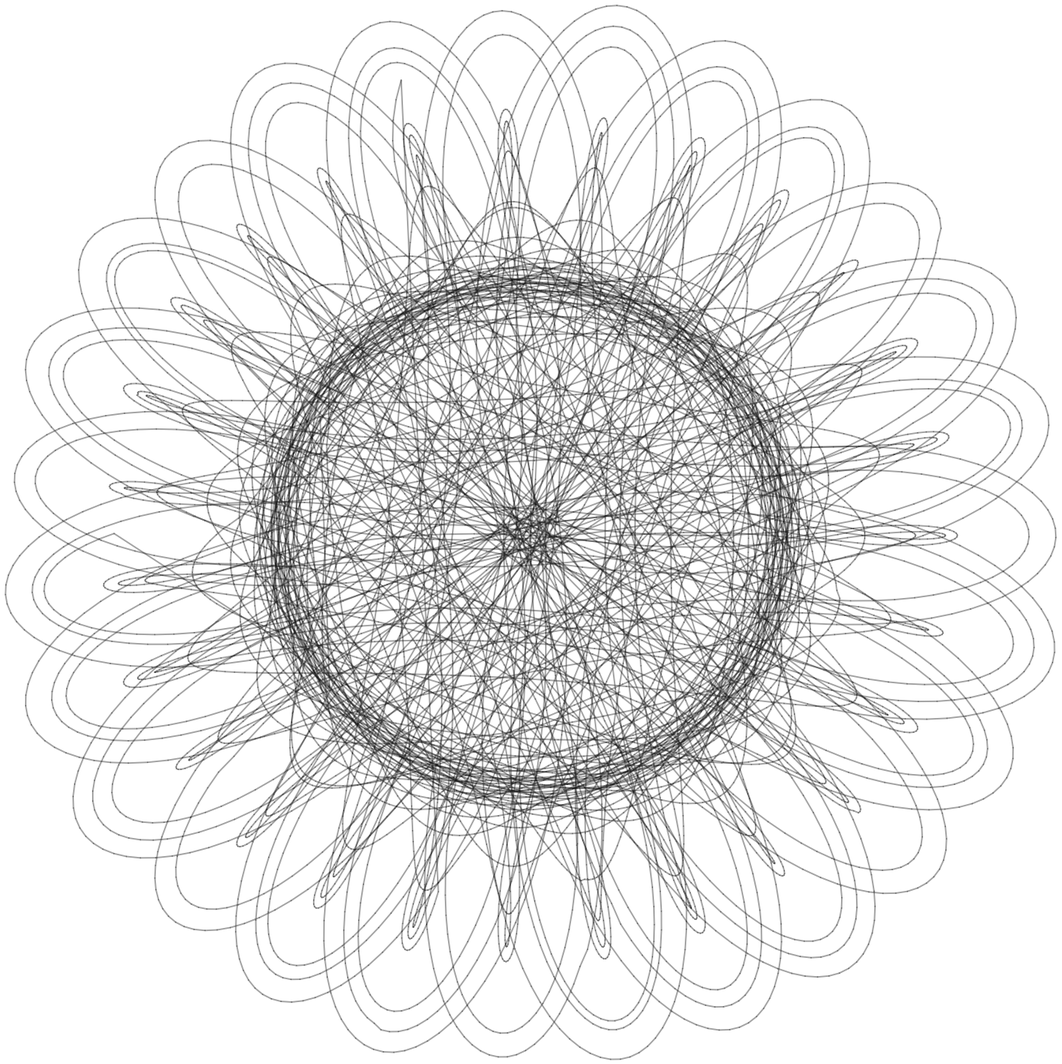
Sound Kinectics
By **Hala Gabr**



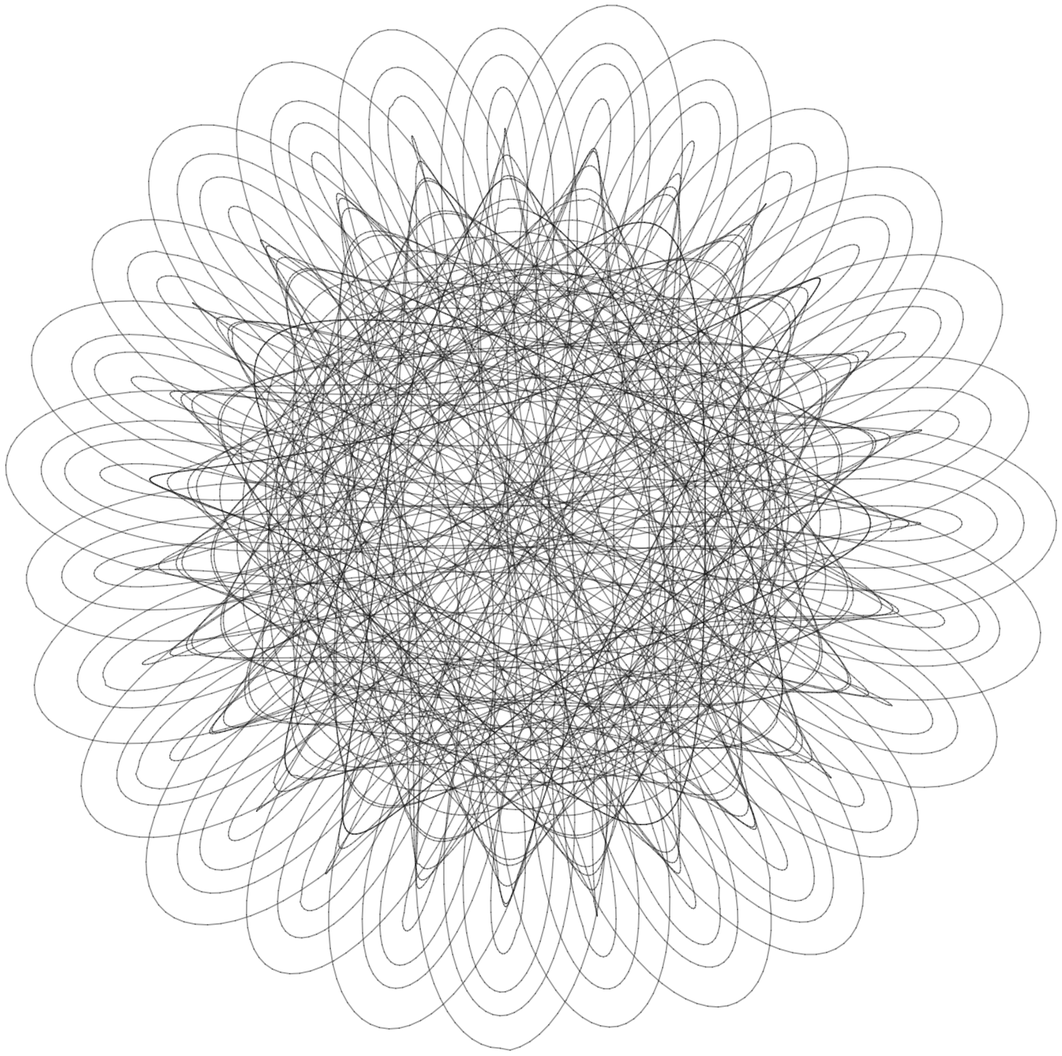
Sound Kinectics
By **Doaa**



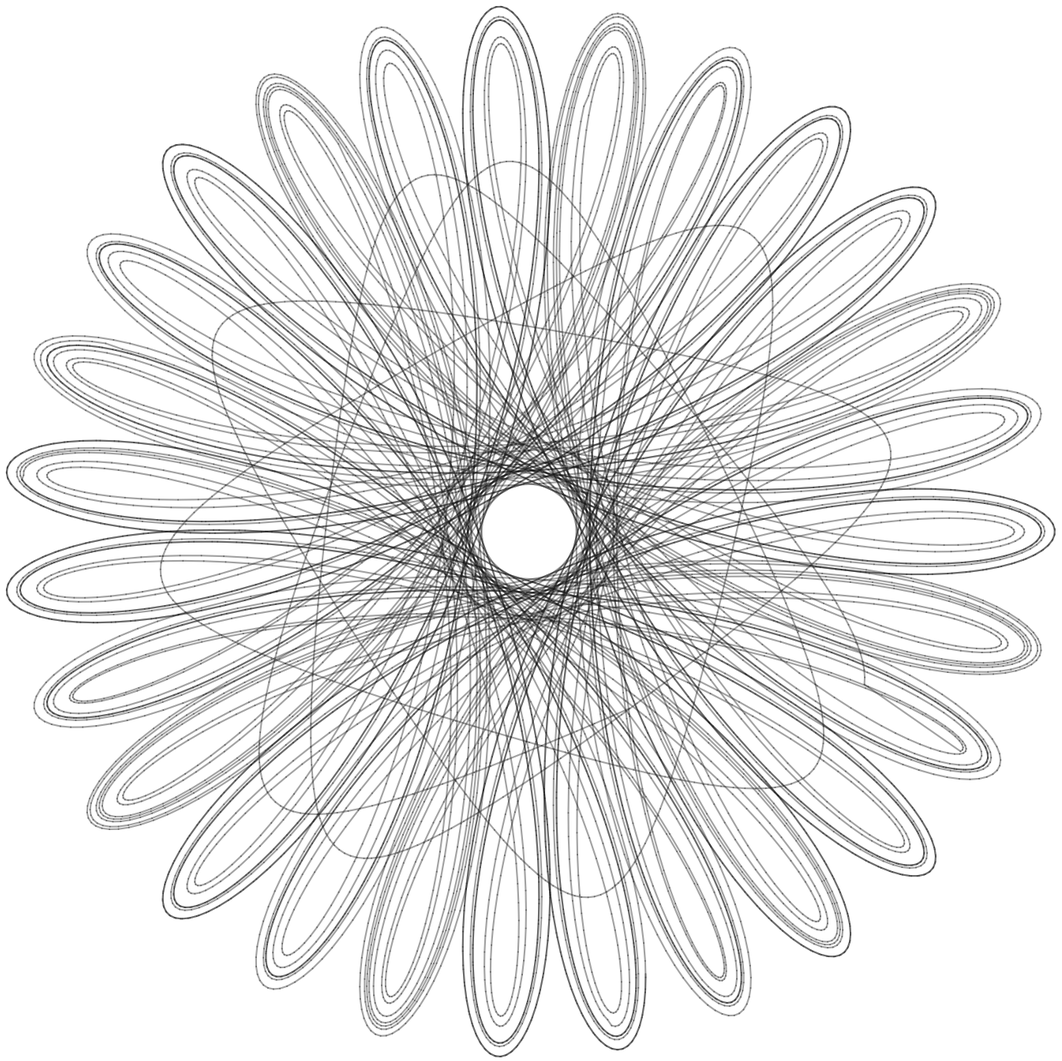


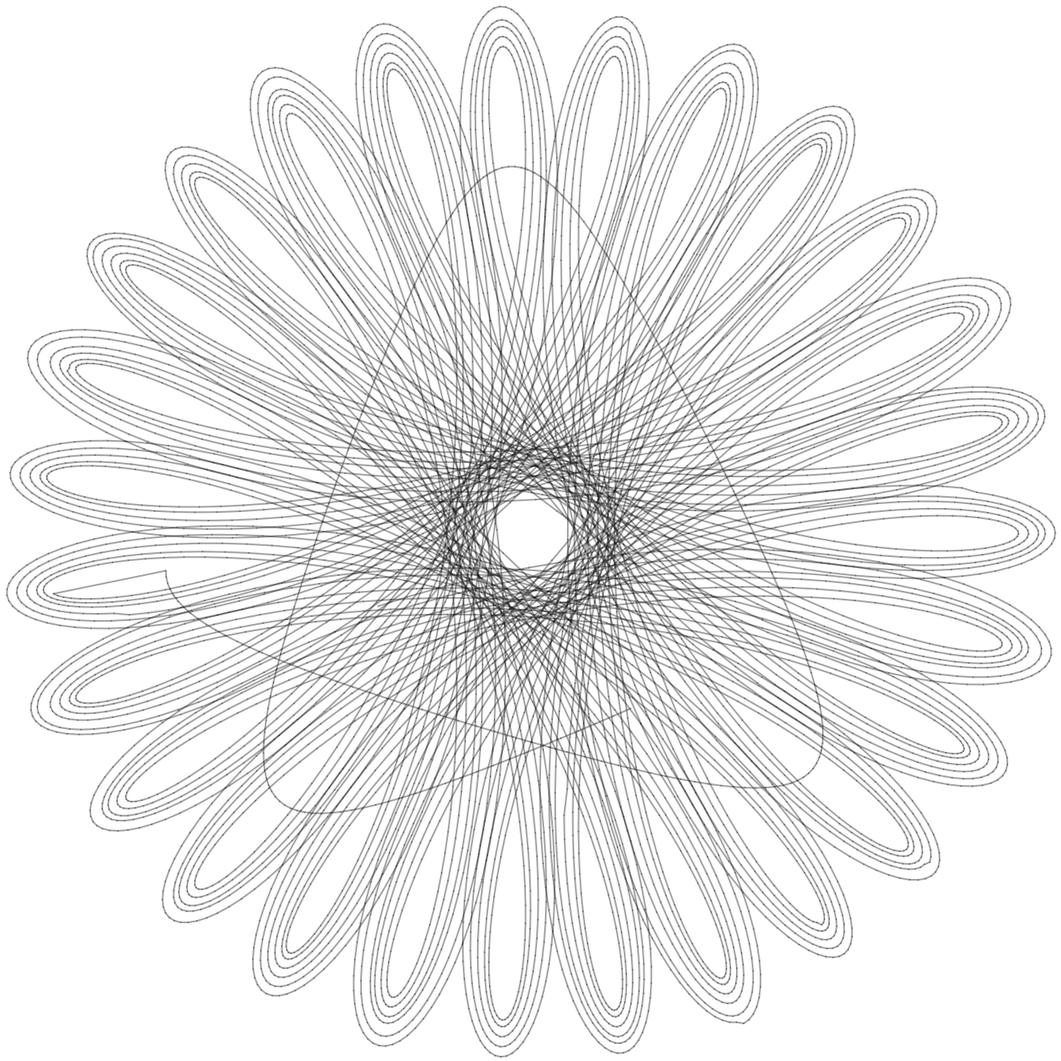


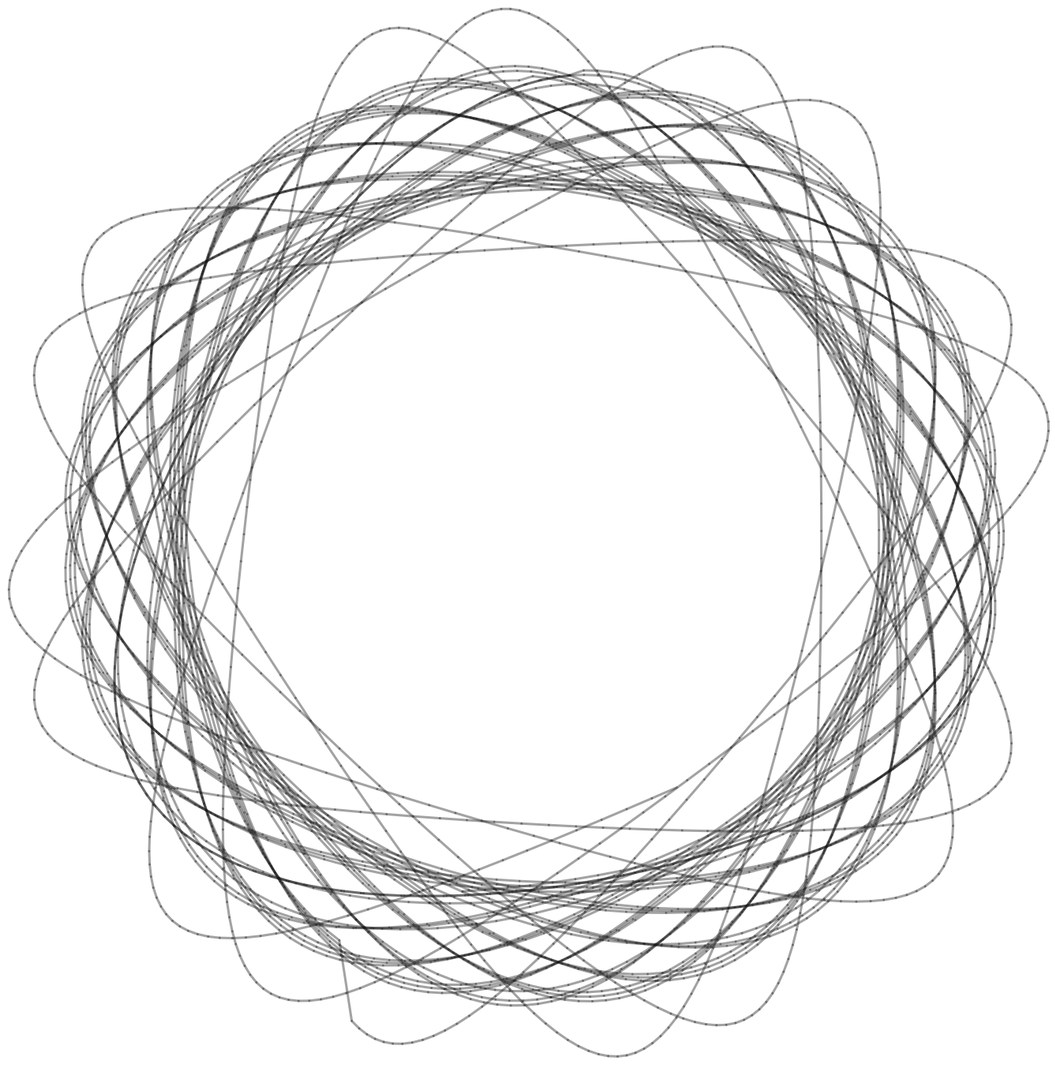
Sound Kinectics
By **Areej**

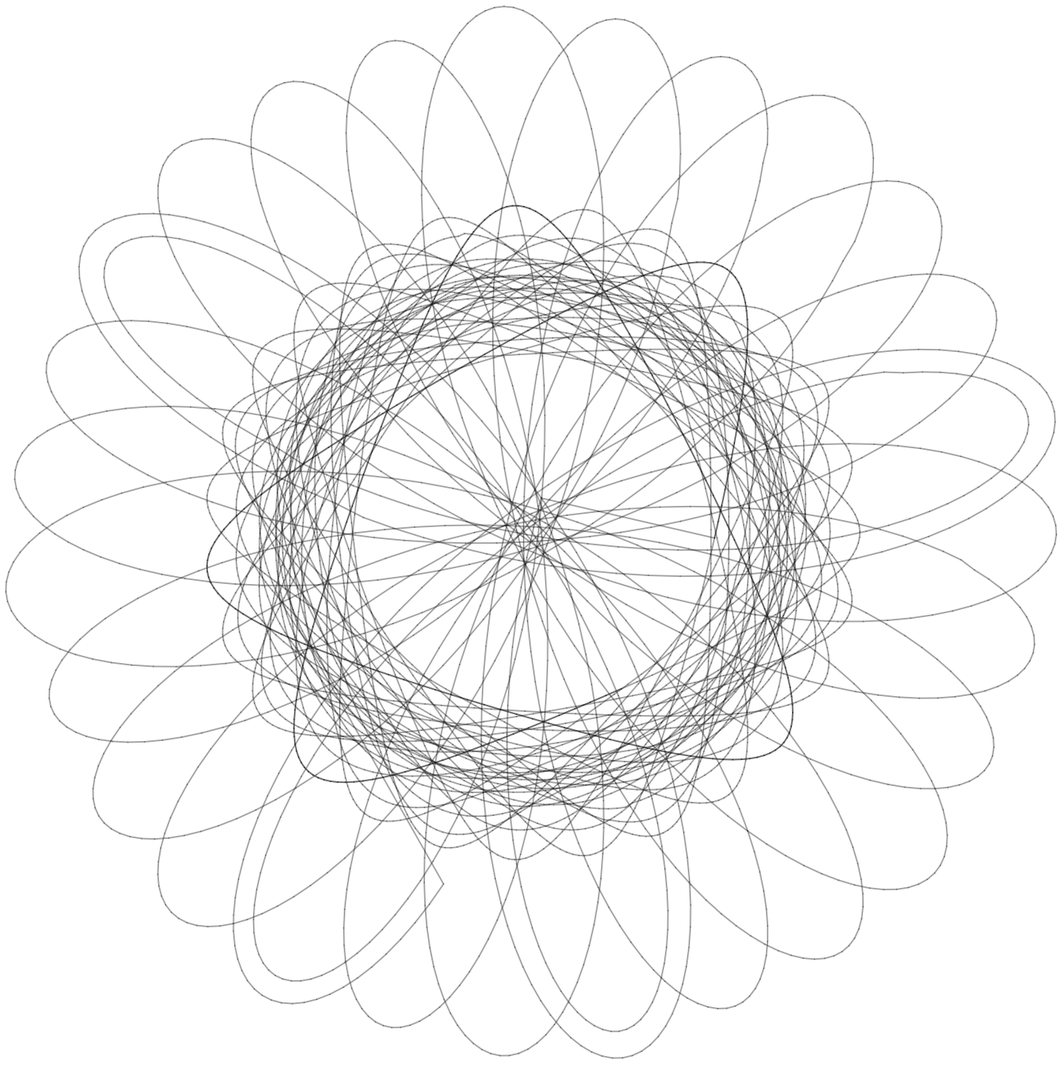


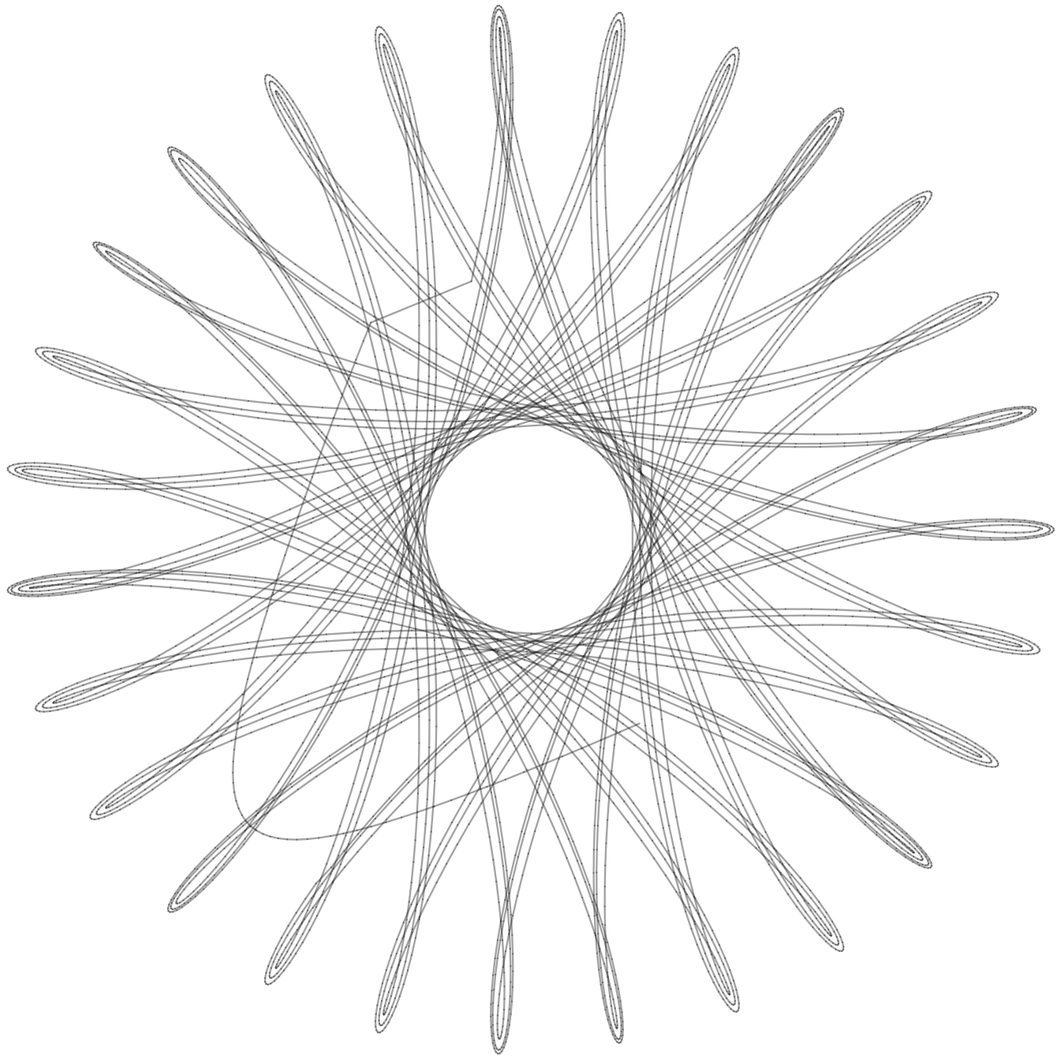
Sound Kinectics
By **Anonymous**

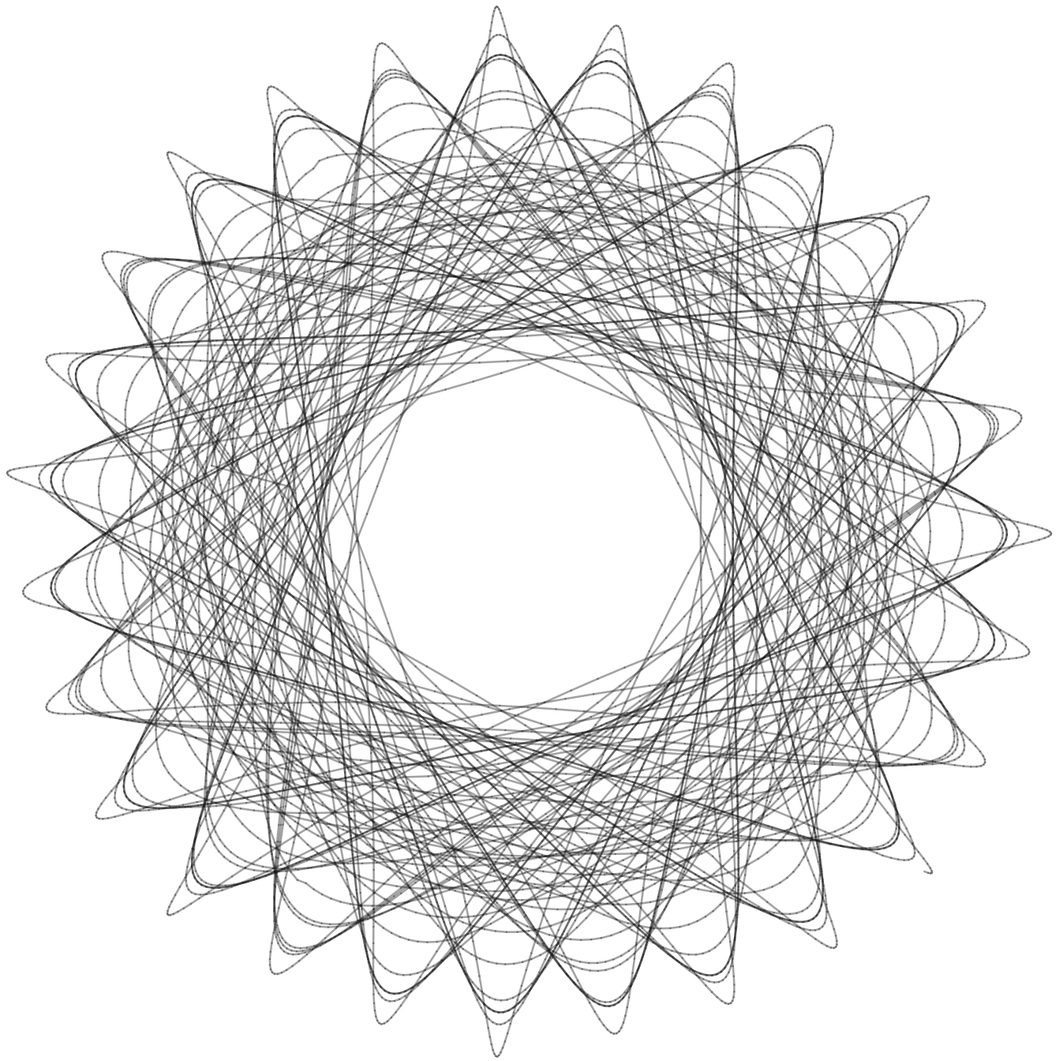


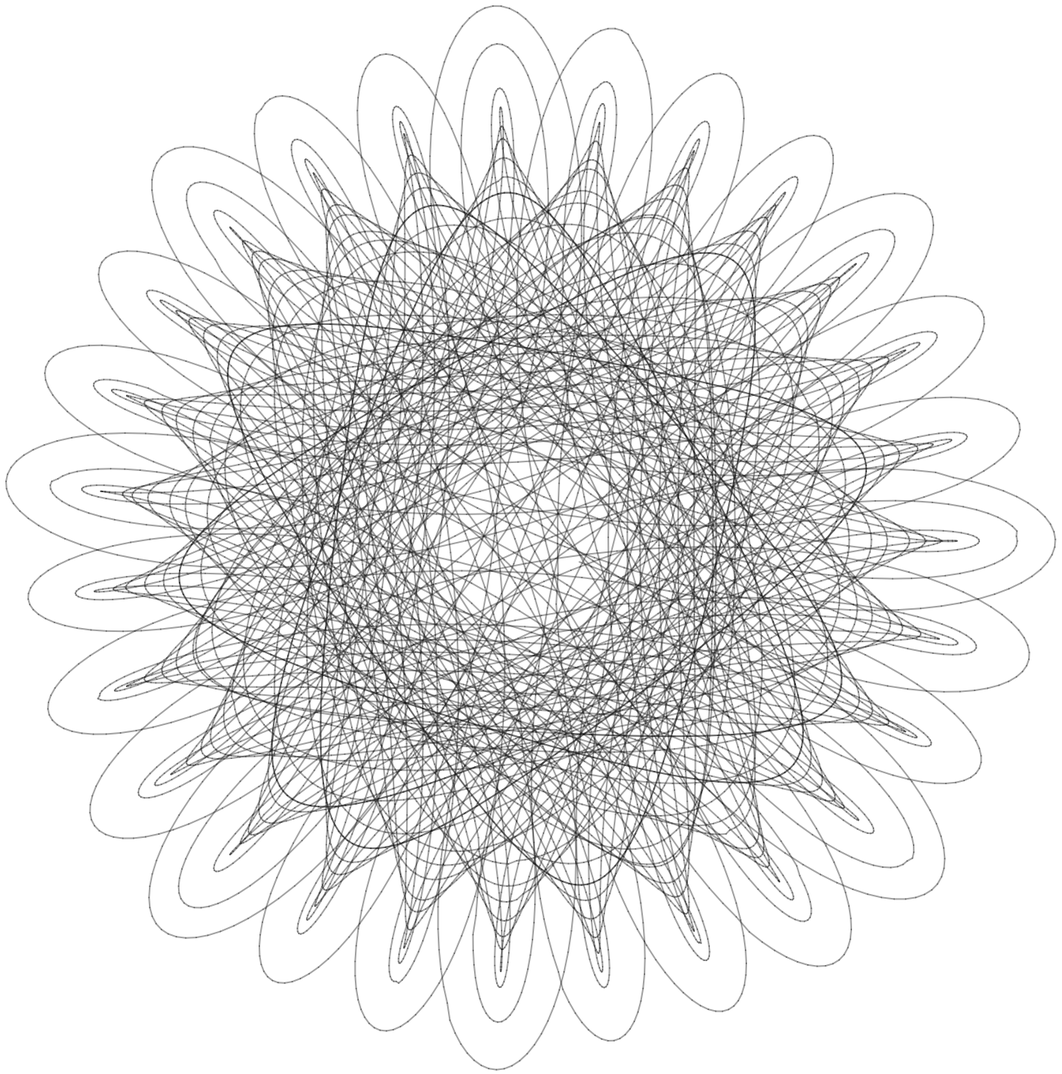




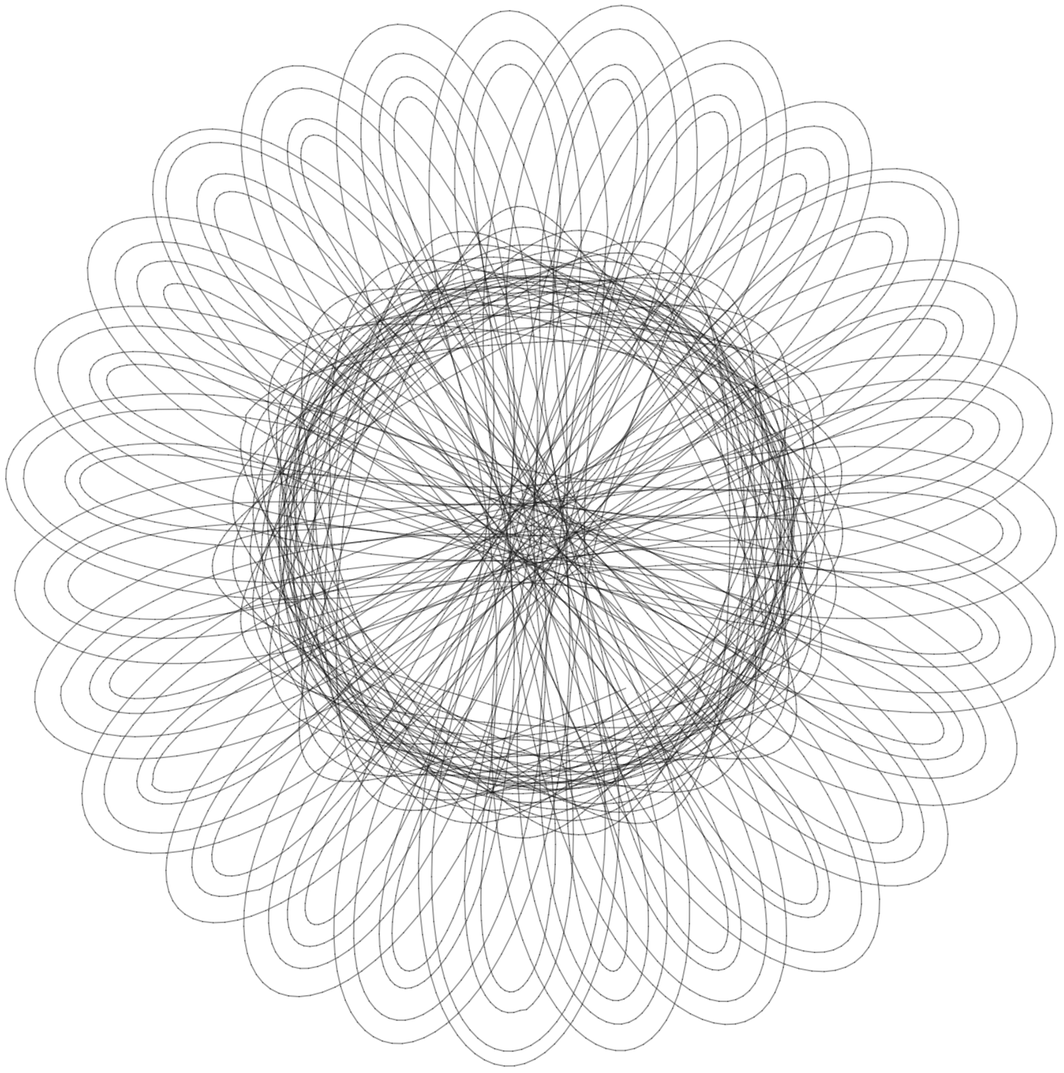




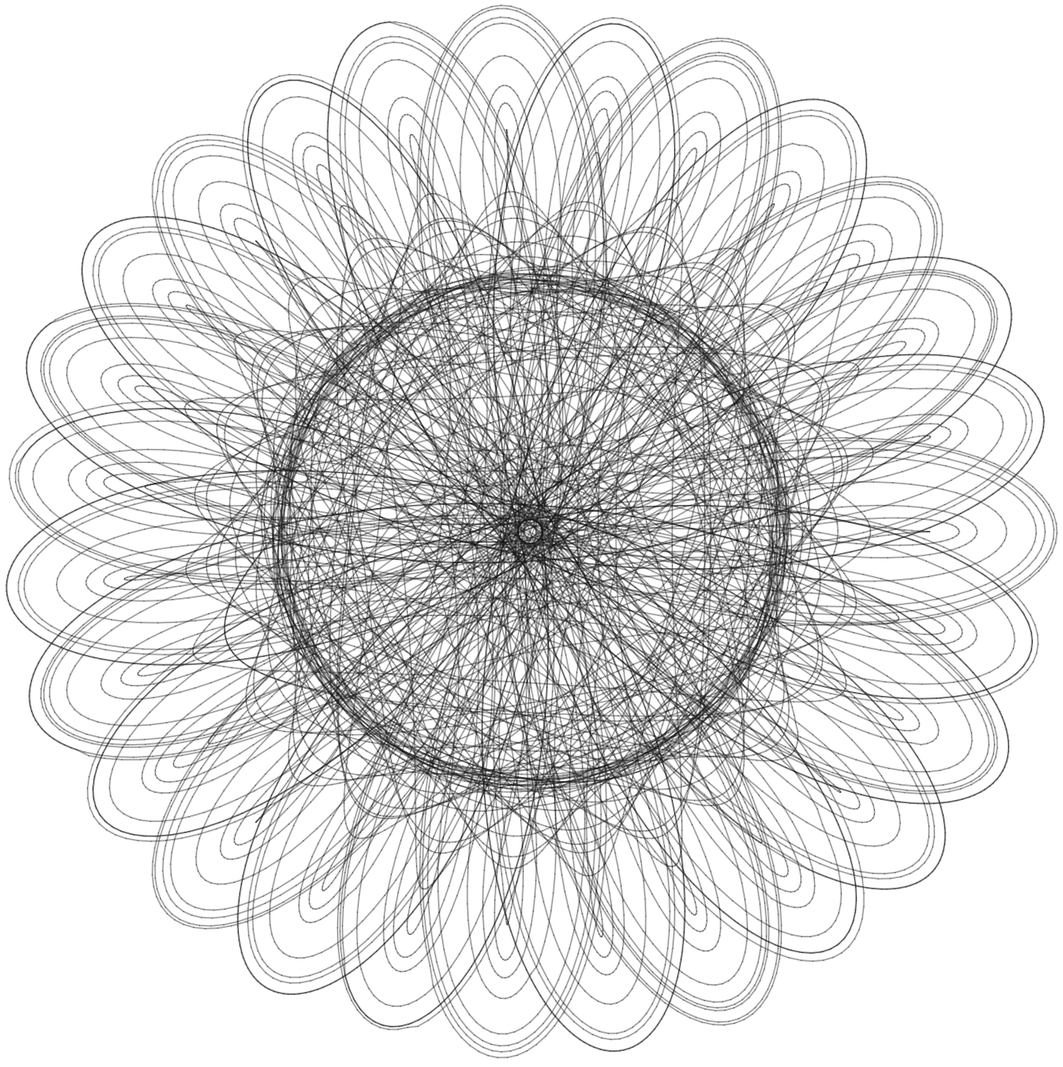




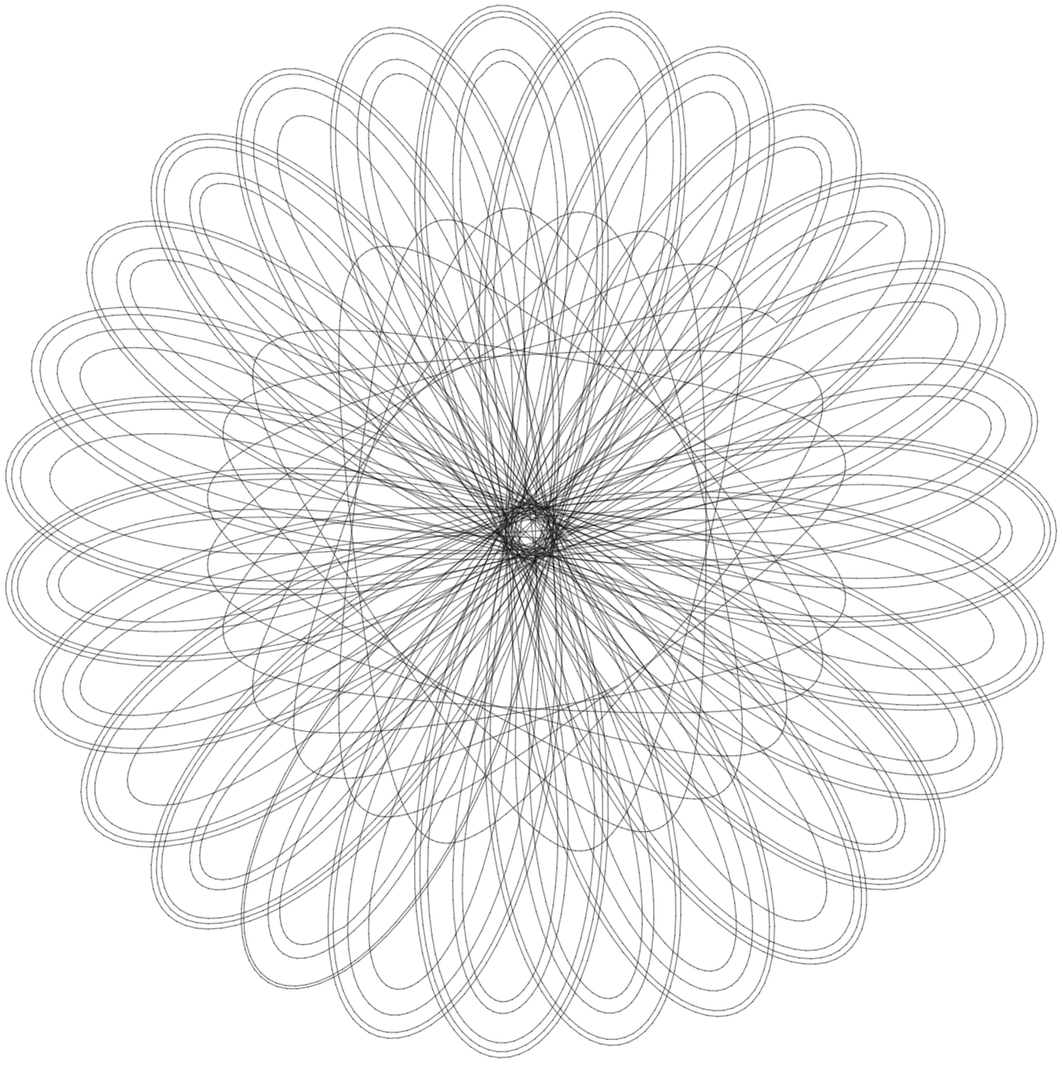
Sound Kinectics
By **Andrew and Dalia**



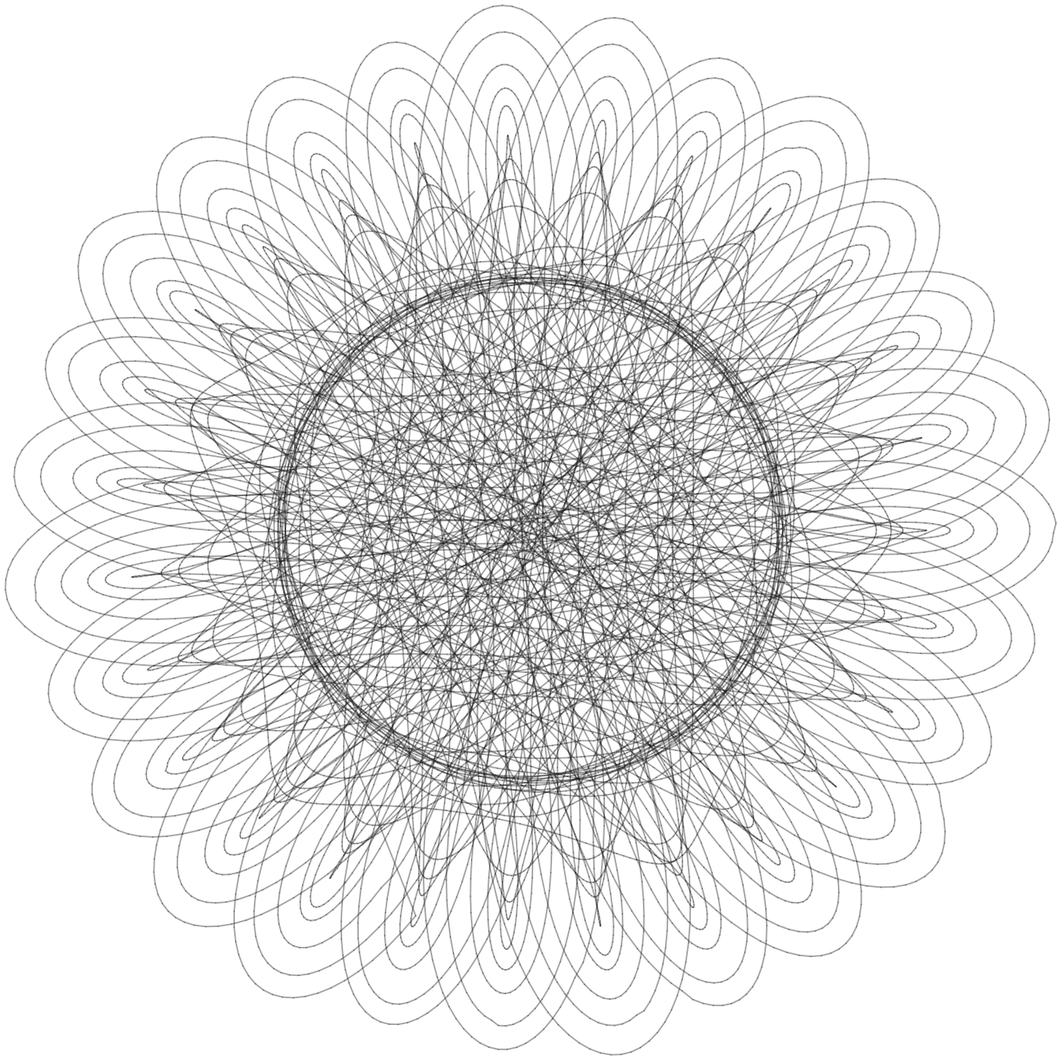
Sound Kinectics
By **Amr Kandil**



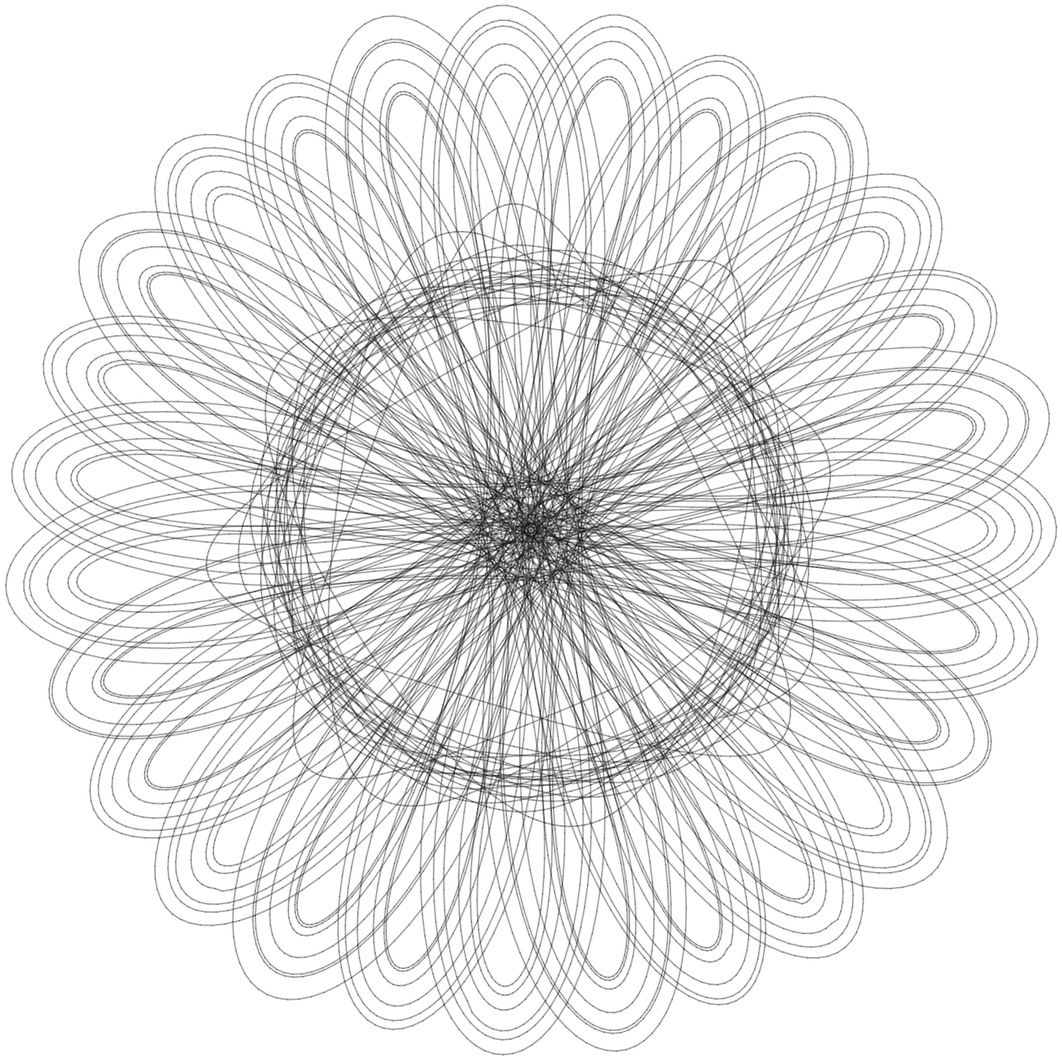
Sound Kinectics
By **Amr Draz**



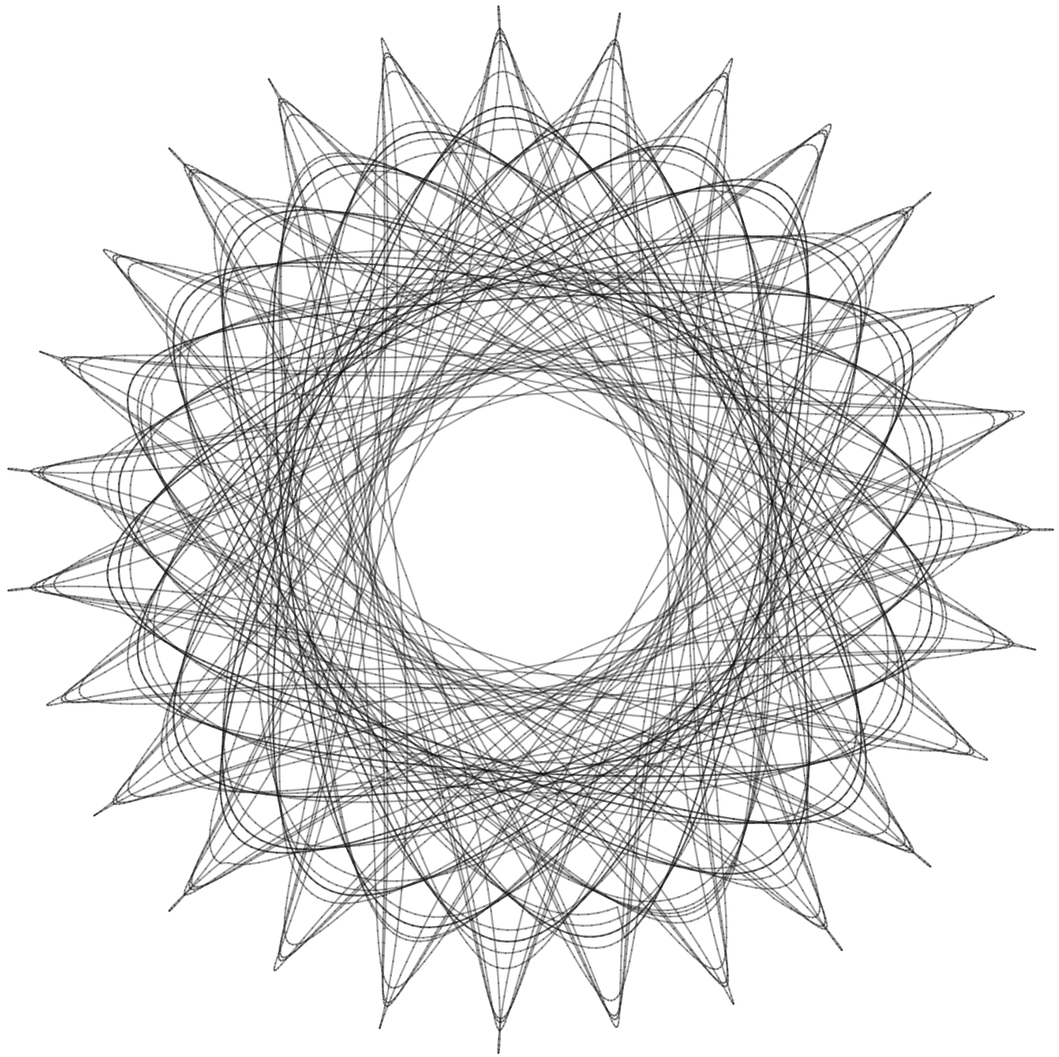
Sound Kinectics
By **Alex Sin Fei Essen**

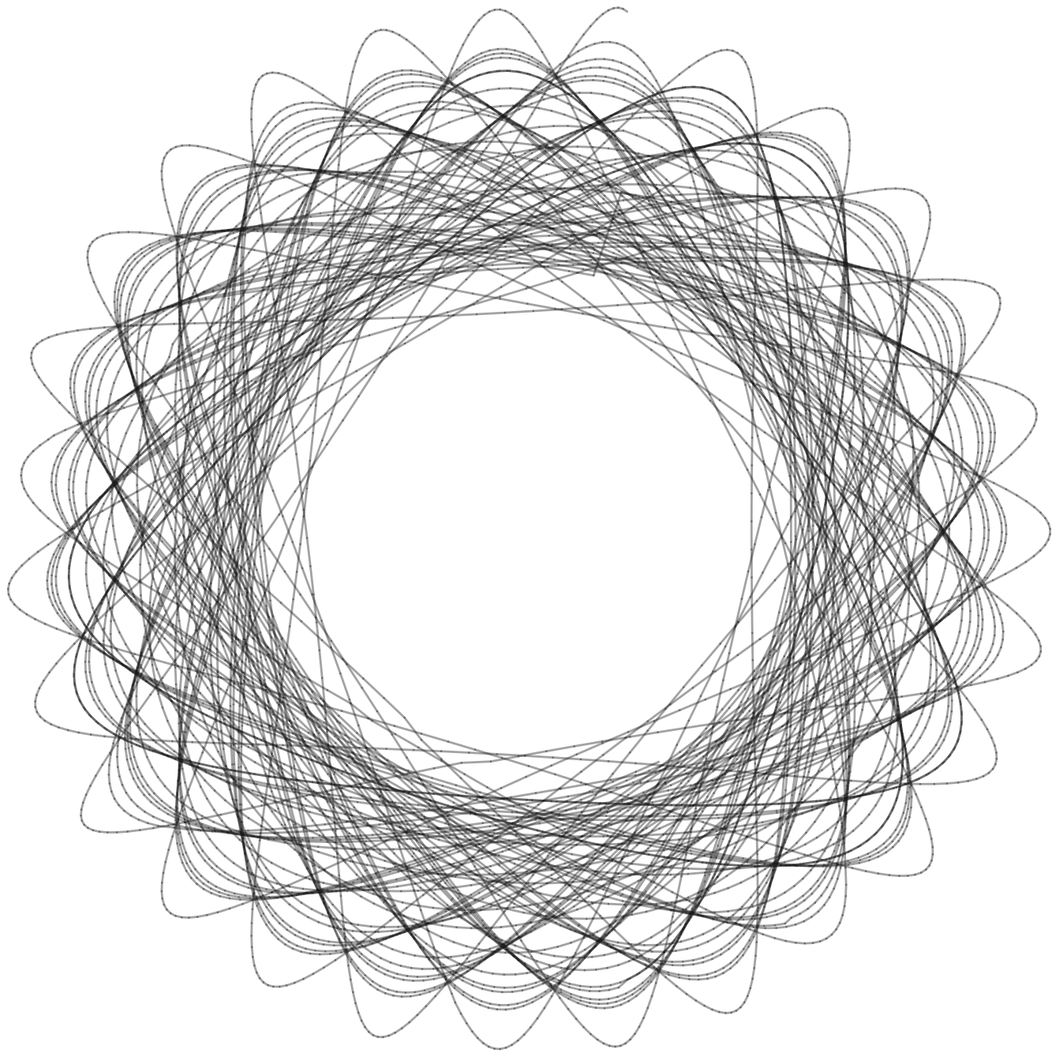


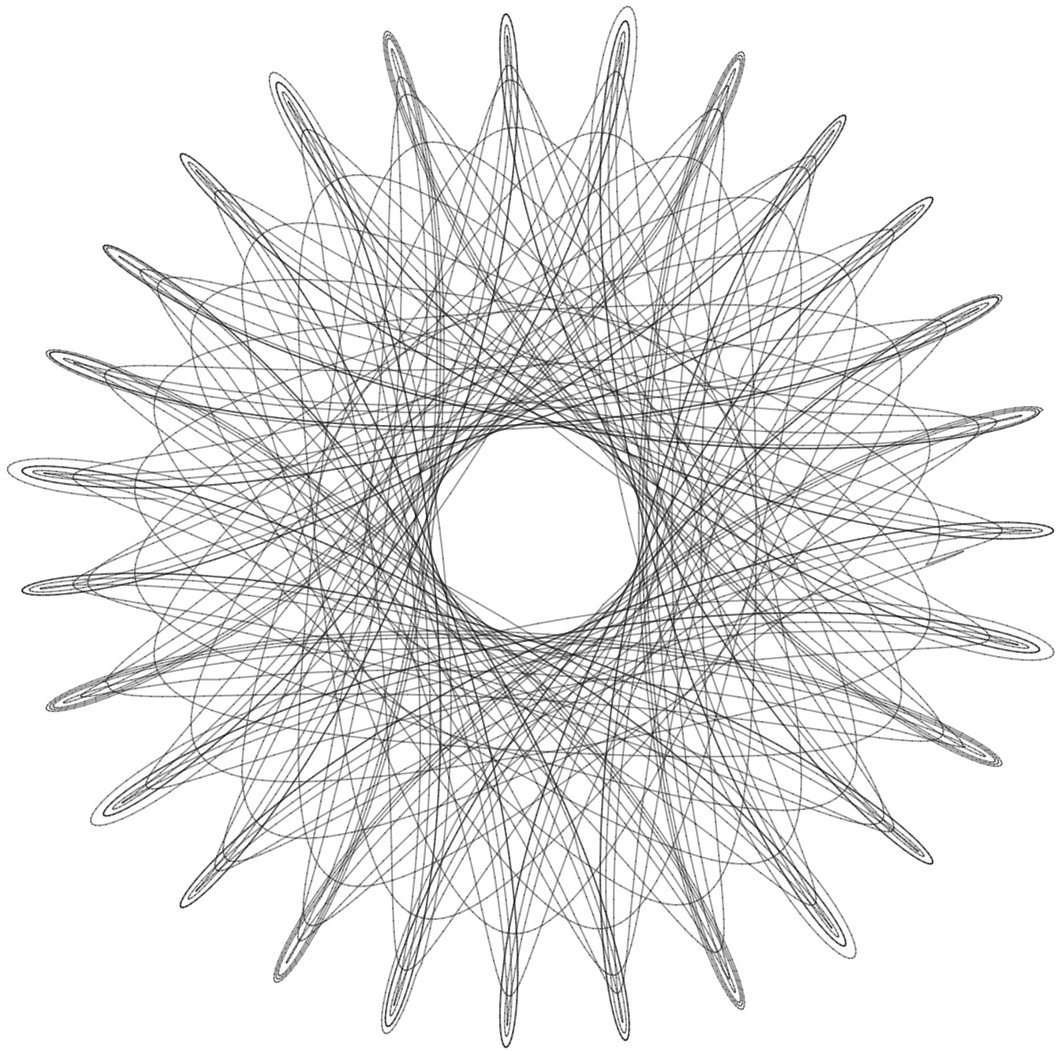
Sound Kinectics
By **Ahmed Saqf Al - Hait**

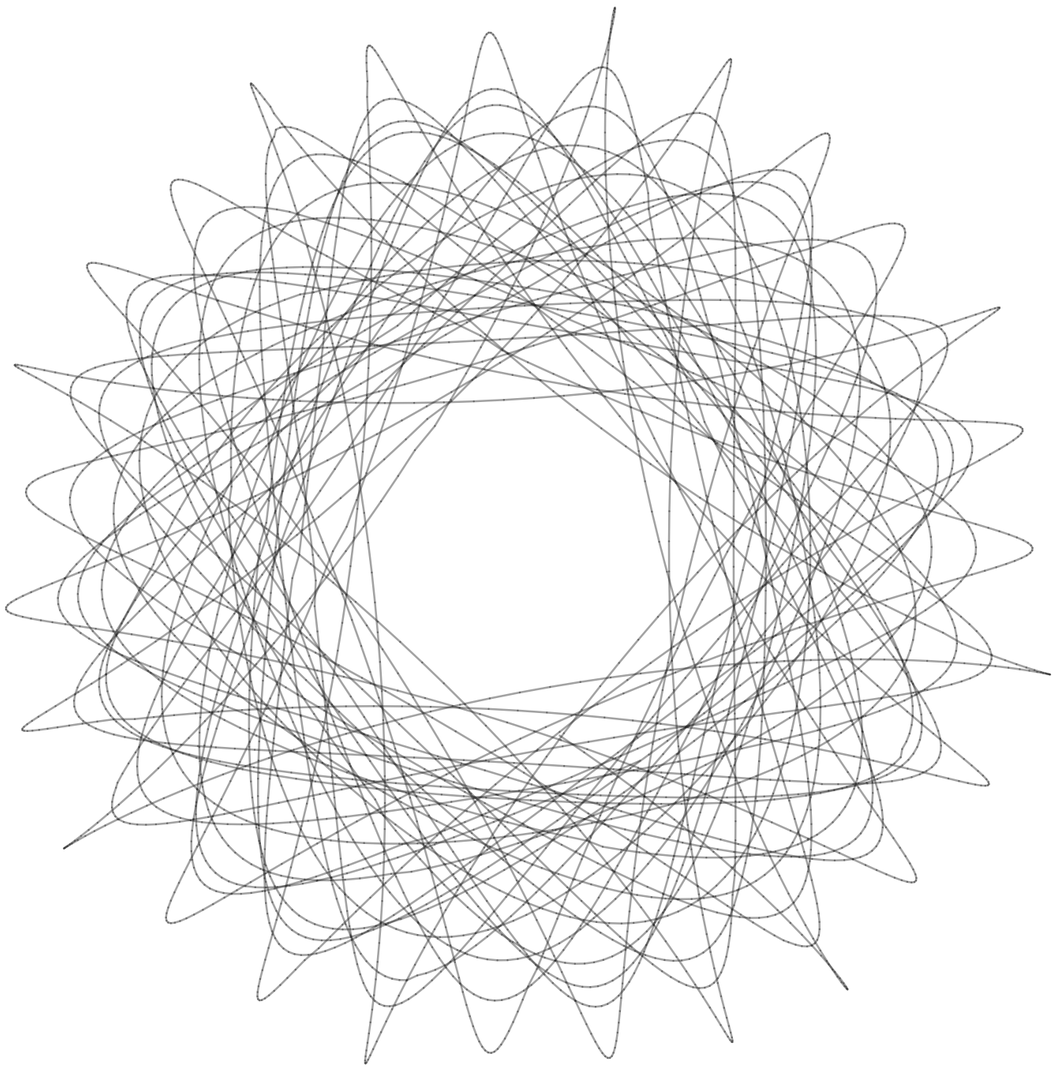


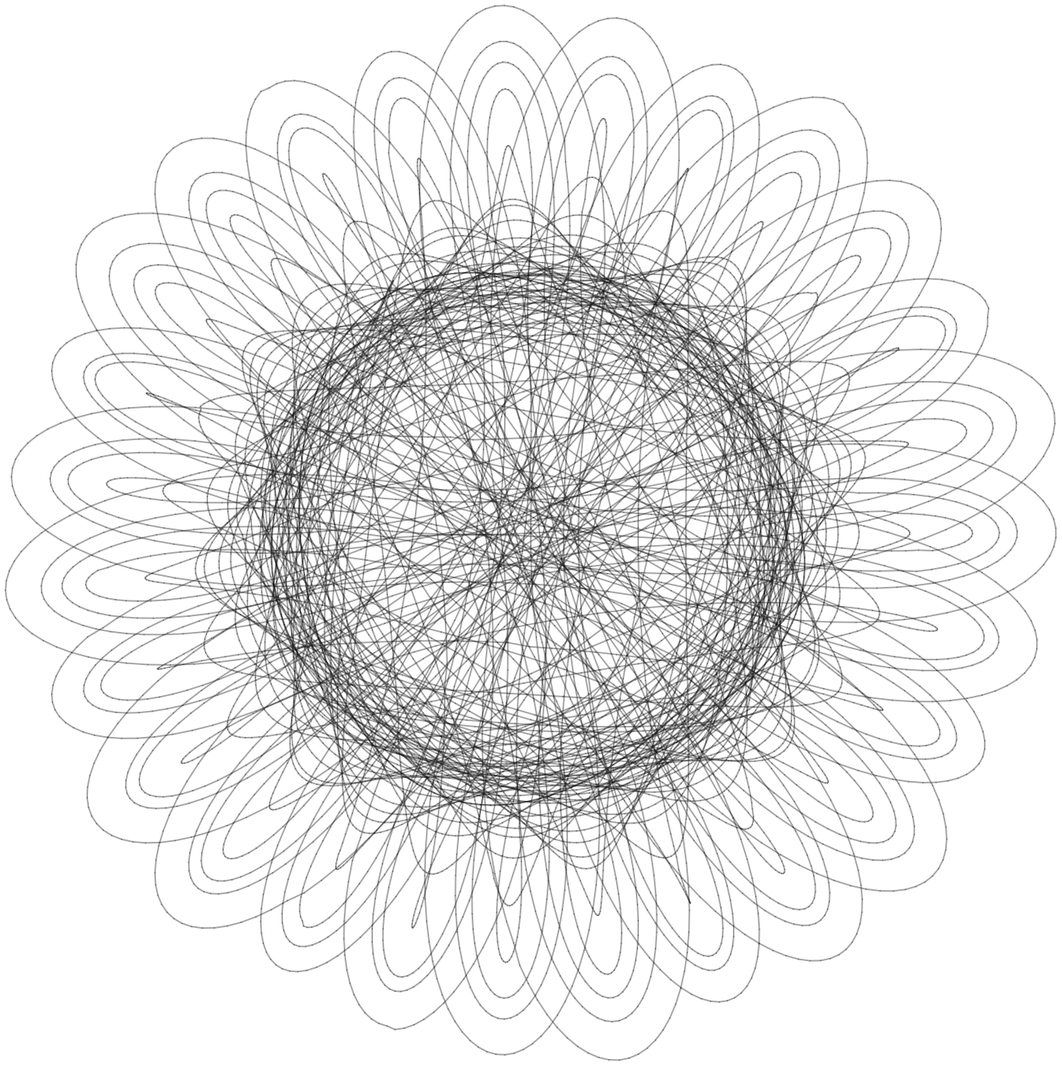
Sound Kinectics
By **Anonymous**

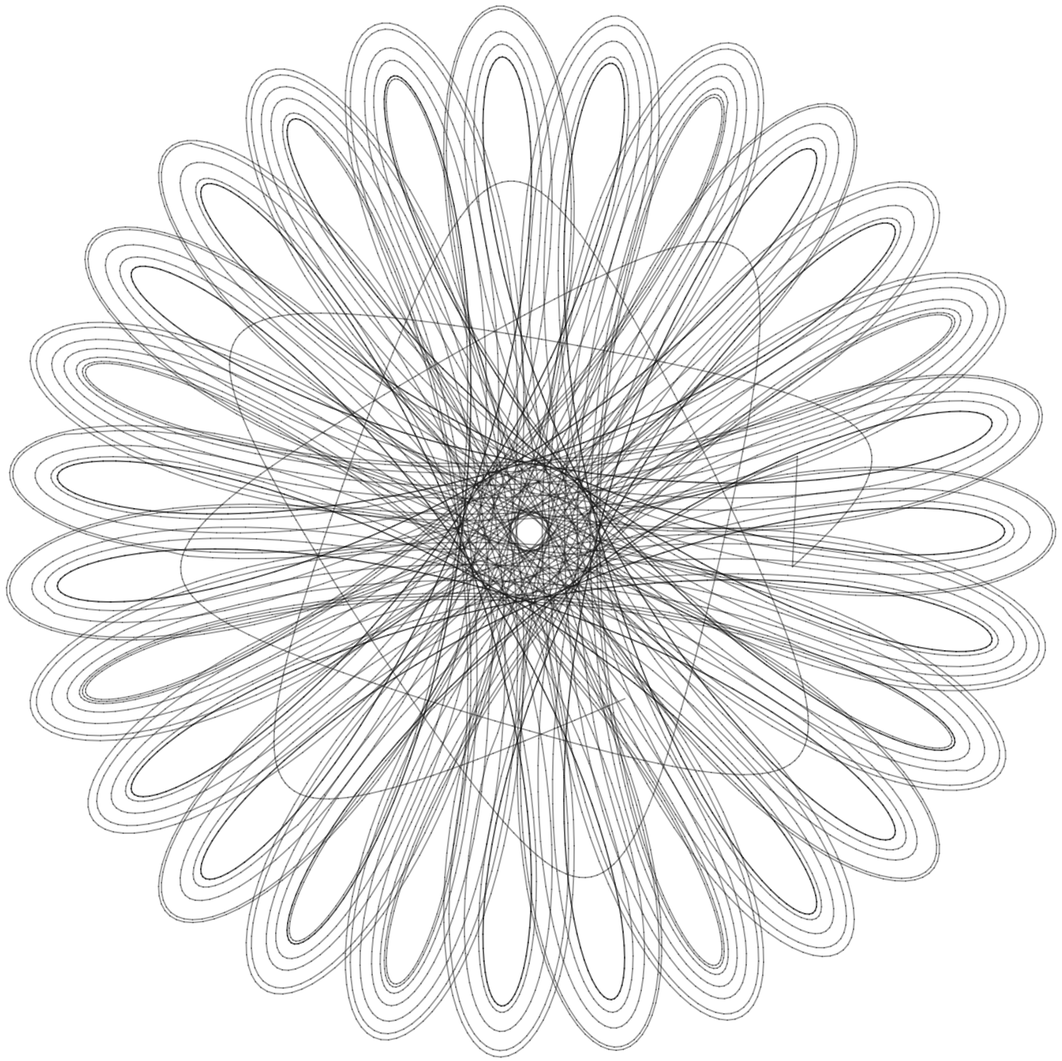


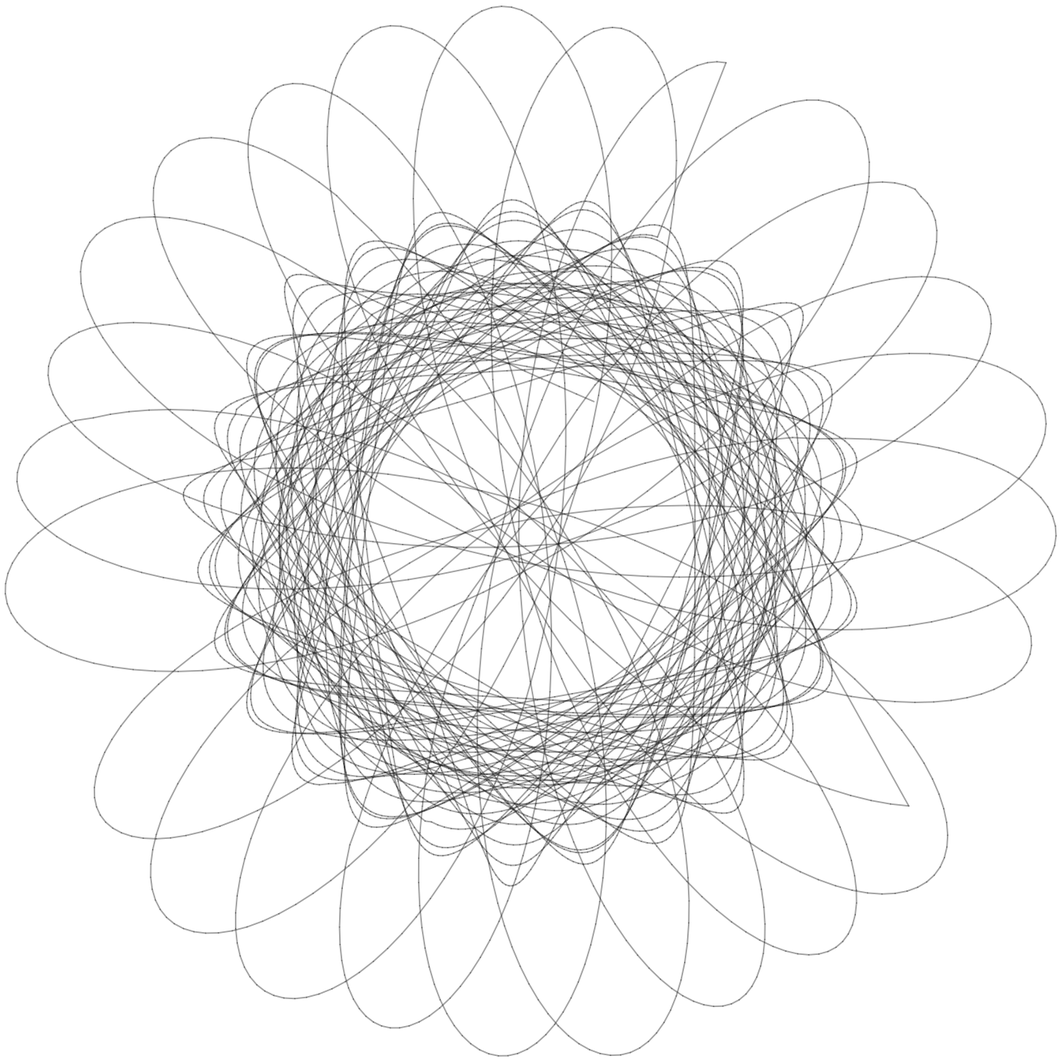


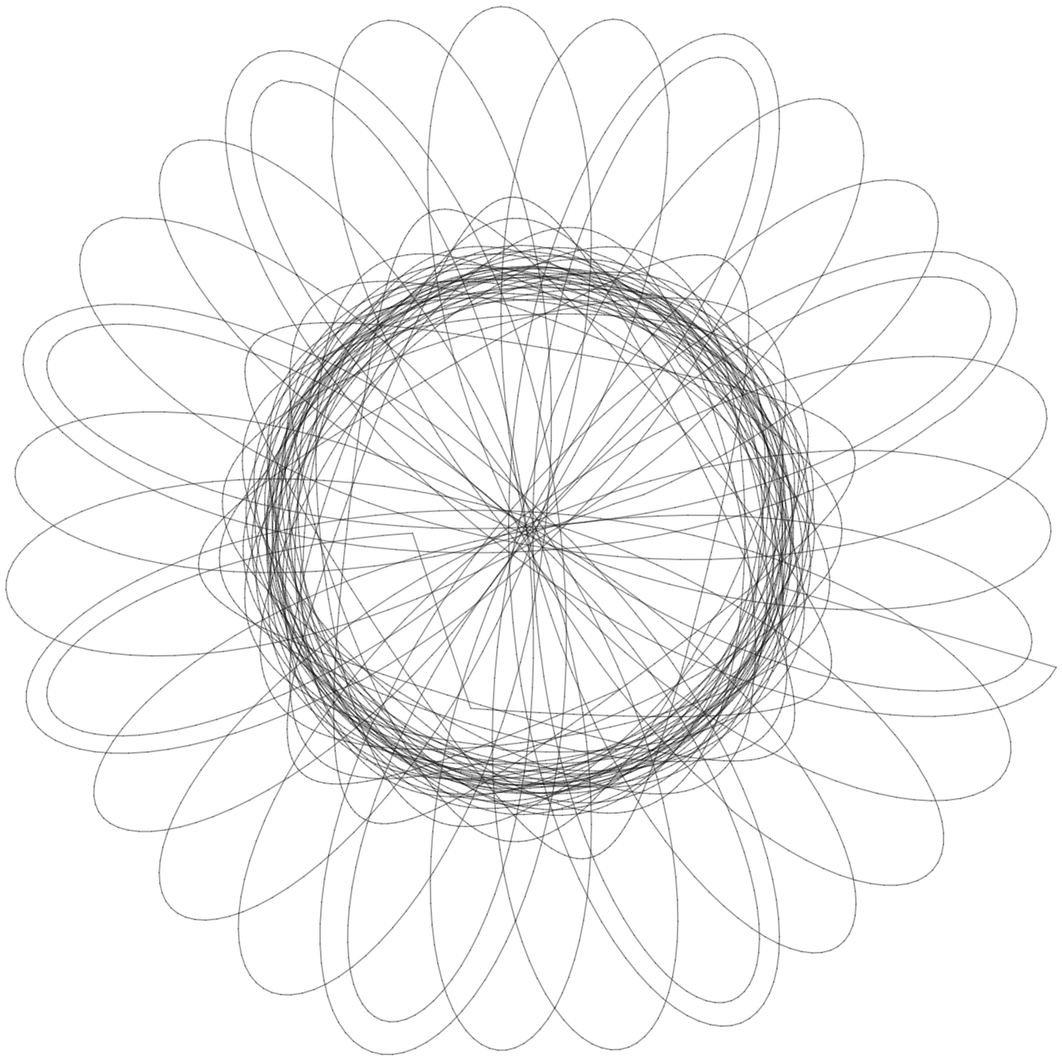












H. Further Development

Post Observations

People who tried out the project were of various ages. To each of them there own movements as well as they're capabilities to adapt to the board. Thus the ones who adapted had no trouble moving according to what they heard while others could not tilt hard enough to trigger an attribute. Therefore the feedback was limited.

A downside however to the adaptation to the situation, in either cases the visual feedback was not an attention point to them. Either they were too afraid to look upwards in order not to lose balance, or the ones who focused more on the entertainment factor too much that they forgot about the visuals.

Further Development

Trial Test #1
Project visuals on the floor

Trial Test #2
Exclude direct visual feedback

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