

# **CONQUERING STRANGENESS,** *THE UNIVERSE IN US*

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## **ABSTRACT**

When Beauty runs deeper than the skin, it's a truth, if the truth adds up to simplicity that's elegance. After all complexity is the sun total of repeated simplicity & behind every complex system lays a simple beautiful principle that makes it work. Like tortoise carries shell on its back. Do we carry the universe in our heads? I later invoke U-Duality to examine symmetries on a circle at D=11 and reveal why space-time on a Brane is tantamount to that on a brain.

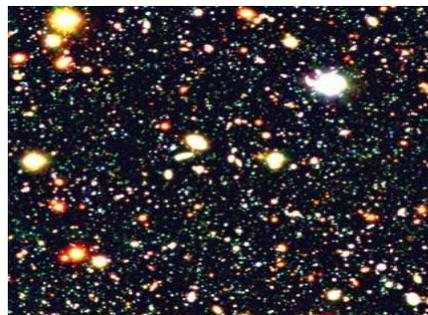
*There is no exquisite beauty without some strangeness in the proportion- Edgar Allan Poe*

The Epic battle *In The valley of Ellah*, Of David and Goliath is sure enough imagery of the gigantic task that we modern day theoretical physicists face in building the ultimate reconciled picture of the totality of all existence. Like Goliath contemplating the universe has been a strange dark tale to many who have preceded us. It's the 21<sup>st</sup> century and vast advances have been made, the answer is closer than presumed and of all Stranger. Like David's sling and stone to Goliath's sword & Armor. In a single window. I contemplate how **simplicity conquers strangeness**



courtesy **Wikimedia commons** I

take you through at simple cognitive journey of the universe and reveal how decoding the ultimate Topological geometry of the universe in M-theory may have led us to revealing the deepest inner workings of the Human brain in Neuroscience. I depone why the universe is more than the crux of a social myth, or an objective reality walled off. 'Out there' in empirical cosmology. At Quantum Planck scale levels why all is one and indistinct. You are the universe and the universe is you. I discuss the universe in US.



*Courtesy NASA*

A Hubble deep space view of the universe by us. If the universe would look back at you, you'd appear as one of the specks dots on the picture because you live in the vicinity of a star a basis premise of self referencing perspective view that I propose.

### THE ABSTRACT ART OF WE CALL REASON

Modern day cosmology is grounded on the concepts of **space and time**.

Space and time are **scalar** quantities scalar quantities have only a **magnitude**. They are thus **abstract**

- Our spatial orientation is modeled on a **Cartesian plane**. These scalar quantities form basis reference frames X, Y, Z axis's in the **Basic** model of our **cognition**, interaction and awareness of the world.

If a "**A picture speaks more than a thousand words**." Space and time are concepts that form a template-a canvas which we build a mental picture of the universe.

These eventually interact in a grid we call space-time. A **fabric** we live in and model. Our surrounding. Space-Time being a '**product of scalars**' it's highly **plastic**. Bends easily and diversely. A gymnast, it even curls in on itself.

- The concept of Space-time has through Eons of evolution becoming firmly rooted in the architecture of the human brain through conditioning and is embedded its Neurostructure. Both as
  - o **Structural model**- Biological neural networks circuitry and clustering patterns.
  - o **Functional model**- based on mathematical geometrical abstractions in Topological fields.

*"We read the weird tales in newspapers to crowd out the even weirder stuff inside us" – Alan de Button.*

### The structural model

The **Human Brain Project** ,in Mid 2017 has come up with findings of '**A world we never imagined**' To me this is the Humanity's, **Greatest Discovery** of the 21<sup>st</sup> century further advancing knowledge on what Carl Sagan called. "**The seat of human civilization**" - The human Brain.

A find that made headlines, appearing in the June 2017 Journal-Frontiers of Computational Neuroscience. Titled. **Cliques of Neurons bound into cavities provide a missing link between structure and function**.

The **Human brain operates in an 11 dimension** architecture **unlike the three we are used to**. We have found that the **Brain builds the universe** by forming multi dimensional Neuro structures called **cliques**. The cliques form in minute spaces called **cavities**. Residing in the Neo-cortex, these **crumble** when **information** has been processed. This means that neural networks **react to stimuli** in an extremely deterministic ordered **pattern**. If the brain **simulates**

its world in such an 11 dimensional landscape then it means that Bio-physically the brain is classically conditioned by its environment to perceive these multiple dimensions. **We thus live in a 11 dimensional multiverse.**

**Anthropic bias** selection “**politics of the brain**” itself a physiological phenomena responsible for. Quantum observation-Selection effects, The Pauli exclusion principle, Wave Function Collapse and the self locating belief. (The absence of the positron favoring instead to give us its sister the Electron) -An **Asymmetry** that the brain **conspires** with the universe to give us

Quantum phenomenon is observer dependent, particle and wave function exist **unitary** and simultaneously as a pseudo state out there, but when observed these selection effects allows us to **only** measure one of the two. This is a ‘**manual override**’. By the brain ridding us of “**free will**” Physics and the brain are not independent.

The findings go a long way in complementing and lay the foundation of an 11 dimensional physics tool called **M-Theory**. Testing parts of this Behemoth **Theory of everything** has been a tall order. Purely a **Topological undergarment** of **Quantum field theory**. It’s a wonder how far it’s gone having **long predicted** an **11 dimensional cosmic model**, its broken bounds revealing the **ultimate machine** that built the large hadron collider.- **The human brain**. I am bound by an **optimism Bias** and see a bright **future** for **unification physics** when theoretical physics and Neuroscience share faculty to ultimately answer the grand questions in the universe Any **Physical model of reality** that we build is always a **product of our cognitive senses** (perceptions). If physics is a **doodle of the brain** essentially, then a truly Fundamental, **Quantum mathematical model** of reality duly serves to **fully** describe the abstract **workings** and **interaction** of phenomena of this organ and how ‘**it all builds up our world**’ The Brain is **not independent of the universe**. It physically **exists in the cosmos**. It’s conditioned by **energy, matter** and information in the cosmos to behave like the universe. **The brain is sufficiently a basic cosmic model extrapolated**. It’s my **a priori** assumption, that **all we observe** on Micro scales (Quantum, string level) and Macro (Hubble volume) is all **rooted as a mathematical model** in Cognition. It’s my proposal that a **Foundational mathematics physical model** of space time, leads to **new knowledge** on **how the brain works** and unveiling, The **Brain-universe** interface hinting that **consciousness** is not a new or strange concept to **Higher Dimensional physics**

- The universe thus exists as a **static mathematical model** in the human brain that becomes **dynamic**, when it **encounters** (prodded) by **stimuli**. A die cast mold that materializes into the world that we observe and interact with.

### **Feedback in Biological systems**

- **Feedback** is when outputs of a system are routed back as inputs as part of a chain of cause and effect. The **path** followed in such is called a **loop** (circularity of action)
- All **Biological systems** Exhibit **feedback** with their **environment** they also stick to feedback in cognitive sciences when interacting with **stimuli**.

- All what we call **Physics** is the **mathematical description of phenomenon** in our surrounding. The **scope not confined by scale**, Human brain is able to **contemplate with ease a large structure (galaxy)** or a minute quantum system (quark) in **Biocosm**
- Its suffices that a Quantum theoretical model of the universe **aptly describes** the brain. The converse is also true.
- This **digress** from the ‘universe out there’ it thus a **Mathematical structure** is an abstract **immutable** entity **existing within** us. Biological neural topological map model of how the brain understands the external world. It’s a case of **Form adding up to Function**.

### The strange loop

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*Strangeness is a necessary ingredient in beauty,*  
Charles Baudelaire

A **strange loop** is a **cyclic** structure that goes through several levels in a hierarchical system. Arising **by moving only upwards or downwards**, through the system one finds oneself **back where one started**. Strange loops feature paradox. A classical example is The **Ouroboros**-The serpent that tried swallowing its tail. *The book **I am a strange loop**, Douglas R Hofstadter, exploits Gödel’s idea, that a mathematical formula say  $22/7$  can be represented by a number – 3.142857, or by a symbol  $\pi$ . It’s possible to take the number 3.142857 describing a formula, insert that number into the formula  $22/7$  which then becomes a **statement of self** -A self referencing system.* Hofstadter describes **consciousness** as a **strange loop capable of perceiving patterns** around it **and assigning symbolic meaning to similar patterns** (Fractals) Such **Behavior by consciousness** implies an **abstract form of super determinism**. Because the inputs of a system always resort to outputs and vice versa in a **precise geometry**, namely a circle. (Hilbert space) then **predictability is inevitable**.

Quantum field theory is a **clinical presentation of a deeper underlying manifestation called M-Theory that thrives in 11 dimensions**. Quantum mechanics is **event based** phenomena of the natural world. It is **Observer dependent** and is our **Brain’s tiered interpretation of the micro world**. In a **participatory universe** such as ours the observer and phenomena **interact** in this **strange loop**. The circle is a **pattern of ordered thought** maintained by long range correlations in this interaction. It so goes then **any system that builds a cognitive model of its world must also include a representation of itself within that world**. A **self generated symbol of the self** working on the **hierarchal level of symbols**. This is a **pragmatic** form of **downward causation** in the **practopoietic** loop as evidenced in **supervised learning in Neurons**. Matter (Baryonic, dark) energy and information are **encoded as abstract models** (objects) in the brain. In an ontological universe that ‘expands’. This is due to our evolving complexity -**Ability to manipulate these Brain models/shapes in space-time**. Over time this

**internal** model ‘calls’ and ‘relates’ these objects and shapes to match external phenomena. In a Resonant simulatory network. Hubble’s expansion of the universe may be ‘apparent’ effect. Probably caused by the increasing area of this simulatory **computing surface** (an event horizon) There must exist a **well defined simple cognitive map** structure in 2 dimensions at discrete levels (Planck scale) here matter energy and information **seem to act upon self**. The curse of the Ouroboros comes to haunt. This is the state of our **Brain-By nature virtue a computer** .falls into infinitely irreducible geometrical loops. The simplest 2D representation of the unfolding **convolution** is a circle. This is **analogous** to **cyclic redundancy** an error in computing.

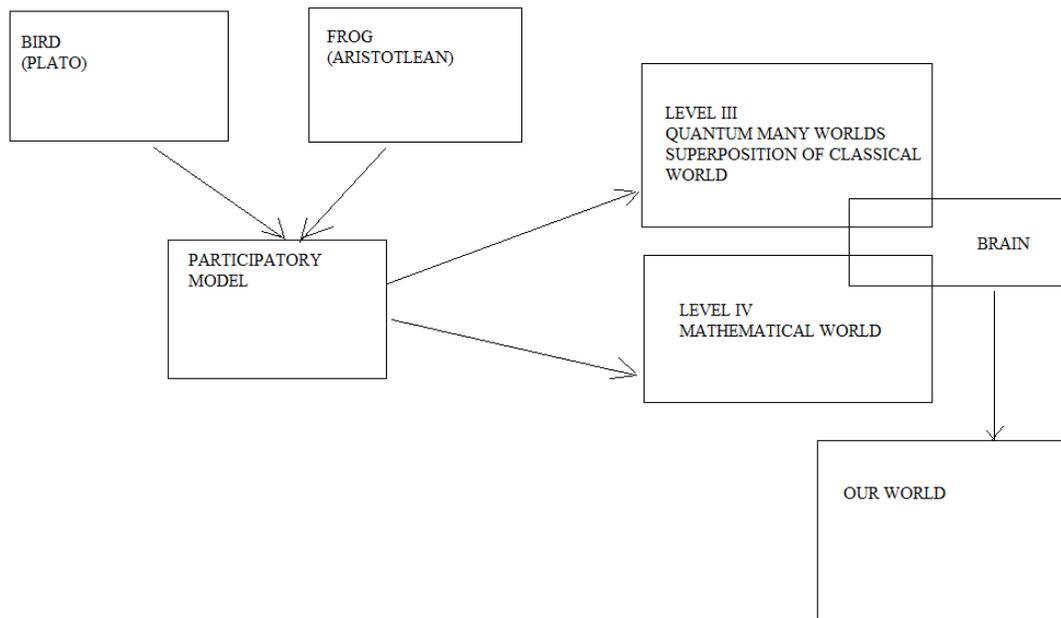
A problem first, **the solution is in the detail**, emergent as a **non-commuting pattern** after formulating a visual analytical tool after applying geometry to the rescue. After all **the brain adaptively takes advantage of this cyclic redundancy** everyday to build both **Recurrent Neural networks** even **Convolutd Neural networks**. Nevertheless the brain learns through repetition **“For repetition is the mother of all learning”**.

Learning in loops and curves thus means that Space-Time takes these convolutions that loop in on themselves. In a cyclic pattern an **end always becomes a beginning** only a **Hologram** can be **coherently extracted** from the unfolding mess. If that is the case, then the universe is unbound-Has no boundary both on the basis of Space and forever exists on a time scale dancing along to this cyclic tune.

**THE VIEW of the universe**

**The narrow Pathway to describing the multiverse**

**THE FROG VERSUS THE BIRD VIEW**



The Frog (Aristotelian) and or Bird (Platonic) perspective does not bother much. A **Multiverse** model is a self referent loop in which **observer and world add up to one description**. At **unity** both frog and bird **concur** we **share the same world** but **afford different views**. This eventually leads us to a **Participatory universe** model is put forth by Archibald Wheeler.

A participatory universe model is **merely a mean nominal argument** that allows us to **safely shuttle between bird and frog view** without violating any laws of physics.

Max Tegmark's **levels III Universe** (Quantum many worlds) model is thus fit. The universe is stated in terms of a **wave function** that lives in an **abstract** infinite dimensional space called Hilbert space and is **"unitary"**.

Here the observer, the observed and the observation are at a kaleidoscopic equilibrium. It's in such a setting Tegmark says **'when observers are asked a question, make a snap decision and give an answer, Quantum effects in their brains lead to a superposition of outcomes such as continue reading the article' and "Put down the article"**. The Wave function evolves **deterministically** and from the birds view (given that the time evolution of wave function is unitary) **there is only one quantum universe**. This leads us to a **level IV mathematical world**. A platonic paradise where classical rules of physics are observed but no quantum 'hide and seek' effect. Eugene Wigner startled by the universality of mathematics stated **'unreasonable effectiveness of mathematics in describing the world**. For the universe is **basically** maths.

Ultimately to get the best of this participatory model a consensual middle way. A **'safe path of least resistance'** is adopted. I propose that for, unity and Determinisms', sake A **Hybrid participatory model** sired by the convergence of level III and level IV scenarios to prop the participatory universe. It's deeply inherent that a duality exists. **A level IV mathematical landscape is the skeletal framework of the level III quantum world**. It is in such a participatory model of which biology puts us. **The universe does not exist until when you observe it**. It's prerequisite for the observer to be in cognition (have consciousness) - ability to perceive and interact with stimuli from the environment.

Gödel's conjectures imply an inevitable strange loop. This **incriminates and indicts the hybrid participatory model**. The level III Quantum many worlds + level IV mathematical structures is not an objective entity out there but something we are part and partake in molding. This is the world we live in. one in which right now you are reading this essay. Its existence is **facilitated and enhanced** by a Bridge between level III and level IV scenarios. This bridge is an organ situated between your ears, called the brain.

In Quantum Mechanics we have a **Dogma** – All possible worlds exist. I imply a mild dose of David Lewis's modal realism that

(i) Possible worlds exist they are just as real as ours.

(ii) Possible worlds are the same sort of things as our world differing in content not in kind (iii) Irreducible entities:

The Multiverse **view** is a consequence of our **interpretation of Quantum physics** which is the **end picture of a 'strange link'** – a feedback loop between the brain and universe.

*The weight of evidence for an extraordinary claim must be proportioned to its strangeness)-Laplace*

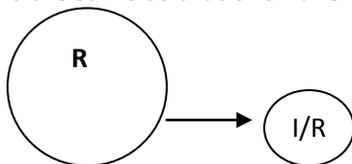
**ITS Anathema in the philosophy of science** *that, every deep scientific experiment or human observation is subject to manipulation by this interpretation.* It's an article of **fatalistic escapism** for science to ignore this persuasive, core expression that the deepest deductions at the heart of physics. Categorically and eventually become self referencing. In Hoefstadt's words –“The strange loop “This explicitly **leads us to studying ourselves.** Any inanimate object (say a flower) that we observe in our environment has an **abstract mathematical mirror model in** our brain. It is the **interaction of stimuli** (photons) from the flower with this brain model that leads to **perception.** A complete theory of everything universe say M-Theory must predict these two – universe and human brain **together in a serving** .For dualistic relationship exists.

### **Functional model-Geometric Determinism**

Though motion of matter in the micro world is very disorderly and chaotic. We humans still study it and have made a lot of inventions applying it in our day to day life. Through random we have **imposed a deterministic philosophy to tame this disorder.** The mathematical formulation of quantum mechanics is built upon the Concept of operator on a Hilbert space. So QM becomes more of an art than a horrible mess. It's an article of faith that **Quantum Mechanics is canonical** and nature has been kind enough to hurl at us a Geometrical abstraction on which it's **anchored and tethered** to-A circle. A representation of Self. The classical interpretation of a Hilbert space as a circle gives the deepest meaning to quantum symmetries.

### **The U- Duality (pupil in iris)**

The U Duality is a relationship that binds S-Duality and T- Duality .simply take, a mirror look in your eye. The shape of your pupil compared to your Iris illustrates this figuratively States that a circle or radius **R** is the same as that of smaller circle - **I/R**



- Such a philosophy of pervades in electricity where a motor can be a generator and vice versa (Lorentz invariance)

The olive montonen conjecture allows us to apply reductionism to parametric modeling that we slot in by hand regardless of magnitude like filling in a Sudoku Puzzle to address unity in an isomorphic infrastructure. Quantum gravity is at unity.

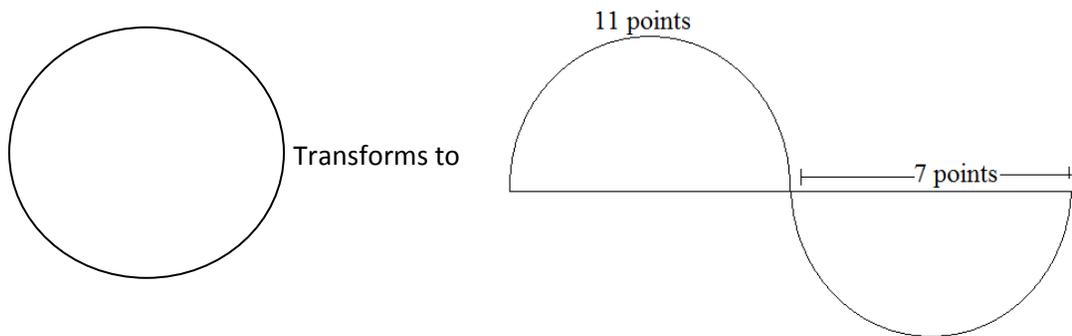
Merits of being Foundational

- Displays coherence and consistency
- Rational in that it is Logical and intuitive
- It is at mathematical unity, 1.

- Exhibits poincaire' invariance.
- Non commutative

Inspired by Richard Feynman's method of seeing QM as an art. I give a graphical illustration of M-Theory in these simple steps. This is a representation of  $\pi$

1. Draw a foundation circle
2. The diameter on the cm scale is 7 cm
3. The circumference is 22cm
4. Graduate off unit marks along the circumference at intervals of 1cm. if you do this correctly you have 22 equidistant points on the circumference, 7 on diameter. A circle has rotational symmetry i.e. looking the same when rotated along any plane.
5. Shear/ transform the geometry along any two points in either X or Y axis this should give two identical semicircles each having 11 of the 22 points, and 7 of the diameter.



To a physicist this should conjure the basic representational outline of a wavelength

Because symmetry is always conserved and one side of a story always adds up to another. It's safe that we use these 11 points to tell the underlying story of quantum mechanics in the form of quantum field theory.

- Implying U- duality it so follows that along these equidistant points. One can consequently draw circle of diameter 1 cm all along the periphery that is the circumference and the diameter always repeating to infinity.
- These give us a finite structure to model infinite systems. Circles are imagined to be the basis elements of a unitary quantum **Time evolution operator**

Time evolution

$$\varphi \longrightarrow T$$

$$\varphi \longrightarrow T\varphi$$

So a state  $\alpha$  always maps to  $\alpha'$

$$\alpha \rightleftharpoons \alpha'$$

- This aptly and precisely defines the “Beable Model” proposed by Gerald T’ Hooft thereby propping the cellular automaton model due to the Beable like behavior
- I propose that it’s these rules that life applies in **reproduction** (species replication or **making copies of self**) so its improbable for a lion to give birth to a tree.
- It comes not by surprise that in state of the art theoretical physics the statistical research into quantizing is done in a mathematical flow work called **loop quantum gravity** its self emergent from **M- Theory**
- Gravity falls in this strange loop becoming infinitely weak the further down, causally in step loops taking after this 11 dimension model.
- This convicts at a glance the “soliton” nature of gravity at quantum sub plunk lengths to human perception. Decoding post Newtonian gravity you require “**searching deeper within ourselves**” perhaps there’s a common particle (Photon) whose effects our brain proprioceptory system reverse interprets as gravity

#### **Conclusion**

It’s in keeping with Reductionist Economic model of nature of **compressing** complex elaborate working of the universe into a **neat compact package** that I call beauty. I have tried my best to keep this essay simple for brevity, so all technical details have been deliberately avoided to help us go round this complexity with ease... with all hope it’s not economical with the truth. The sustainability of 21<sup>st</sup> century physics to match the productivity of 20<sup>th</sup> century physics ,greatly entails “**lots of catching up**” with emergent **Neuro physics**. It’s my prayer that such a model as I have described of a Quantum universe builds a **skeletal framework** for a single window system of the world. **All else is emergent**

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