

SAMVAR SHAH

An Artist is a Bridge: A Visual Portfolio

Artist's Statement:

I grew up coding in the morning and sketching in secret at night because from where I am, boys cannot be 'arty'. I hid my drawings under math books until my rebellion took the form of a purpose- to be a bridge between math and art, between people divided by cultural and geographic boundaries, between the past and the future.

Inspired by nature and heritage, I work in Python, transforming chaotic attractors and fractals into fluid forms- a Lorenz attractor becomes colliding galaxies and a Mandelbrot flow grows roots. Through this digital language, I breathe new life into the heritage craft of Rogan Kala and give it contemporary expression. Inspired by Rogan Kala's ancient motifs, I experiment with color and form, reimagining it for today's world, hoping to contribute to the revival and relevance of this vanishing 300-year-old tradition. My work fills me with a sense of purpose and belonging, as I navigate between worlds through patterns and pixels.

My goal is to apply cognitive computation to my art, enabling traditions to guide innovation so that my work challenges assumptions- whether about numbers, traditions or identities.

This portfolio moves between human heritage and natural wonders- from Rogan Kala's endangered hand motifs to the vast universe of storms and skies. By interleaving culture with computation, I show how patterns link roots to horizons and the local to the universal.

The Enclosed Flower (Sanskrit)

Samvrit Pushp

Inspired by: Rogan Kala motifs

Description: Samvrit Pushp is an algorithmic homage to Rogan Kala. This floral symmetry recalls the rhythmic handwork of Rogan artisans who painted freehand on cloth. Arranged in a precise 2x2 grid, each blooming form is rendered with slight variation in repetition to reflect precision as well as imperfection.

Technique: Rogan Kala often uses radial and grid symmetry. This piece preserves the human irregularities of handcraft, showing how computation can carry forward the essence of tradition



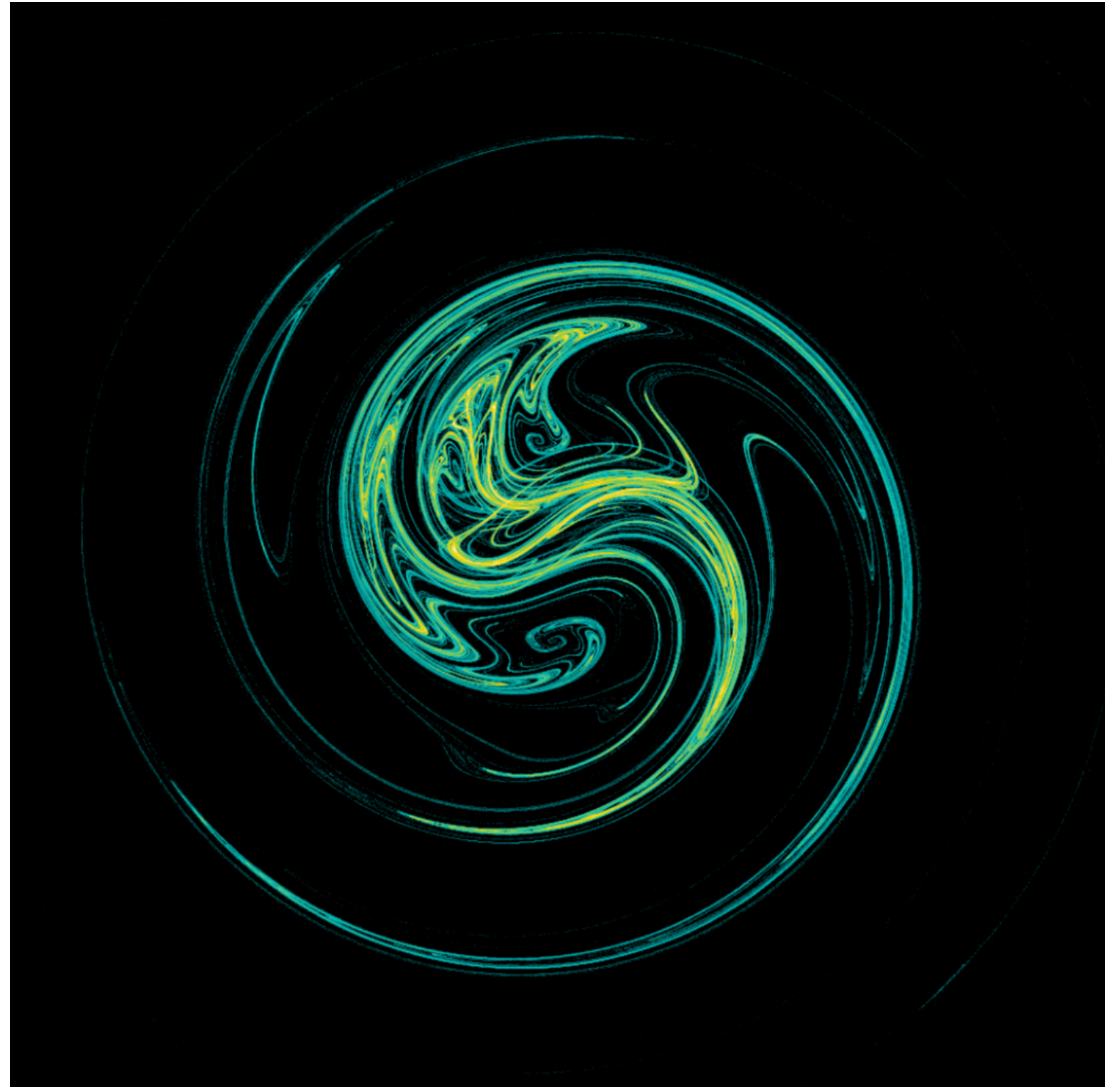
Eye of the Maelstrom

Inspired by: Hurricanes seen from space

Description: An emerald spiral emerges from the sea and presses against the oceanic waves. It appears fierce, but it leads to the process of birthing new life and new landforms. Each render is unique with a reminder that while we plan, life can spring endless surprises.

Technique: I applied an Iterated Function System with random affine functions to rotate and move points through space. I used non linear swirl variations to create a turbulence effect. The gold-turquoise color map amplifies the duality of resilience in fragility.

Submitted to CICA museum- 11th Intl Youth Art Exhibition, Korea.

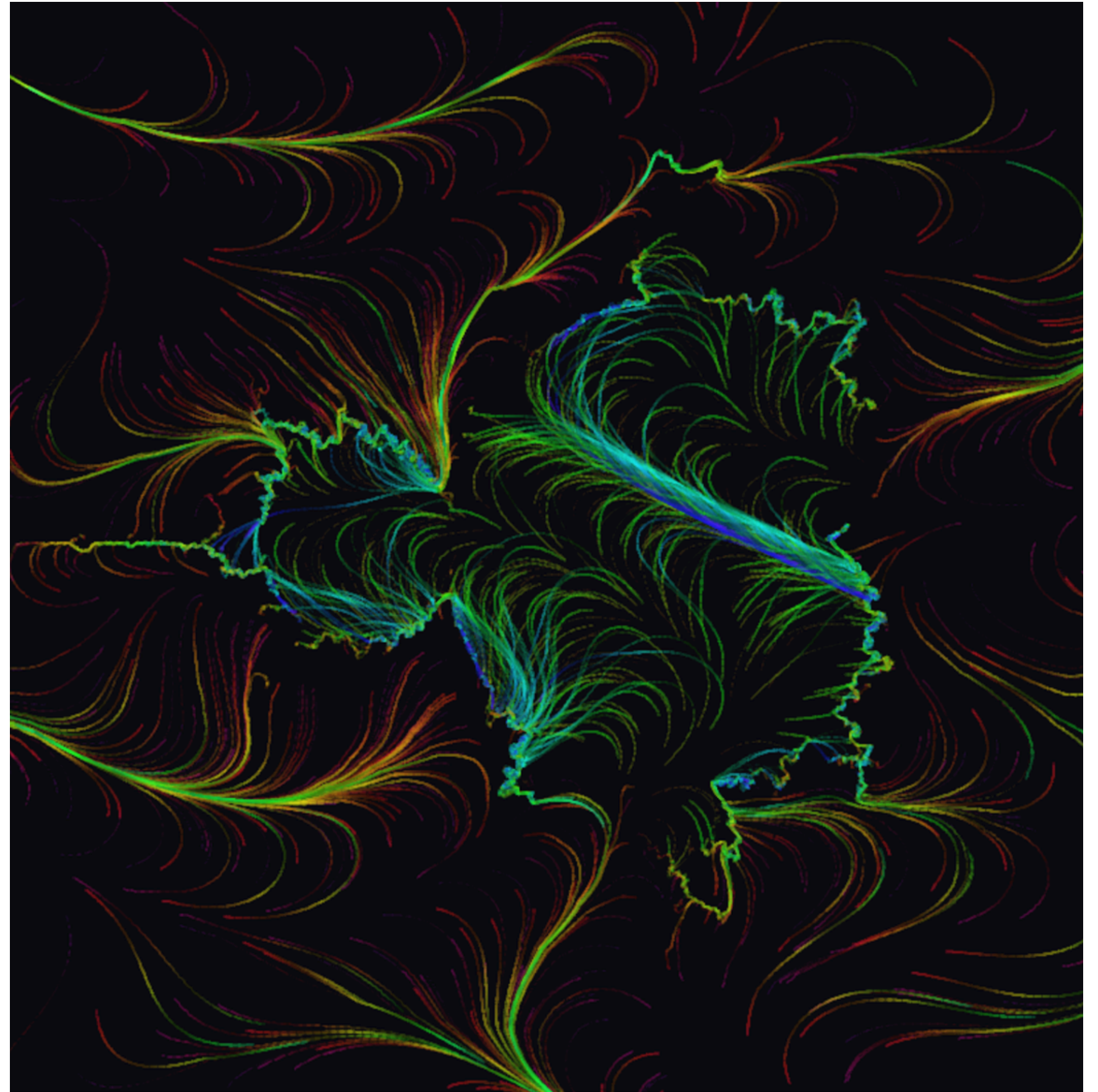


Roots of the Silent Grove

Inspired by: Organic Undergrowth of the Amazon

Description: The tangled root systems of trees buried beneath an old forest floor. The capillaries of moss branch quietly and connect tree to tree, sustaining the forest above. Inspired by Rogan Kala's vine motifs, this piece reimagines ecological interdependence as a visual network.

Technique: I used the Mandelbrot flow because its branching mimics roots searching for water underground. I've used this technique to reflect our interconnectedness. Using orbit plotting for coloring helped develop fibers radiating outward and using potential function gradient flow created filament-like structures that resemble undergrowth in a forest, devoid of light, but with a life and culture of its own.



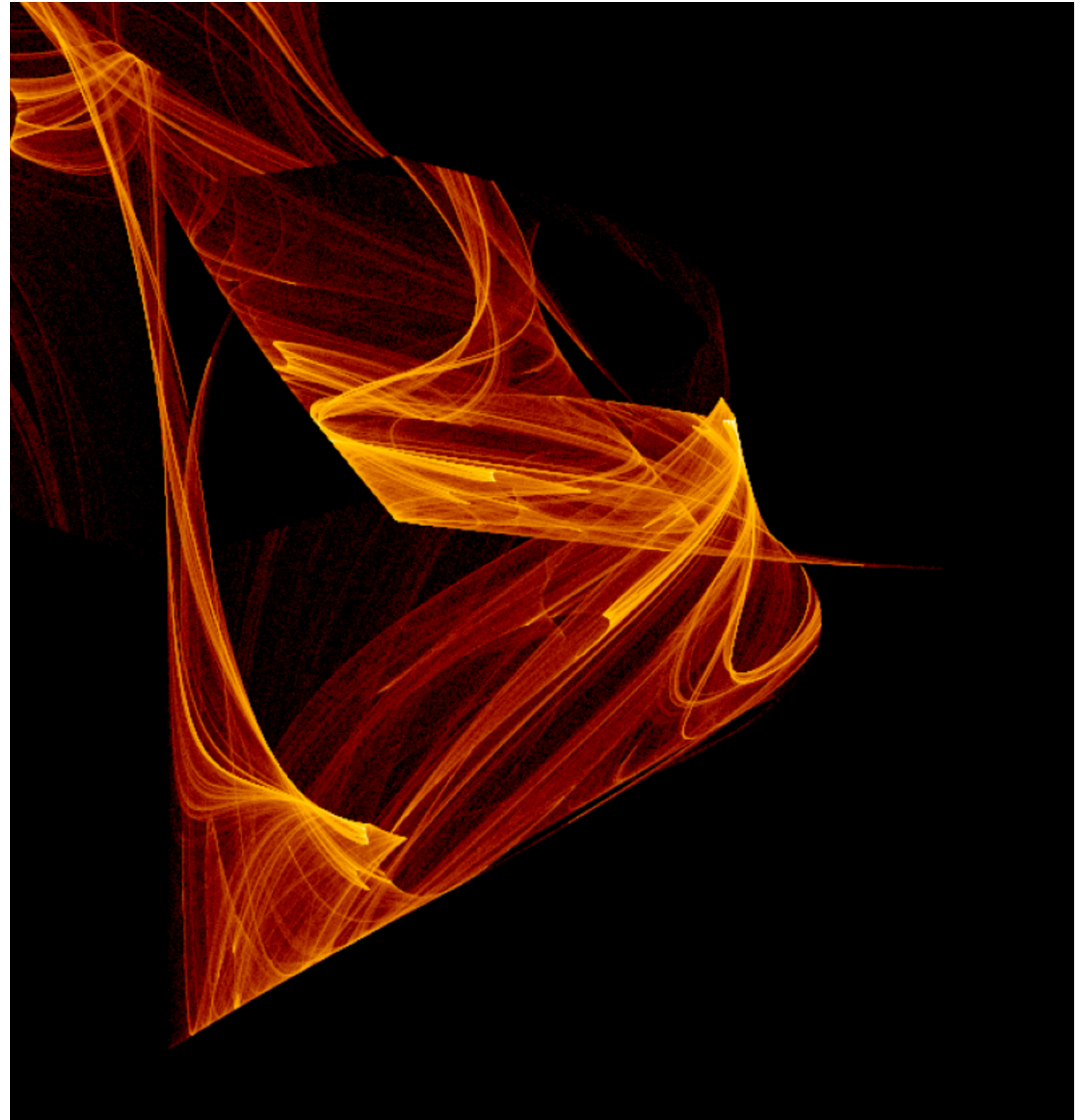
The Ember Pyramids

Inspired by: Pyramids of Giza at Sunset

Description: Ancient pyramids rise in a sky dimmed by the onslaught of centuries. Their dusty edges glow with the last embers of the sun. The structures bury within them, memories of lifetimes and live to tell stories for generations to come.

Technique: This piece uses non-linear transformations in flame fractals. To give it a more organic and intricate look, I used non linear variations and used histogram assignment to smoothen the color gradients to give it an ethereal, glowing appearance. Gamma correction is applied to adjust digital brightness. The smooth blending of colors evokes a nostalgic feeling of years gone by.

Submitted to ClCA museum- 11th Intl Youth Art Exhibition, Korea.



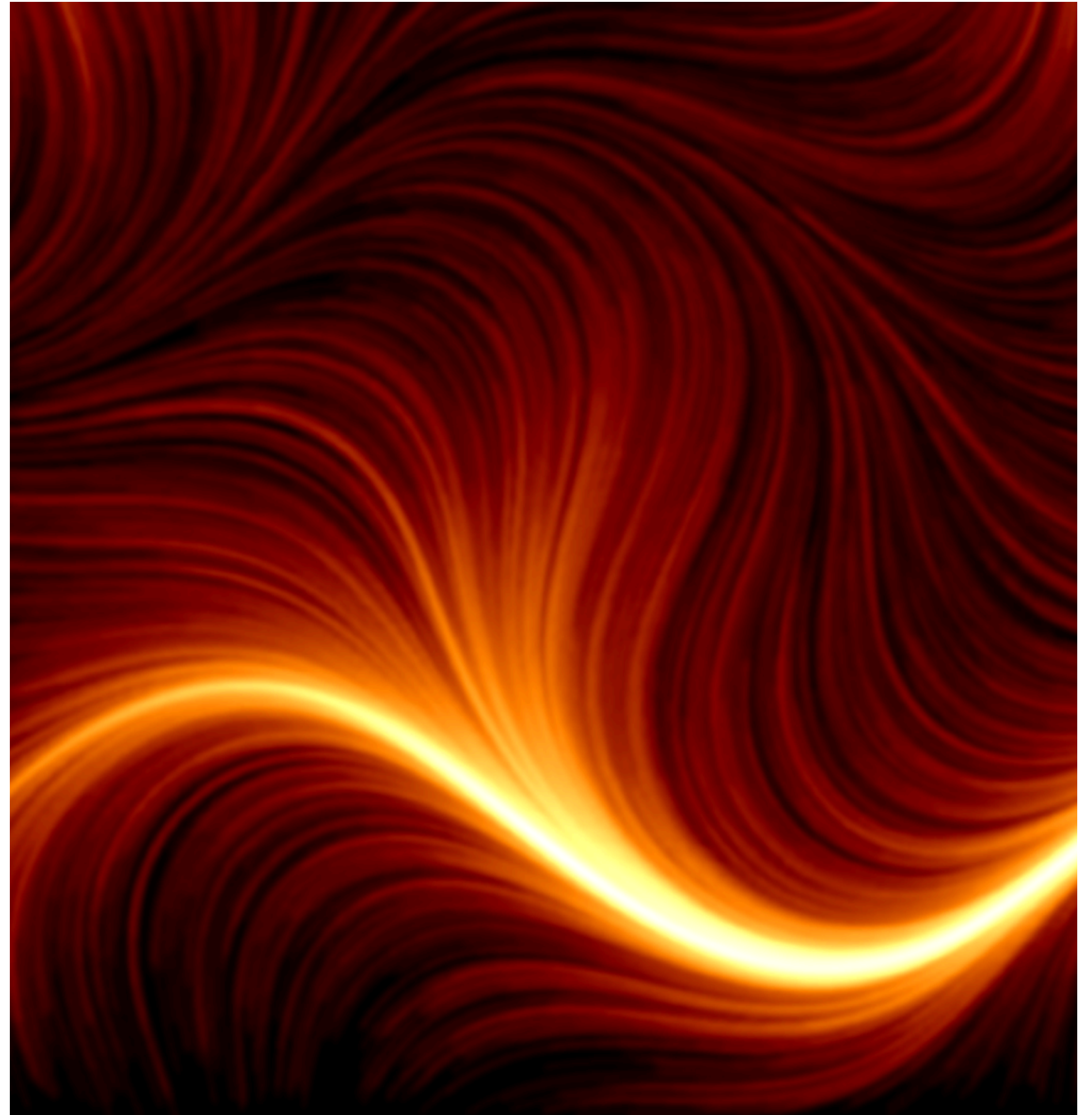
River beneath the Sun

Inspired by: A River at Dawn

Description: The horizon spills a ribbon of molten gold. The air is fragrant with the scent of warm earth and the rustle of unseen creatures stirring at the water's edge. It is an artery of life feeding the land underneath and the ecosystem above it.

Technique: Here Perlin's flow field is transformed into a smooth sunrise palette by applying a Gaussian filter. Perlin noise mimics natural gradients like flowing rivers due to its coherence and Gaussian filter removes sharpness, producing a soft blur and giving it a hazy warmth. The image therefore appears sun-kissed and evokes a feeling of hope and brightness.

Submitted to CICA museum- 11th Intl Youth Art Exhibition, Korea.

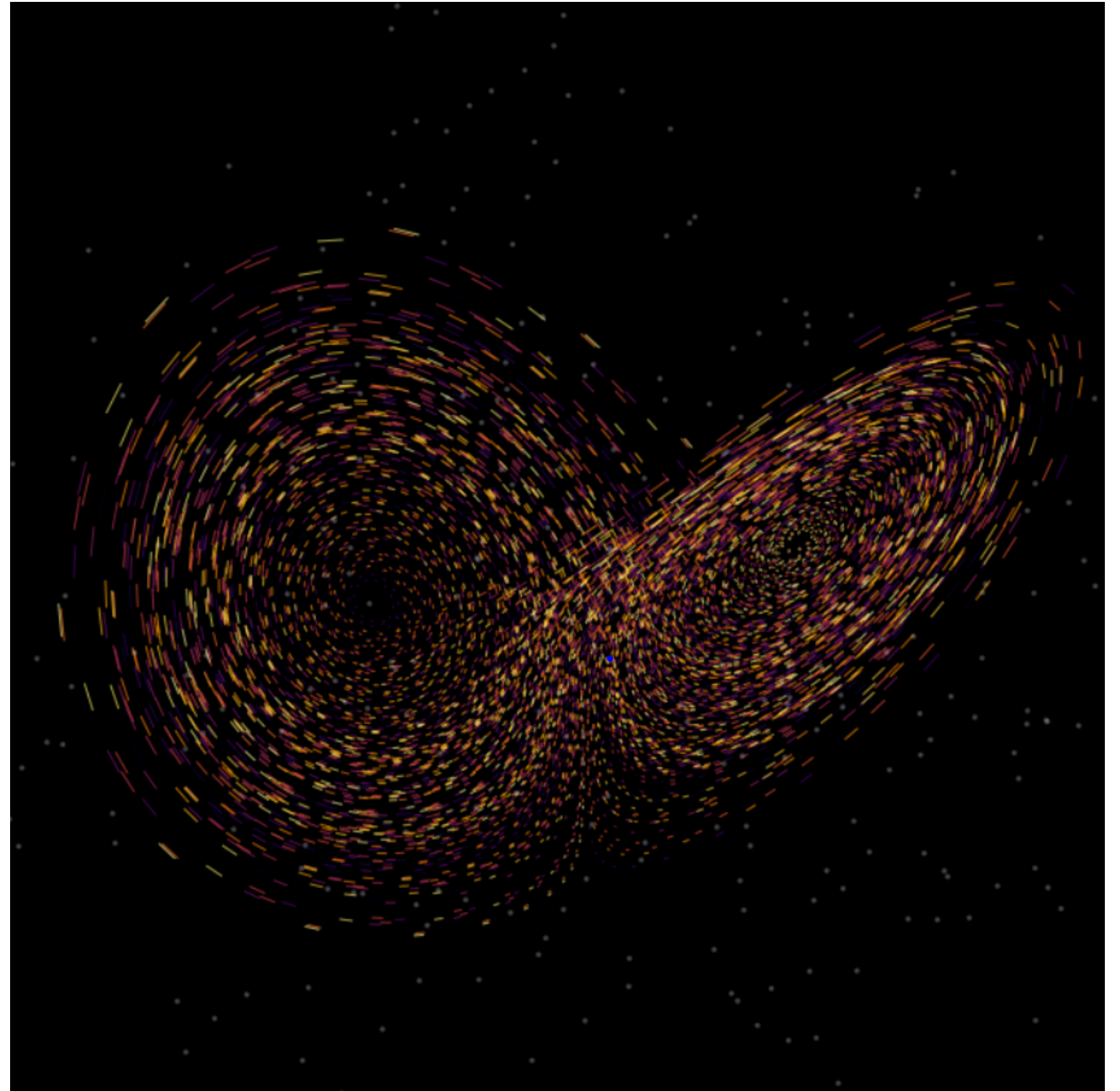


Twin Storm Whispers

Inspired by: Collision of Galaxies

Description: Two spiral giants dance in the sky with their stars flying into delicate arcs of color. They weave a tapestry of dust and flame. In their silent embrace, ancient stars find their end and new worlds are born.

Technique: I used Lorenz attractor to demonstrate the deterministic yet random nature of cosmic storms. It is an apt use for this image as Lorenz attractor although deterministic, leads to drastically different output with minimalistic change in the initial conditions, much like our world today- while the degradation on a daily basis is too small to be noticed, the impact is too consequential to go unnoticed.

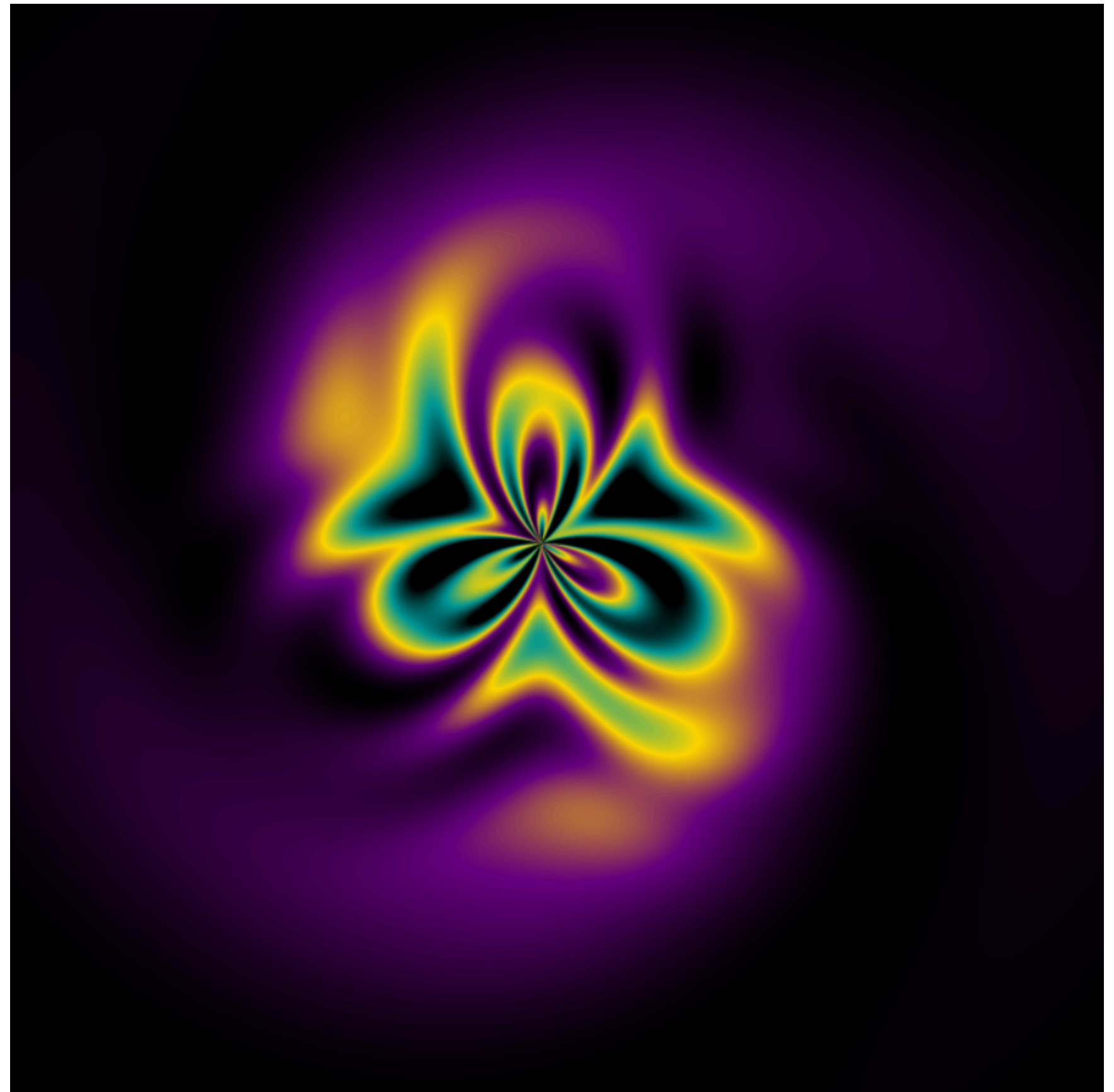


The Abyssal Bloom

Inspired by: Luminous Sea Life

Description: In a pitch black sea, a glowing organism radiates with life. Its electric colors sear the dark and its movements harmonize with the rhythm of the ocean. Inspired by Rogan art, it displays central symmetry and bright contrast, signifying tenacity even in isolation.

Technique: I used core ripple with polar coordinates to create wave-like ripples. The radial mask generates a natural boundary by fading the intensity as we move away from the center. Inner-outer swirl patterns enable distortion of the waves to create a pulsating, luminescent effect. The layering and blending of colors is achieved by using linear segmented color maps, creating a ray of light in an abyss of darkness.

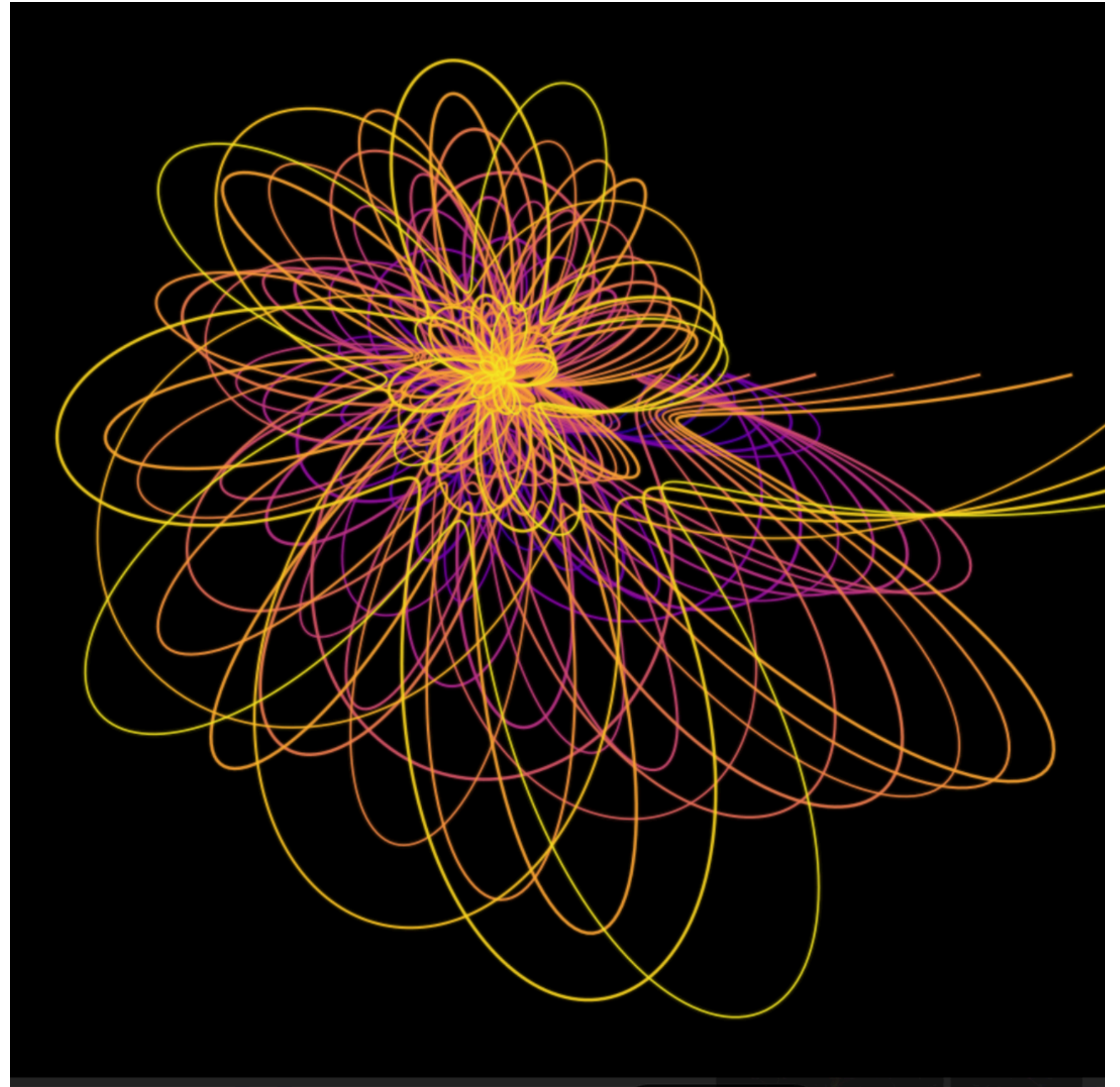


Solar Flare Orchid

Inspired by: A Flower in Zero Gravity

Description: Intricate loops of neon yellow, orange and magenta become petals in space. The flower blooms in eternal cosmos, unburdened by its weightlessness. When we become free from the weight of our expectations, we rise, we blossom.

Technique: I used Lissajous curves, creating base loops and knots resembling natural flowers for this image. Rose curves were added to the formula to generate radial symmetry for the flower and finally harmonic patterns were infused to create a spirograph-like image. A plasma colormap was used to give it a sonic flare resonance. The open ended spirals signify that we bloom when we become open minded.

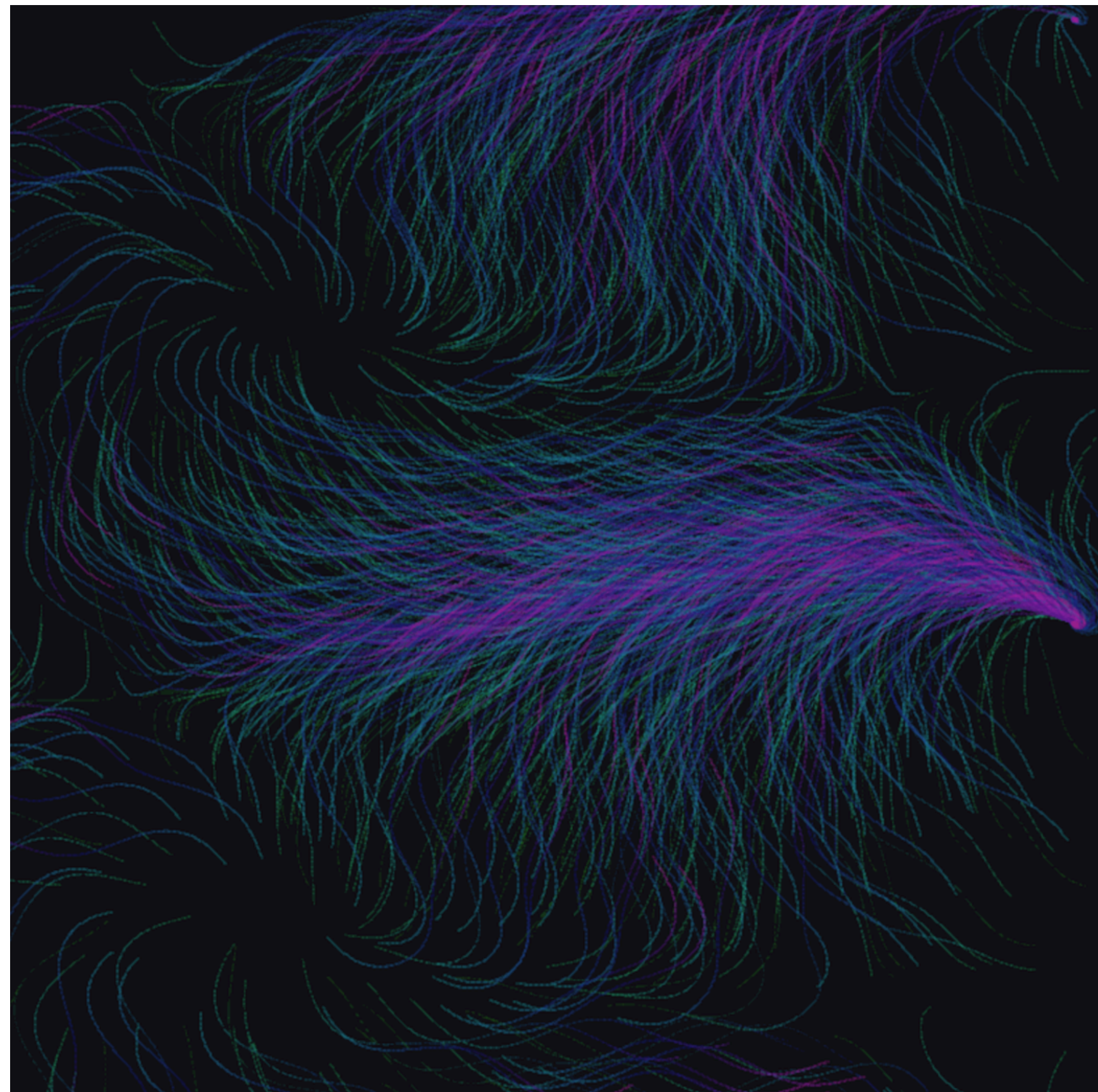


Magnetic Winds

Inspired by: Aurora Borealis

Description: Colored winds caught in invisible fields of the stratosphere. Its magnetic tendrils curl and coil across the dark sky. The palette shifts from warm reds and purples to cool blues and greens taking one through time-lapse snapshots of aurorae flowing across arctic silence and reflecting the transient nature of our lives.

Technique: This piece uses harmonic curves to resemble aurorae or magnetic field lines which are themselves harmonic oscillations in space. I've layered the curves with a shifting color palette to create a dreamy but electric view. Injecting harmonic curves gives the base vector field a rhythm and organic waviness, reflecting the seasons of life.



The Expansion (Sanskrit)

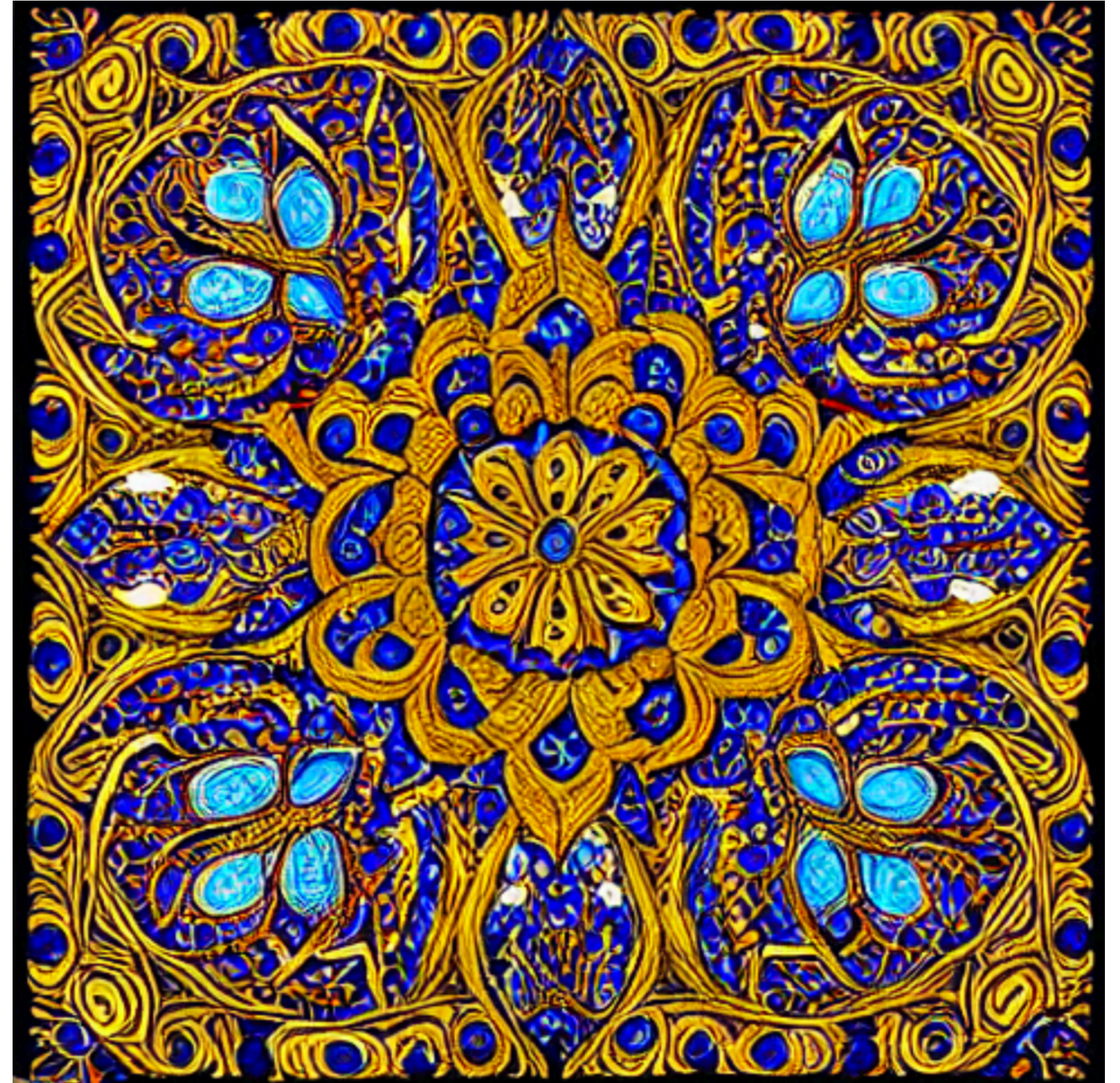
Roganic Vistaar

Inspired by: Rogan Kala motifs

Description: This piece is inspired by the intricate circular compositions of Rogan art. It blossoms into a digital mandala with a densely interconnected structure of lines, nodes and floral geometry.

Technique: Rogan Kala inherently has a very algorithmic, flow-field like structure. It naturally gives in to closed harmonic loops that resemble paisleys or flow streamlines that resemble vines. This image has been generated using GAN through a ML model I built especially for Rogan Kala, in collaboration with Padmashri winner and world-renowned Rogan Kala artist, Abdul Gafur Khatri. He is the guardian of the sole surviving family that practices the dying art of Rogan Kala.

This work symbolizes the expansion of Rogan Kala beyond its physical roots from cloth to code.



Math Formulas Used

1.1 Samvrit Pushp - Trained machine learning Rogan Kala Model

Forward noising: $z_t = \sqrt{\bar{\alpha}_t} z_0 + \sqrt{1 - \bar{\alpha}_t} \varepsilon$, $\varepsilon \sim \mathcal{N}(0, I)$.

Training: $\mathcal{L} = E \|\varepsilon - \varepsilon_\theta(z_t, t \mid c)\|^2$.

1.2 Eye of the Maelstrom - Iterated Function System with random affine functions

$$\mathbf{v}' = \begin{pmatrix} x' \\ y' \end{pmatrix} = \begin{pmatrix} \sin(r^2) & -\cos(r^2) \\ \cos(r^2) & \sin(r^2) \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix}$$

1.3 Roots of the Silent Grove - Mandelbrot iteration

$$M(c) = \min\{m \in \{0, \dots, M_{\max}\} : |z_m| > 2\}, \quad z_{m+1} = z_m^2 + c, \quad z_0 = 0,$$

1.4 The Ember Pyramids - Flame fractals with non-linear transformations

$$f_i(x, y) = \sum_j w_j V_j(a_i x + b_i y + c_i, d_i x + e_i y + f_i)$$

1.5 River beneath the Sun - Perline noise

$$(x_{n+1}, y_{n+1}) = (x_n + v_x(x_n, y_n) \cdot \Delta t, y_n + v_y(x_n, y_n) \cdot \Delta t)$$

Math Formulas Used

1.6 Twin Storm Whispers - Lorenz attractor

$$\dot{x} = \sigma(y - x), \quad \dot{y} = x(\rho - z) - y, \quad \dot{z} = xy - \beta z$$

1.7 The Abyssal Bloom - Self modified polar coordinates

$$f(R, \Theta) = \text{clip} \left[\underbrace{\sin(8R + 4 \sin(3\Theta)) e^{-1.5R^2}}_{\text{inner dense}} + \underbrace{0.6 \sin(4R + 2\Theta) e^{-0.6R^2}}_{\text{mid-range}} + \underbrace{0.4 \sin(2R + 1.5\Theta) e^{-0.25R^2}}_{\text{outer soft}}, 0, 1 \right]$$

1.8 Solar Flare Orchid - Lissajous curves

$$r(\theta) = s_i e^{\alpha\theta} [1 + \beta \cos(k_i\theta + \phi_i)]$$

1.9 Magnetic Winds - Harmonic curves

$$a(x, y) = \sin(\omega_1 x + \varphi) + \cos(\omega_2 y - \varphi),$$

$$b(x, y) = \sin(\omega_2 y + \frac{\varphi}{2}) - \cos(\omega_1 x - \frac{\varphi}{2}),$$

1.10 Roganic Vistaar - Self Made Rogan Kala Model

$$\text{Guidance: } \varepsilon^{\text{guided}} = \varepsilon^{\text{uncond}} + s(\varepsilon^{\text{cond}} - \varepsilon^{\text{uncond}}).$$

$$\text{Sampling: } z_{t-1} = \frac{1}{\sqrt{\alpha_t}} \left(z_t - \frac{1 - \alpha_t}{\sqrt{1 - \bar{\alpha}_t}} \varepsilon_\theta \right) + \sigma_t \xi.$$