The Improbabilities of Theoretical Physics & Mathematics

Traditional representations of physical and mathematical theories are displayed through words in a textbook or with limited visuals. In this concentration, I celebrate the complexity of such theories and give them due representation of their true beauty through art, the form in which beauty often cannot be described with words or simple visuals.

In order, the pieces are named *The Speed of Light, The Paint Can Problem, Multiverse, Schrodinger's Cat, Spirographs & Polar Equations, Fractals, Occam's Razor, Murphy's Law, Chaos Theory*, and *The Large Hadron Collider and the Unified Theory of Physics*. In the way that theories are complex, I challenge myself to meet the theoretical complexity with my technique and creativity and by examining the interrelatedness through a broadened scope. Specifically in *Murphy's Law* and *Multiverse*, I take inspiration from Jackson Pollock, known for his chaotic splatter paintings, and the street artist known as Evol who painted apartment complexes on cardboard. Additionally, the light patterns of *Chaos Theory* are actual movements of a double pendulum that I constructed, affected by the environments in which I photographed them. The pieces evolve from literal interpretations of theoretical physics and math into logical statements which are affected by the previous theories and finally, overarching theories that encompass the others.

Through this concentration I have expanded my knowledge and use of 2D media including one that is often disregarded: textiles. Similarly, *Multiverse* depends on perspective photography called anamorphic projection in which the 2D form is warped to create a 3D illusion. There is an audience for every artist but the true realm of understanding exists within the artists themselves. In this, I express my personal appreciation of the improbabilities of theoretical physics and mathematics so that others may savor its unique beauty.

Title: The Speed of Light

Medium: Textiles

Dimensions: 15” x 11.5” without 2” black mat

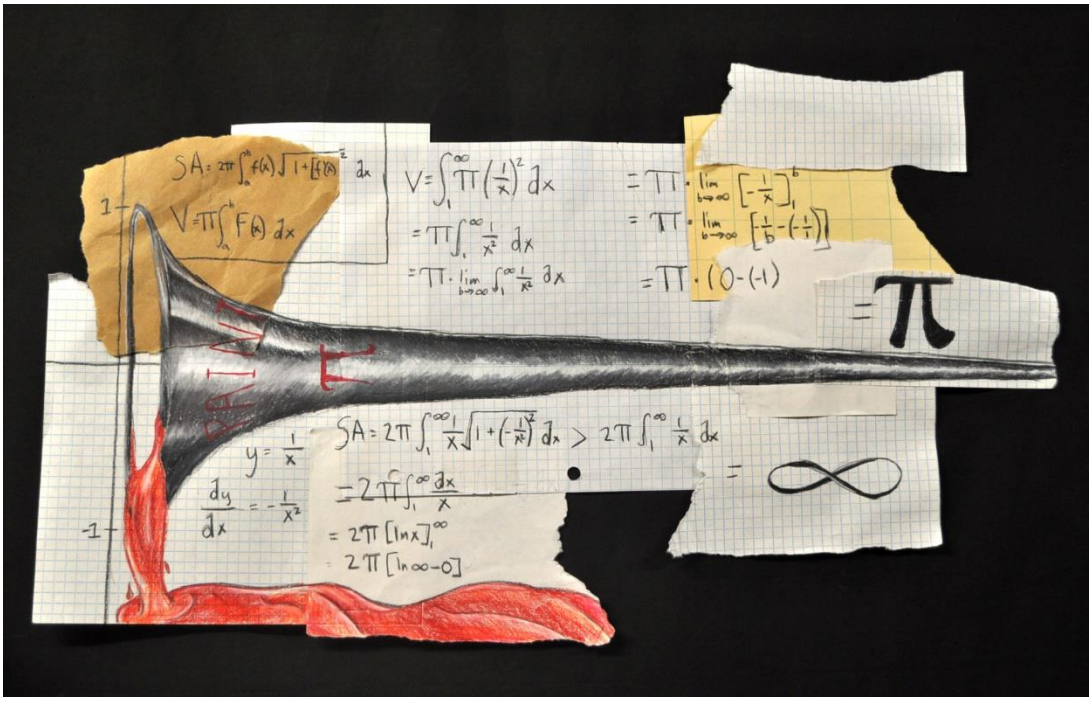
Description: This piece explores the idea of what it looks like at the speed of light. Because surpassing the speed of light means surpassing our perceptible visual range, it will remain unknown to us until we can compensate for it. The use of textiles provides a unique texture to this piece in that it juxtaposes the complex idea of light and its properties with a very tangible medium.

Title: The Paint Can Problem

Medium: Colored Pencil

Dimensions: 17” x 10.375” without 2” black mat

Description: The paint can problem, introduced in calculus, explores the issue of a revolved surface with a surface area greater that its volume. In this interpretation, the paint can does not hold enough paint to cover the outside. Other interpretations include Gabriel’s Horn and a cake which cannot be fully covered with icing.



Title: The Multiverse

Medium: Acrylic on cardboard

Dimensions: 12” x 12” x 12”

Description: Several universes exist and interact within one larger universe called the multiverse. When viewed from a distance, the “worm hole” on the top of the piece appears to envelop the surrounding portions of the box in an optical illusion but when viewed up close, the worm hole is elliptical. This technique, anamorphic projection, is employed by many chalk artists to make their artwork appear three dimensional. Inspired by Evol’s apartment complexes on cardboard, this multiverse displays windows to other universes with the piece as a whole existing as the multiverse.

Title: Schrodinger's Cat

Medium: Plexiglass etching

Dimensions: 8.5" x 6.25" without 3" black mat

Description: Schrodinger's Cat is an illustration of the Heisenberg Uncertainty Principle (multiple variables of a particle cannot be determined simultaneously). If a cat were placed in a box, by knowing its position in the box, it cannot be determined whether the cat is alive or dead. The process of plexiglass etching includes scratching an image onto a sheet of plexiglass, covering the stamp with ink and placing a sheet of paper on top. The stamp and paper are then rolled through a press to produce and image and allowed to dry.

Title: Spirographs and Polar Equations

Medium: Hand Embroidery

Dimensions: 8.5” diameter

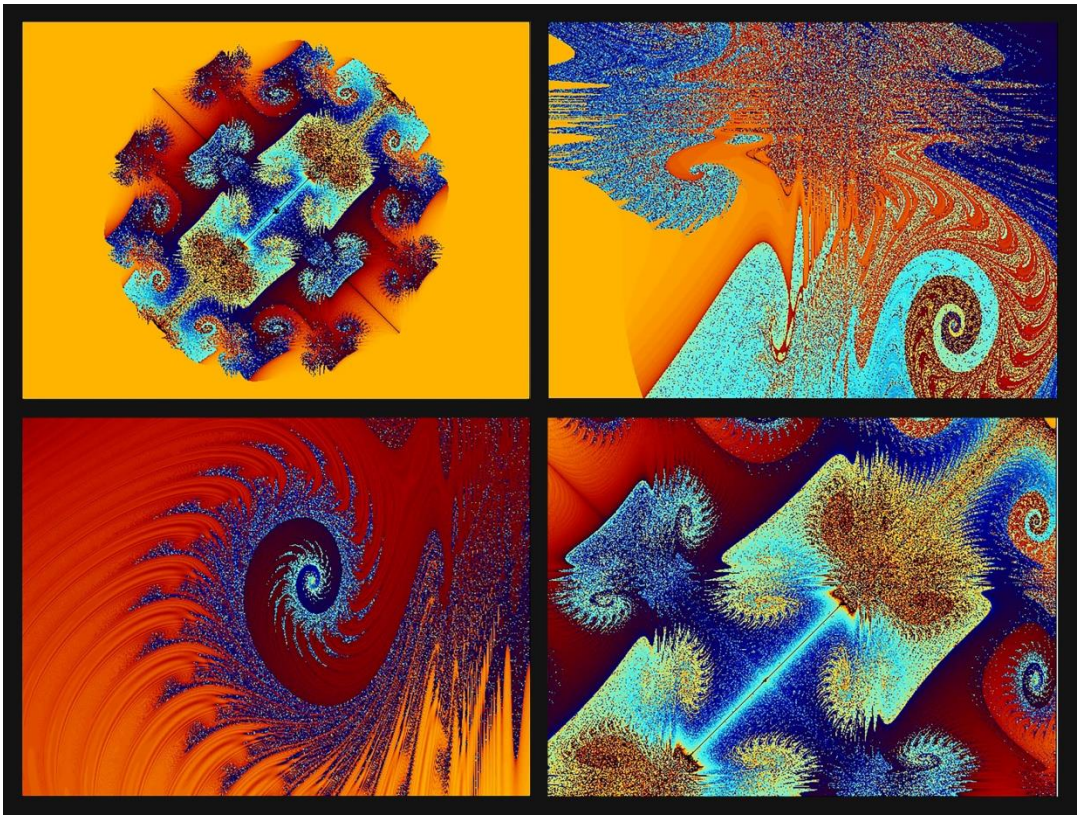
Description: Spirograph designs are based on polar equations, functions displayed on a circular coordinate grid rather than a rectangular one. Displaying functions in circular form expands the possibilities of performing calculations in three dimensions with cylindrical coordinates and spherical coordinates, useful for calculating circular motion, electrical fields and magnetic fields. This particular piece demonstrates how a simple toy and a creative art can be combined through mathematics, connecting three seemingly unrelated topics in a way that displays uniqueness and beauty.

Title: Fractals

Medium: Digital

Dimensions: 18.5” x 15.25” including black mat and silver frame

Description: Mathematical and visual patterns in fractals continue to infinity, no matter how many times one zooms in. Each zoomed-in image presented in this piece can be found in the largest image in the upper left hand corner.



Title: Occam’s Razor

Medium: Permanent marker and colored pencil

Dimensions: 12.375” diameter

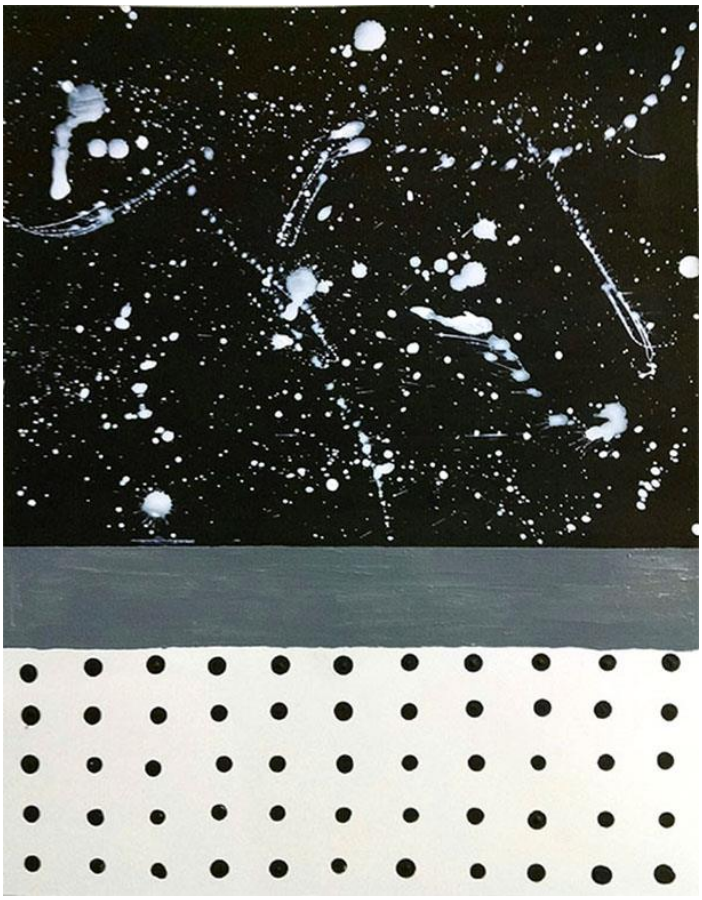
Description: “All things being equal, the simplest answer is usually the correct one.” This piece, inspired by the doodling phenomenon known as zentangle, demonstrates complex and detailed designs whereas the overall shape of the piece exhibits its true simplicity.

Title: Murphy's Law

Medium: Acrylic

Dimensions: 18" x 12"

Description: "What can go wrong will go wrong." Inspired by the work of Jackson Polluck, *Murphy's Law* explores the very fine gray area between order and chaos, what goes right and what could go wrong.

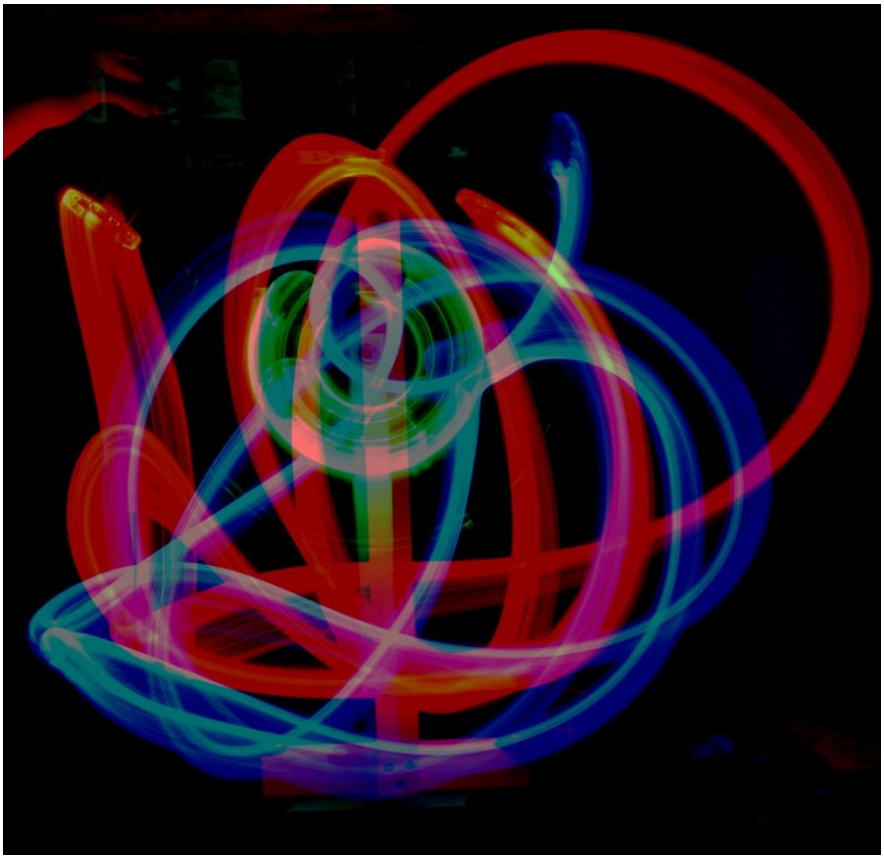


Title: Chaos Theory

Medium: Photograph/digital

Dimensions: 25” x 25” including silver mat and black frame

Description: A double pendulum exhibits chaotic motion: there are patterns that that the swings will follow, but due to the infinite variables affecting the system, each turn will be different. or example, the light patterns of this piece are actual movements of a double pendulum that I constructed, affected by the environments in which I photographed them. Due to the nature of chaos theory, no two images were alike, producing a new piece each time.



Title: The Large Hadron Collider and the Unified Theory of Physics

Medium: Mixed media

Dimensions: 6” x 6”

Description: The Large Hadron Collider (LHC) is a particle smasher with a goal of revealing what happened at the first few moments of the Big Bang on the quantum level. The idea is to discover new information and/or confirm our current understanding of how our universe works in a way that it will work on every scale, leading us to one unified theory that will tie together the existing theories (General relativity, quantum mechanics, Newtonian physics, etc.) Inspired by the data plots published by the physicists working the the LHC, the mixed media nature of this piece acts as a reminder of all the possible variables that must be taken into account when developing a unified theory of physics. When closely examined, all of the theories of physics and mathematics presented in this collection are represented.