

# Consciousness: On its Source, and Operations

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## Abstract

Traditional approach to consciousness research accepting the brain as its source has not fruitfully worked. This article takes an inverted approach accepting consciousness as the most fundamental, and the brain, or even a biological single cell, is an organ of behavior for manifestations of consciousness. The idea has been supported by several pieces of evidence from different disciplines of science, medicine, neuroscience, plant biology, and cellular cognition. The human brain at the ZPE state has been emphasized as the fountainhead of creativity. Twelve emerging areas have been clearly chalked out for further research. A model of Brain-Consciousness coupling and another on Consciousness-Brain coupling have been proposed. The paper leads us towards Immersive Neuroscience as the helm of several disciplines of science and for a science-based, consciousness-centric spirituality for humanity.

## Introduction

I am prompted to pen down this article to address the following questions. What is primary, consciousness or the brain? Why should we consider the primacy of consciousness over the brain? Is the brain essential for manifestation of consciousness? If so, what are the essential parts of the brain, and how much of the brain is essential? Can science of consciousness develop independent of Neuroscience? Do we have any mechanism for coupling of the brain with consciousness and coupling of consciousness with the brain? How much Time we have to wait for a science of consciousness to be on board?

Let us begin humbly. We are conscious of ourselves, what is around us in the environment in the external forum, and what is going on in our mind, memory and other contents of consciousness

in the internal forum. Even today we are not sure of what is the source of this consciousness, or what is its purpose and what it does. Or, whether the science of consciousness is independent of the brain? However, neuroscience is heavily dependent on consciousness. A seriously brain-injured unconscious patient in the clinical ward begs in silence for rationalization of his/her condition in science, and in clinical management. His/her silent appeal is rarely heard by the physicians, although quite often an experienced physician reflects on the situation rather cluelessly. However, the relatives of the patients anxiously demand for a systematic approach to the condition which can generate hope in management of unconscious patients and the patient recovers his/her consciousness. *Journal of Consciousness Study* started in 1994 in response to such reflections of the physicians and appeals from the relatives of a prolonged

unconscious patient. However, even today what we are missing in conventional neuroscience is precisely this consciousness-brain relationship.

## Mainstream Suppositions in Brain-Consciousness Relationship

The conventional view in neuroscience is that the source of consciousness is our topmost organ, confined within the skull bones, what we call the brain. The governing power is with the brain, which uses consciousness for behavioral manifestations as and when necessary. Investigation on consciousness is a prerogative of only neuroscience! There are at least a dozen ongoing theories of this neuro-centric consciousness over the last forty years. There are several imaging techniques to pinpoint what is happening in a group of neurons, or even inside a single neuron. Unfortunately, no evidence is available to support any of this theoretical supposition that the brain is the source of consciousness! None of the running theories has either any predictive value for neuroscience or for any other discipline of science. Nor any of them has any strong explanatory power for neuro-information links.

In such a situation, we are reminded of what Murray Gell-Mann, Nobel Laureate in Physics, said in 1994, "...we need to overcome the idea, so prevalent in both academic and bureaucratic circles, that the only work worth taking seriously is highly detailed research in a speciality. We need to celebrate the equally vital contribution of those who dare to take what I call "a crude look at the whole".

The fault-lines in the prevalent view are obvious in several assumptions.

1. Brain has been thought to be a matter, not a biological organ.
2. Complexity of the brain is considered a material complexity, while it is a profound biological complexity.
3. Artificial neural network (ANN) has been considered an experimental tool to investigate the brain network. ANN is constructed on the basis of as if there are only neurons in the brain with neuron to neuron bipartite connections. In the real brain, in addition to  $10^{11}$  neurons, there are 2-10 times more glial cells. The cortical and cerebellar synapses are tripartite. In the human cerebral cortex, one neuron connects with 5000-10000 other neurons thus producing 500-1000 trillion synapses. One astrocyte is said to modulate approximately two million synapses.
4. Another wrong assumption is that the connections between the neurons are only electromagnetic, while it is biological too, and there are wireless connections between the neurons.
5. The behaviors which have been considered in analysis of functions of the brain are mostly signal-based and automated reflexes. Brain's intention and will-based autonomous and holonomic behaviors have been overlooked, and not tried sufficiently for necessary explanation.

As a consequence, the scientist spending years in consciousness

research loses bait (<https://medium.com/paul-austin-murphys-essays-on-philosophy/consciousness-when-david-chalmers-and-christof-koch-placed-a-bet-on-it-5b0400c9f18>). A few of them feel frustrated to question whether consciousness is an illusion (<https://www.youtube.com/watch?v=SzFqc7Cmq44>)?

Therefore, let us examine an ontologically reverse view, where consciousness is primary, and everything else is secondary. I recall the suggestion by Albert Szent-Gyorgyi (Nobel Laureate in Physiology and Medicine, 1937) [1] for the readers, that we need to work not merely as an Apollonian type of scientists, who are classical and systematic and tend to develop established lines to perfection, but surely to investigate as a Dionysian, who is intuitive and romantic, who is more likely to open new, unexpected valleys for research on the backdrop of the lessons from the past.

## Author's stand on the Consciousness-Brain relationship

Since 1985, I have been working with a view [2-7] that the brain is not the source of consciousness. The brain cannot also use consciousness. It is consciousness which uses the brain for its manifestations. In this ontological reversal, there is inversion of the Governing Power too. The Governing Power is not with the brain, but with consciousness.

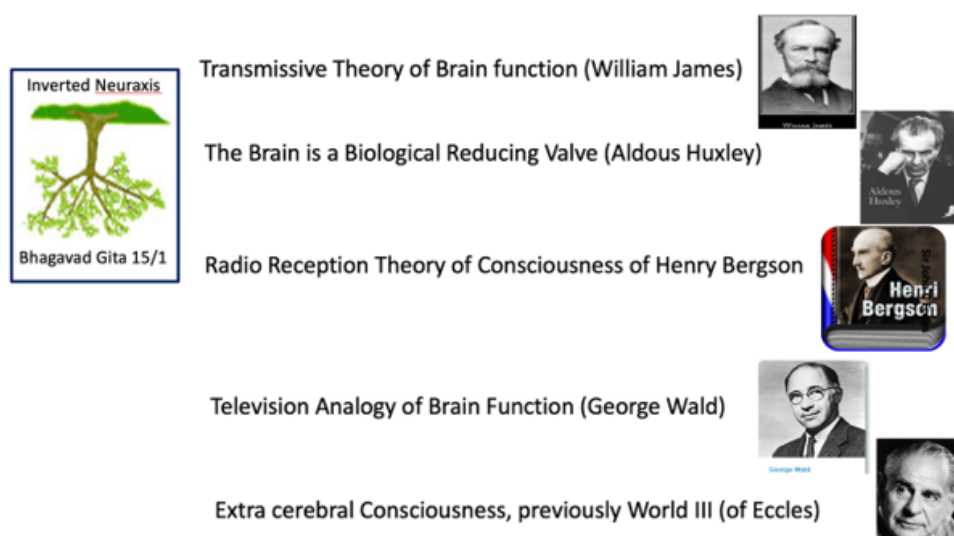
Favoring and supporting this view, there are many powerful ideas, soft evidence from culture, evidence from mystical, neurophenomenological, psychoneurological, and neurophysiological experience, in addition to recent emerging evidence from research on nonlocality, inter-netting of several brains, deeper connection between brains beyond electromagnetic binding.

### Powerful Ideas:

In Bhagavad Gita (15/1), the human body has been described as an inverted Peepal tree with roots open to eternity and branches down (Figure 1). There exists Aristotle's view that mind is attached to the brain! We wonder why neuroscience till now haven't considered the Transmissive Theory of brain function by William James, the Father of American Psychology! According to Aldous Huxley, the brain operates as a Biological Reducing Valve. There is Radio Reception Theory of consciousness of Henry Bergson. George Wald brings television analogy in the brain function. John C. Eccles speaks of World III, which later he changed to extra cerebral consciousness (Figure 1).

### Soft Evidence from Culture:

In ancient civilizations people used to make a hole in the skull to let the evil spirit out. Across cultures, there is a custom of blessing the juniors by putting the pronated palm(s) on the top of the head to be blessed. When the revered Pope puts his blessing hands on the head of Stephen Hawking, science is said to meet religion. There is practice of clean shaving of the head by the divine aspirants to achieve nearness to 'God'! In spiritual occasions, there is a belief-system of shaving the head, and writing 'Aum' on it (Figure 2).



**Figure 1:** Powerful Ideas on Transmissive Functions of the Brain.



**Figure 2:** Soft evidence from culture on assumption that consciousness acts from outside on the cerebrum. It was in primitive culture of making holes in the skull, to let the evil spirit out (lower left corner). The idea is expressed in American Art (upper right corner). Shaving of the head and writing "Aum" on the head (lower right corner), and the act of Blessing (upper left corner and below), are prevalent in spiritual culture.

Further, without using any technology, the members of indigenous tribes regularly communicate with each other over long distances. There is emerging evidence of long distant healing by means of prayer (Larry Dossy, and others).

### Mystical Experience:

Many advanced mystics feel pressure on the top of the head following intense meditation. Others report wide temperature variation on the top of the head. During transfer of power from the



Guru to the next designate, there is a ceremonial spiritual event of *Shaktipat* (Power Fall) that happens on the disciple's head.

### Evidence from Neuro-phenomenological Experiences:

There is a phenomenon of autoscapy when a being comes out of his body, and observes the surroundings, and himself standing in front of him. During 'out of body' experience (pioneered by Robert Monroe), the person experiences travelling over a distance, and performing any act he wants to do being invisible to others.

Almost every one of us has experienced during childhood flying in a dream, breaking the barriers of raised walls and natural boundaries (Figure 3). Besides, there is documented evidence of near-death experiences by many patients on the surgical table, e.g., tunnel traveling, and watching physicians and surgeons around working on his own left-out body! All such phenomenological evidence suggests that consciousness is not confined to the brain, and the source of consciousness is unlikely to be the brain-activities (Figure 3).



**Figure 3:** Neurophenomenological experiential evidence pointing at consciousness outside the cerebrum can look at its own body as well as the surrounding environment during Autoscopy, Near-Death Experience, Out of Body Experience, and while flying in dream.

### Psycho-Neurological Evidence:



**Figure 4:** Hard evidence from the treatment response by cognitive therapy in an OCD patient (left side of the figure), and on the right is shown how hypnosis replaced general anaesthesia in deep surgical procedure. Both evidence certainly indicates supremacy of mind over the brain. In the language of subtle energy science, this is an example of a therapeutic application of radiesthesia instead of anaesthesia.

PET images of the brain have shown that the changes in the head of the caudate nucleus in a patient with obsessive compulsive disorder (OCD), could be reversed by both psychotherapy and medication therapy [8]. Instead of general anaesthesia, surgical procedures are being performed by controlled hypnosis. In Liège, surgeons routinely operate on patients under hypnosis [9]. Deep brain surgery (<https://www.awcof.com/news-worlds-first-deep-brain-surgery-using-hypnosis.html>) and other surgery have been reportedly done by hypnosis (<https://www.sciencephoto.com/media/654661/view/surgery-under-hypnosis>) (Figure 4). Such practical therapeutic evidence supports supremacy of the mind over the brain's neural activities in manipulating brain-consciousness (Figure 4).

### Neuro-Physiological clinching towards Evidence:

From his life long experience of operating on brains, the Canadian Neurosurgeon Wilder Penfield concludes in *The Mystery of the Mind* that "to suppose that consciousness or the mind has localization is a failure to understand neurophysiology". Several published papers in neurophysiology point towards an imaginary space time domain deeper to, or posterior to space time domain described by classical and quantum physics. For example, we are aware of the electrophysiological phenomenon of "readiness potential" in the cerebral cortex as described experimentally by Benjamin Libet [10,11], happening prior to action potential. However, we are not aware of the phenomenon of genesis, events prior to, or posterior to this readiness potential. In our expanded cosmological knowledge of multiple universe(s), the system of the Multiversity, Free Will Readiness Potential Ratios has been proposed as the key for a Multiverse number calculation [12].

### Other Emerging Evidence:

#### a. Clinical psychology, and psychiatry:

In clinical psychology, and psychiatry calibrated magnetic stimulation of the cerebral cortex has been found to lead to a defined pattern of perceptual experience or alteration of it. Also recall the "God Helmet" of Michael Persinger, officially known as the *Koren helmet* after its inventor Stanley Koren, and Schumann's resonance, between planetary heartbeat and brain's 7Hz frequency.

#### b. Marriage of Mind and Machine:

Nicolelis M [13] goes beyond the boundary of the brain on the new neuroscience of connecting brains with machines and how it will change our lives. Savage describes the marriage of mind and machine [14].

#### c. Inter-netting of Neurons within the brain:

Conventional neuroscience speaks of physical and biological networks between the neurons and their interstitial biochemical connectivity. Recently intracerebral wireless connections between neurons [15, 16] have been described, indicating various information states wandering in the supracortical environment influence the brain.

#### d. Inter-netting of Brains:

Direct brain-to-brain communication in humans, and working

on an "Internet of brains", takes another step when event-related EEG correlations between spatially related subjects is demonstrated [17], and also as reported by Robert Martone [18].

#### e. Experiments on Nonlocality:

Alan Aspect's experiment on nonlocality [19], further reinforcement of this experiment by Nicolas Gisin [20], and the latest experiment on Nonlocality in 2002 [21] bring credible evidence in favor of the existence of a nature deeper than in quantum void that might help in explaining a number of unaccounted factors in the extracerebral informational environment that could influence brain-consciousness.

#### f. Interbrain-connections at deeper level:

The first ever evidence of interbrain connections at a level deeper than electromagnetic connection, comes from the experiment by Grinberg et al, This communication has been supposed to be deeper than inter-netting by electromagnetic connections, since two persons who participated in the experiment were kept in Faraday's cage [22]. Ellingsen et al have documented in PET scans the behavioral mirroring in patient-clinician interaction [23].

### How much of the Brain can a person do Without?

The whole brain is not needed for routine or even advanced conscious activities. What one needs for conscious activities are the rostral brainstem, the cerebral cortex, and the connections between the two in the form of reticular projections.

In 2007, there is a case report in *Lancet* [24] of a 44 year old white-collar civil servant who has lost more than 90% of his brain tissue due to hydrocephalus (Figure 5), but lives almost a normal life with two children, having verbal IQ 84 and performance IQ 70 (Figure 5).

The evidence, cited in *Lancet*, does not make a 'white crow' for neuroscience. Most likely, because of the 'knowledge filter', such case reports are not readily accepted, and published in the mainstream academic journals. A number of cases, however, have been reported in the journal like, *Popular Mechanics* (September 19, 2014); describing a man of Louisiana missing all but the brainstem, a 42 year old Virginia Native missing half of the entire brain, a German girl missing half of the cerebral cortex, and a 24 year old Chinese lady with missing cerebellum. All of them have little compromised life. The incredible life of Carlos Rodrigues, the man with half a brain (Figure 5), half of the brain lost in an accident, has been published in *Culture* in 2021 (<https://www.scoopwhoop.com/culture/true-story-of-carlos-rodrigues-man-with-half-a-brain/>). *Nature*, however, has published an experimental study on hydrocephalic rats, "life without a brain" in 2019 [25].

### Neurons and Brain are not synonymous

The brain, neurons and even non-neural cells behave as the cognitive substrates. We will call those cognitive substrates in which five nonlocal cognitive operators namely consciousness, self, life, mind and information can operate in an organized way as a system.

## Brain of a white-collar worker

Lionel Feuillet, Henry Dufour, Jean Pelletier

A 44-year-old man presented with a 2-week history of mild left leg weakness. At the age of 6 months, he had undergone a ventriculoatrial shunt, because of postnatal hydrocephalus of unknown cause. When he was 14 years old, he developed ataxia and paresis of the left leg, which resolved entirely after shunt revision. His neurological development and medical history were otherwise normal. He was a married father of two children, and worked as a civil servant. On neuropsychological testing, he proved to have an intelligence quotient (IQ) of 75: his verbal IQ was 84, and his performance IQ 70. CT showed severe dilatation of the lateral ventricles (figure); MRI revealed massive enlargement of the lateral, third, and fourth ventricles, a very thin cortical mantle and a posterior fossa cyst. We diagnosed a non-communicating hydrocephalus, with probable stenosis of Magendie's foramen (figure). The leg weakness improved partly after neuroendoscopic ventriculocisternostomy, but soon recurred; however, after a ventriculoperitoneal shunt was inserted, the findings on neurological examination became normal within a few weeks. The findings on neuropsychological testing and CT did not change.

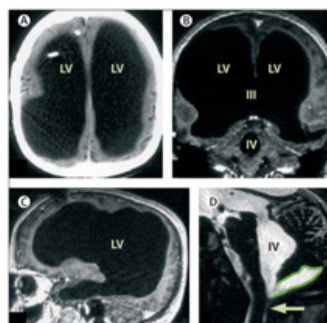
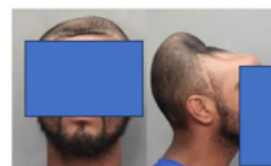


Figure: Massive ventricular enlargement, in a patient with normal social functioning (A) CT; (B, C) T1-weighted MRI, with gadolinium contrast; (D) T2-weighted MRI. LV=lateral ventricle, III=third ventricle, IV=fourth ventricle. Arrow=Magendie's foramen. The posterior fossa cyst is outlined in (D).



**The Incredible True Story Of Carlos Rodriguez, The Man With Half A Brain**  
*Culture*, Jan 20, 2021.

<https://www.scoopwhoop.com/culture/true-story-of-carlos-rodriguez-man-with-half-a-brain/>

**Figure 5:** On the left shown is the PET scan of the brain from a white-collared civil servant (author acknowledges the journal *Lancet*). On the right is the picture of the man with half a brain (author acknowledges the journal *Culture*). Both evidence point out our illogical obsession with primacy of the brain in the brain-consciousness relationship.

Neurons are constituents of the brain. However, brain and neuron are not synonymous. Human heart has about 40,000 neurons. Human gut has 100-600 millions of neurons. However, neither the heart nor the gut has the organization of neurons as found in the human brain.

Neurons are special biological cells, and the author views them having polarity of their membrane, and the serenity of their genes. The membrane of a neuron is polarized for biologization of consciousness. Their minimum or absence of mitotic activity maintains the serenity of genes, and keeps their microtubular network stable for storage and conductance of different information states. These two properties of neuron, polarity of membrane, and serenity of genes, account for consciousness-philosophy of neurons, and neuron-philosophy of consciousness respectively (cf., dualistic interactionism of Eccles). Neurons attract environmental consciousness-related factors (subtle energy, scalar field, different information states, subquantum physical states), and themselves are attracted towards such factors.

The brain is the end organ for behavioral expressions of three realities; consciousness-reality, cognitive reality and material reality. Simply, the brain is considered a natural complex organ developed as the culmination of the biological reality. However, the biological reality, even in the form of a single cell represents a holograph of a conscious reality, a cognitive reality, and a material reality. Conscious reality determines the freedom to make a "will" or "won't", while consciousness's operative pole maintains the holonomy with the rest of nature. Cognitive reality is a complex,

multi-layered, labyrinthine decision-making reality consisting of four autonomous operators namely the operative consciousness, the sentient self, which creates the sense of "I", me and mine, the homeostatic entity "life", and the event-making entity that has been called mind, and their interactive operations. The material reality consists of a very complex signal network connecting 100 billion live neurons and the related astrocytes through tripartite synapses, and also wirelessly as stated.

The author postulates that the brain (i) has evolved as the "home" and workplace for the nonlocal cognitive faculties, (ii) acts as a 'sensor' of different information states, and (iii) is a biological device for the expression of automated, autonomous and holonomic behavior.

## Conscious Activities in Brainless Animals

Extracting information from a signal, learning and retaining what is learnt as memory, self-nonsel distinction, execution of intention, opting for a choice, making a decision in a simple or complex situation are the testimonials for conscious activities. Conscious activities are evidence of the presence of operational consciousness.

There are brainless land animals like snails, and several sea animals such as jellyfish, coral, octopus, sea urchin etc. None of these animals has an organized brain, but only scattered ganglions, a collection of nerve cells. However, all of them respond to signal-based, information-based, intention-based, and "will"/"won't"-based stimuli. This suggests that they have their own mind, they



work over available options to choose the best. They often willfully do not opt for any option, which might stimulate a change inside (forum interna) for adaptation with the environment!

### Conscious activities in Plants

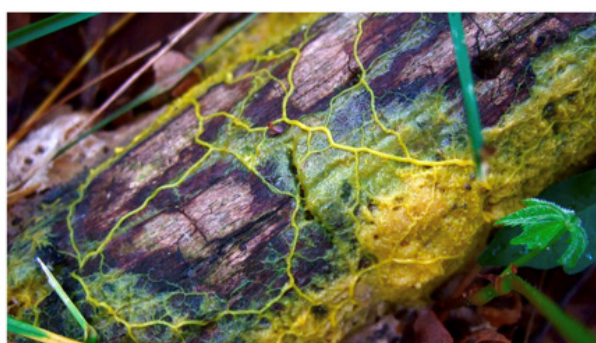
The plants do not have neurons. However, plant biologists have discovered that the cells at the apex of the roots of the plant can exhibit a sense of self and non-self [26]. The response of a plant to the presence of the roots from other nearby exhibits a sense of territory. A sentient sense of 'I, me, and mine' is there resulting in interplant competition for roots space. Arguments for, and against this view are also available [27]. Plant signaling and behavior is available in <https://www.newyorker.com/magazine/2013/12/23/the-intelligent-plant>. Besides, there is a much earlier 1973 book, *The Secret Life of Plants* by Peter Tompkin, the then a New York Times Best seller, although not awarded much credibility recently.

### Conscious activities in unicellular Organism

That a single cell is conscious has been conceptualized by the author in 1987 in his book, *The Dynamic web of Supracortical Consciousness* (reference no 3). James A Shapiro, a bacterial geneticist from the university of Chicago, has published a paper in 2007, titled, "Bacteria are small but not stupid: Cognition, Genetic engineering and socio-bacteriology" covering his first-hand experience on genetics and behavior of bacteria over forty years "to recognize that even the smallest cells are sentient beings" [28].

The author developed this idea further in a recent paper [29] from which, the following paragraph is quoted. "The evidence that a single cell is conscious, has free will, can learn, makes decisions,

and communicates and exchanges with its colleagues comes from the recently published seven papers. Beckman and Latty [30] report *Physarum polycephalum* finding the shortest path through a maze, constructing networks like humans, solving computationally difficult puzzles, making multi-objective foraging decisions, balancing nutrient intake, and often behaving irrationally. Tang and Marshall [31] highlight the behavior of bacteria or protists, free-living single-celled organisms coping with varying environments, locating prey and potential mates, and escaping from predators similar to any free-living animal. Dexter et al [32] communicate the hierarchy of complex avoidance behavior by unicellular *Stentor roeseli*. Schenz et al [33] communicate the ability of slime moulds and ciliates to integrate complex spatial information (Figure 6). Chaehwan et al [34] publish how the senescent cell's extracellular vesicles (EVs) promote the senescence of other cells. Non-senescent cells' EVs are seen to rejuvenate senescent cells. Lanna et al [35] report gifting of telomeres by APC to T cells to keep T cells young! Could all such complex cognitive activities and behavior be explained by the molecular assembly, automation, and robotic intelligence? To solve these problems there are attempts to rely on AI, e.g., producing a computational model of multilevel development of cognitive abilities in an artificial neural network [36]. The author, however, prefers a different track to explain such behaviors, accepting the view that attributes of the human psyche such as mind, information, self, life, and consciousness are already present in a single cell, and each of them has molecular correlates" [37, 38]. Also relevant in this context is the author's developed concept on the cognitive orchestra [39], sourced from consciousness (Figure 6).

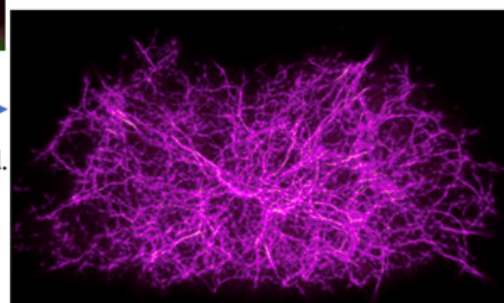


Scientists produced this map of the universe's cosmic web based on locations and masses of known galaxies and the lacy patterns of slime mould.

Reference: Joseph N. Burchett, Oskar Elek, Nicolas Tejos, J. Xavier Prochaska, Todd M. Tripp, Rongmon Bordoloi, Angus G. Forbes. **Revealing the Dark Threads of the Cosmic Web.** *The Astrophysical Journal*, 2020; 891 (2): L35  
DOI: [10.3847/2041-8213/ab700c](https://doi.org/10.3847/2041-8213/ab700c)

The intricate patterns of this yellow slime mould can help tease out the structure of the vast strings of matter that connect galaxies in the universe's cosmic web.

Reference: Schenz D, Nishigami Y, Sato K, Nakagaki T. **Uni-cellular integration of complex spatial information in slime moulds and ciliates.** *Curr Opin Genet Dev.* 2019;57:78-83.



**Figure 6:** Unicellular slime mould is creating intergalactic pattern on the slime.

Consciousness is evaluated neurologically by appropriate response to a given stimulus. For an unicellular organism, where there is no trace of any neuron or a “nervous system”, it is difficult to explain the responsive behavior to a stimulus, the mechanism which carries it out, and the target organelle on which the stimulus acts.

The cell shows automated behavior; automated cell signaling and the molecular robots run the most of the metabolome of a cell. Cell's autonomous behavior is observed in its proteome, and genome. Protein configuration changes with cellular intention. There are situations, when the genes jump, DNAs enter into fluidics. The cell's holonomic group-behavior e.g., exhibiting cooperation and collaboration with other cells are expressed through its epigenetics, changing the ‘life-style’ of the cell. Examples of holonomic behavior of human immune cells in Telomere-transfer from APC to T-Memory cell, and extracellular vesicle transfer from the non-senescent cell or from a stem cell to the senescent cells point the roles of intention and consciousness in cellular behavior.

The stimuli to a cell, as an example of organized cognitive substrate, may be signal-based, information-based, intention-based, and consciousness-based. Signal-based stimulus operates on metabolomes with matter-sourced conventional energy, and leads to desired dynamic metabolic transformation. Information-based stimulus operates on the proteome with information-sourced dark energy, changing the structural conformity of proteins from primary to secondary, tertiary and quaternary configuration, as and when necessary. Intention-based stimulus operates on the genome through consciousness-sourced subtle energy leading to a change in its language of genes by DNA-fluidics, gene-jumping, transposons, and thus compelling us to read DNA-stories not merely as prose but poetry as well! “Will” or “Won’t”-based stimulus operates through subtle energy on the epigenome to change the “life-style” of a cell.

Surprisingly, a single cell is equipped to handle the three ecosystems of energy; matter-sourced conventional energy, information-sourced dark energy and consciousness-sourced subtle energy. Conventional energy is stored as ATPs. Dark energy is used in bringing configurational changes in the proteins and genes. Subtle energy is used in the epigenome, genome and proteome.

### Possibilities of consciousness in non-biological states

It is easy for consciousness to manifest through the biological system because of the presence of “life” there. Life is an ineliminable and inescapable entity required in the process of cognition. The Theory of Panpsychism by Italian philosopher Francesco Patrizi has an interesting life-story from sixteenth century, almost killed in 1920 by Vienna Circle's logical positivism, rejuvenated recently by Rupert Sheldrake, and both Giulio Tononi and Christof Koch arguing separately in its favor. Fringe Theory claims the sun may be conscious (<https://futurism.com/the-byte/biologist-says-sun-unconscious>) too. Many consciousness researchers (e.g., Amit Goswami), hold the view that even our universe is conscious! “The universe is built a lot like a giant brain - so is it conscious?” is the title of a paper recently published in New Scientist (25 June, 2024)

by Joshua Howgego (<https://www.newscientist.com/article/mg26234971-200-the-universe-is-built-a-lot-like-a-giant-brain-so-is-it-conscious/>).

The above information might stimulate many of the readers to search on the net for theories built up in non-biological and biological states, which support consciousness! We suggest inverting the ontology, and instead search for evidence how the brain has been made in the holographic image of the universe, or multiverse! What are the theories which upheld the primacy of consciousness! Survival of consciousness, its science and phenomenon are not dependent on the brain, universe, or any of the man-made theories. In reverse, death, life and the growth of a theory depend on whether the theory has been upheld by consciousness or not! The theory of Relativity, and of Quantum Mechanics have survived the test of Time, because both of them are supported by consciousness. Their originators were aware of it. That is what made them so confident in their theories. For the same reason, the theory of panpsychism has survived since the sixteenth century. For a similar reason, we land up with a messy life of enactive cognitive science [40]. Information theory on consciousness, sourced from information, might have a short life in the paradigm war. However, the science of information sourced from consciousness [41-45] has come to stay.

### What is the Source of Consciousness Then?

According to the author, consciousness has no Source! Everything else is sourced from consciousness. Consciousness is the ground without any background. Sentient entity “self”, homeostatic entity “life”, and event-making entity “mind”, different information states, along with the operative pole of consciousness form the cognitive orchestra (System Psyche), which play on the foreground of consciousness. Also, the consciousness-sourced constituents of subtle energy (Photon, Phonon, Conformon and Neutrinos) convey the rhyme of the multiversal musical code to the animate and the inanimate worlds!

This view has the explanatory power for behavior in the brainless animals such as corral, jellyfish, octopus etc., plants, and even of a unicellular slime mold, which replicates intergalactic patterns in its slime without using any satellite or server!

### Nature of Consciousness and the Scope for doing Science of it

The author does not have any Theory on Consciousness because of its nature. Consciousness is fundamental, ineliminable, irreducible, non-negotiable and inviolable. Consciousness is also nonlocal, scale-invariant, singular, undivided, and non-dual. Consciousness is the the Ground without any background, not an inert but an active ground, a supportive, participating, intervening, and a creative ground, a will-making ground. Consciousness is absolutely autonomous, as well as holonomic in nature.

Consciousness operates with its ‘will’, that is translated as intention. Since consciousness does not operate with the aid of any Field, Force or Energy, consciousness is absolutely non-violent. Consciousness disarms any Army of its weapons.



If the statement in the above paragraphs is a Theory on consciousness, let it be so! No one can claim it to be one's exclusive theory. It is everyone's theory who all have tried to understand consciousness. However, there is no scope of doing science with such a consciousness!

The scope arises when consciousness becomes operative. What does it do? The scope arises when consciousness customizes itself as a 'self' of any self-organizing system, which becomes an 'individual'. Individual enquiry begins then. Individuals ask questions; how does it happen, why and when does it happen? What is its purpose?

Also, holding such nonnegotiable consciousness as the Source, science can formulate theory on the brain, on neural correlates of consciousness, on matter-correlates of consciousness, on cognition, on information, on subtle energy and dark energy, on the largest intellectually comprehensible system of multiple universe(s), The Multiversity, and the Multiversal Musical Code.

### What does the Brain do for Consciousness?

As already stated, the brain is a powerful biological organization that acts as a "sensor" of different information states in the environment such as a digitized signal, non-digitized information, non-factorizable information (when the content, intent and the ability to reduce uncertainty cannot be clearly distinguished), information manifold, and information crystal, all of which operate on the foreground of consciousness.

The brain allows specific operations through itself by the operators, which in psychological language have been named as the members of the cognitive orchestra, viz consciousness, 'self', 'life', mind and information. The brain allows 'space' for forum interna.

Neither the information states, nor the members of the cognitive orchestra are constituents of the brain. The members of both groups are nonlocal. The brain thus makes nonlocal manifest as local, makes the non-observable observable, the intangible tangible, and the subtle exposed.

The brain transforms the Idea in internal forum into a Design for external forum, shapes the design into an Architectural marvel, brings it down to earth with Technology and Engineering!

For science, the brain breaks the theory in the internal forum into study design, makes one write a Research protocol and chooses methodology for collecting evidence, that might lead to a concurrence of external and internal forums for a discovery. *It is the brain which makes the Unknown imaginable, Imaginable intelligible. Intelligible possible, Possible verifiable, and Verifiable verified.*

In all such conscious activities what makes the brain stand as unique amongst all organs of the body is that the brain is not merely a monodic (either formal or natural), a dyadic (both natural and formal), or a triadic (natural, formal, informational, 'live' and conscious) system, but also a tetradic (natural, formal, codal, and 'live'), and a pentadic (simultaneously natural, formal, codal, 'live', and conscious) system. *This unique property of the brain is the key for investigating the frontier of immersive neuroscience.*

Conscious activities of unicellular organisms are almost always flawless. However brain's are not! That is why, we often find technologists at the helm propagating machines as if they are alive,

can learn and have memory, or the accomplished biologists project 'life' as a machine, and even longstanding spiritualists mistake artificial intelligence for augmented intelligence! This is the time we characterize and define what is life, what is a machine, and what is meant by spirituality! This is the time we become alert and take precautions so that the human brain does not degrade itself in behavior, and does what even no animal brains do!

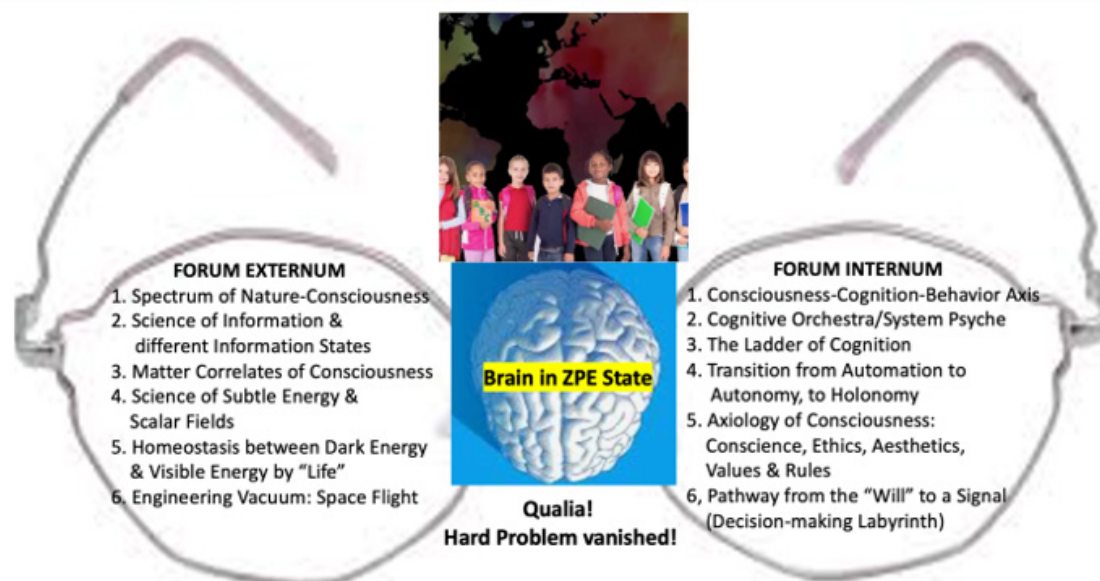
### Operations of Consciousness

What does consciousness do? Ontological consciousness *becomes* particulate consciousness *creating* a boundary. The 'particulate', 'individual' consciousness within the system has been mystically called 'self' that within the boundary of the system *generates* the sense of 'I', 'Me' and 'Mine'. With self, the subtle part of 'life' is also individualized within a life-system. While, the 'life' is engaged in 'homeostasis' of the system, the 'self' *makes* the system *aware* of itself, and of the environment outside and inside. Consciousness also *operates as the centre* of all *phenomenology* in nature; surface phenomenology at classical level, (nest I), and quantum level (nest II of nature), elementary phenomenology of mind, information, memory, thoughts, intelligence and memory at sub-quantum nest (nest III of nature), and depth phenomenology (of intention, ethics and aesthetics involving self and life in sub-subquantum nest (nest IV of nature). Both the Arrow of Time and Cause-Effect trajectory end at the deeper border of nest II. Nest III deep wards they are not there! From its own nest (nest V), consciousness asserts its "will" / "won't", which *generates its axiology*, intention, ethics ('self') and aesthetics ('life') (in the nest IV of nature) and submit an informed instruction sheet to the 'mind' operating from the nest III of nature. The mind, across ZPE, splits *information* into form (Space & Time) and energy, observed as a visible and measurable signal to manifest as space, time, and energy in a 4-D world. Consciousness's *reflective* function initiates processes such as sensing of the senses, thinking about thinking, feeling about feelings, becoming aware of awareness, intuiting about intuition. While the self brings a sense of autonomy over automated behaviors, overarching consciousness brings a sense of holonomy over several autonomous units. Overarching consciousness *looks after* what all has been happening in our (any system's) mind, self and life in terms of quality management of information. In its *recursive* function, consciousness winds up both internal and external forums into itself!

### How do we go about?

The available data, natural, experimentally verified evidence, and logic are still incomplete for a science of consciousness for labelling it as evidence-based science. To achieve this state, consciousness research is suggested to be directed towards several missing links, which might come from what are considered as *fringe* by contemporary science. The central question is, what is posterior to quantum discontinuity, quantum void, and ZPE? The fringes are, other kind of energy beside the conventional matter-based ones! How does consciousness use them to influence cognitive substrates, such as the brain? What is the required preparedness of the brain to become conducive for consciousness.

The author has been developing the following twelve areas; six outside the brain, in the external forum, and six inside, in the



**Figure 7:** At the zero-point energy state of the brain, the vision changes. There is ontological reversal. Creativity bursts in both the forums with the opening of several new doors for doing science. New avenues of Research open up; figure shows six such in external forum and six such in internal forum.

The investigator needs a well-evolved brain for making contributions to science of/for consciousness. What is the initial brain state for everyone to get engaged in consciousness research? Natural system (forum externa) and the formal system (forum interna) are two different independent forums. Two appear distinct anterior to, and superficial to ZPE. One can see their interconnections clearly when the organ brain rests at the zero-point-energy state; the nearest approximation of which is the state of the brain of a newborn, the brain in the state of deep sleep (when the mind is in complete rest), and in an exceptional state when the observer has learnt to remain awake in a deep sleep state.

Therefore, it is suggested to bring the brain of the investigator to the zero-point energy state! A recent study (*Brain*, 2024;awae199, <https://doi.org/10.1093/brain/awae199>), shows that the brain in Default Mode Network (DMN, or M-FPN, medial frontoparietal network)) has a causal relationship with critical thinking. The DMN and ZPE state of the brain are very close to each other, although there is a difference. In addition to passive tasks in the internal forum as found in the default mode there is passive focused external attention too in the ZPE state of the brain. Their relationship is yet to be established.

All twelve areas under development by the author are briefed below.

Outside Neuroscience (Forum Externum), we require to develop more and expand the following six areas with the source link to consciousness.

#### a) Spectrum of Nature-Consciousness

Every event of nature cannot be explained by classical (in nest I) and quantum physics (in nest II). There is nature beyond quantum discontinuity, quantum void, and ZPE. The author designates them as sub-quantum (nest III), and sub-subquantum nature (nest IV), following which is the nest of consciousness (nest V). Every nest has a defined operation by a defined operator carried by a defined currency (see reference 6).

#### b) Science of Information and different Information States:

Information has its own identity. It is a substance of its own. It has an operational mechanics, different from quantum mechanics. A signal is merely a space-time construct of information. Information-as-such exists in nest III as a trifoliate structure, with a content folium, an intent folium and a folium which reduces uncertainty. Ensembles of several information with a definite symmetry formation as a combination of non-digitized and non-factorizable information constitutes the knowledge structure. The experience is structured as information-manifold. Wisdom remains at the boundary of nest IV and V as an information crystal. Signal, information, knowledge, experience and wisdom are different information states [41-45].

#### c) Matter-Correlates of consciousness:

When everyone has been eager to investigate neural correlates of consciousness with PET scan, NMR and fMRI etc., the author draws attention towards matter-correlates of consciousness. Such matters are in exotic state.

Why are these matter-correlates of consciousness important? In various stage of science, many background media, e.g., ether, plasm etc., are invoked! The author believes such media would turn

out to be exotic matter state.

According to the author, the “mind” leaves its signature on the exotic supersolid state of matter, while information surfaces as exotic crystal with a fluctuating ‘magnetic moment’ that is independent of environmental influence. The signature of “self” could be searched on the superconductor state of matter! Life’s signature/footprints could be discovered as correlates/correspondences on superfluid states [46]!

#### **d) Science of Subtle Energy and Scalar Fields:**

Subtle energy is not as weird as thought. Subtle energy is not “dark” energy, but is a dark horse, which in special conditions subtly exhibits unexpected and amazing behavior that is not yet accounted for. There are differences in views on subtle energy between different physicists and different mystics. Since 1987 the author has had his consistent theoretical conceptual view on the microvibratory physics of this subtle energy as an extraordinary group made of conformon, photon, phonon and neutrino. All of them are well known in mainstream science. Except conformon, others are detectable and measurable by available equipment. Characteristically, they are (i) beyond the polar opposites (particle and antiparticle), (ii) massless, or acquire mass by interacting with Higgs Boson, (iii) without any color and charge, and (iv) virtually abundant in the universe across the nested hierarchy of nature, (v) available to everything and everyone ‘ad libitum’. They also seem (vi) ‘conscious’ since they are (vii) consciousness-sourced. Finally, they show (viii) interpenetration of space, time, and cause in their behavior [3], which means all four of them, in addition to energy, carry information (‘gnergy’). Korean scientist Sungchul Ji was the first to formulate around 1972, the concept of ‘Gnergy’ as the hybrid union of information (‘gn-’) and energy (‘-ergy’) in the context of photon and conformon [47]. He advanced the original conceptual formulation of conformon by Ilya Prigogine. The present author developed the idea to state that conformon conveys information on the *conformity* of the whole, phonon conveys information on the *rhythm* of the whole, photon conveys information on the *dynamicality* of the whole, while neutrinos convey information on the *openness* of the whole. Photon is thus not merely a component of electromagnetic energy, it also carries information and is influenced by longitudinally propagating scalar fields. What makes them **subtle** is their hybrid combination with information, and assumed connection with consciousness. Both information-as-such, and consciousness are pre-quantum in activities, posterior to ZPE and quantum void! We have no way yet to harness either subtle energy or dark energy.

Scalar fields are conceptually associated with subtle energy. Scalar fields, unlike an electromagnetic field, oscillates vertically with compression and release, has superluminal speed without violation of relativity, can take a shape (e.g., toroidal) that can pass through an electromagnetic shield, and conveys subtle energy. Scalar fields, according to the author, has its source posterior to the quantum void, in the deeper nests of nature. We are familiar with electromagnetic fields at the classical 4-D world. However, there is largely ignored quantum electromagnetic fields (Bohm-Aharonov effect) also. According to Late Thomas Bearden, there is also scalar

electromagnetic fields where ‘zeroes’ differ for individual brains. Force fields are zeroed externally, but active internally. The scalar electromagnetic fields seem relevant in the context of the view that consciousness acts on the brain that leads us to immersive neuroscience.

Subtle Energy may function alone (e.g., Conformon, higher octave ultraviolet Photon), in combination of two (e.g., Photon and Phonon, as in dissipative structure), or three (e.g., Photon, Conformon and Phonon in proteomics and genomics), or all four together, as in information holograph [48]. In cell biology, according to the author, photon-phonon mainly operates on Metabolome, conformon on the Proteome, conformon and neutrino on the Genome, and neutrinos on Epigenome. In contrast to quantum entanglement in the inanimate world, information holographs lead to information entanglement in the animate world through ‘self’. Information Holograph has both vertical and horizontal components like the scalar electromagnetic fields (Figure 8).

#### **e) Dark Energy and its Homeostasis with Visible Energy by means of “Life”:**

About 70% of the Universe is dark energy! What does the adjective “dark” mean in science? Does it convey some sense in favor of the terms like, hitherto unknown, hitherto unidentified or not described, unobserved, non-observable, or a mechanism which is not fully known in spite of all efforts? Or, does it convey that it is there, but intangible! According to the author, the dark energy is sourced from information-split phenomenon. Only “life” can utilize dark energy, and probably for this reason the freely wandering nucleic acid in the cosmos were enclosed to give a shape to life-form, with a boundary! The entity which can manage dark energy-conventional energy homeostasis is alive.

#### **f) Engineering Vacuum (For the Space Flight):**

It seems possible to engineer the vacuum, and even make space flight for interstellar space [49]! It began with an imagination [50], and now is moving towards reality (space flight; Elon Musk).

Also, inside the brain (Forum Internum), we are required to develop and expand the following six areas with their source-link to consciousness.

##### **i. Consciousness-Cognition-Behavior Axis**

Consciousness-Cognition-Behavior axis requires more attention of the scientists to understand consciousness, cognitive orchestra and the brain as an organ of behavior [51].

##### **ii. System Psyche / Cognitive Orchestra:**

Cognitive faculty members are (i) operational poles of consciousness, (ii) ‘self’ as CEO of the system on behalf of consciousness. (iii) ‘life’, as homeostatic manager, (iv) the mind as event-making agent, and (v) information states as currency of their operation. They together form the System Psyche (see ref. 38). The other name is cognitive orchestra (see ref. 39). All the members are nonlocal in nature. Coupling of the local electromagnetic world with the nonlocal world happens across ZPE through an information-split phenomenon.



### iii. The Ladder of Cognition and the Cognitive Canvas:

The Ladder of Cognition extends from Noise to Sensation, Sensation to Perception, Perception to Concept formation and Hypothesis generation, to Theory formation, and finally to expression of the Worldview. It is related accordingly to the corresponding information states, executed by cognitive operators with their specified operation [52]. Ten-layered cognitive canvas consists of embroidery on the surface (signal network), fabrics (Mind, Self, Life, Intelligence, and Emotion) in the middle, and layers of consciousness at the base. Embroidery consists of two layers, fabric three layers and the base, consciousness, five layers [53].

### iv. Transition from Automation to Autonomy, to Holonomy:

The Behavior of an organ, made of cognitive substrate, is mostly automated. Only a living system exhibits autonomous behavior over signal-based automated reflex ones. Choice is asserted over several options. To behave with other systems, the given system requires coordination, cooperation, and collaboration. The transition points are important. While autonomy is brought out by 'life', holonomic behavior is a manifestation of consciousness! You are autonomous! So am I! I cannot cross your autonomy. So you are! Morality arises here. We enter the axiology of consciousness.

### v. Axiology of Consciousness; Conscience, Ethics, Aesthetics, Values, Rules:

Until the axiology of the cognitive substratum is strengthened, it is difficult for consciousness to blossom. How Consciousness is related to the Value system? In brief, rules and laws are for the

4-D world. Observed values are inside the system, on the basis of which such rules and laws are made. Values are upheld inside by the sense of ethics and aesthetics, which are generated from conscience! Conscience is the reflection of the roots of the axiology of consciousness within the system. Conscience, Ethics, Aesthetics and Values together make one's Attitude [54]. More clinical research is required in psychological science to strengthen this hypothesis. As a whole, for an organ like brain it requires *multilevel integrity*; classical integrity, quantum integrity, phenomenological integrity, and the integrity to become conducive for the operation of Mother Nature expressed physically as subtle energy, scalar fields, cognitive correlates of exotic matter states, and different information states.

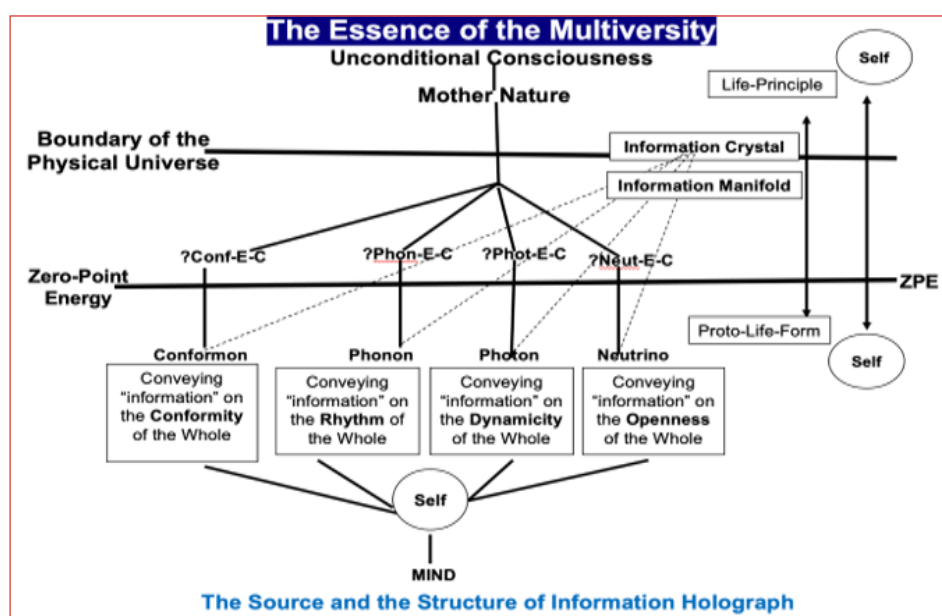
### vi. Pathway from the "Will" to a Signal (Decision-making Labyrinth):

How a conscious "will" becomes a signal, through the decision-making labyrinth has been described by the author [55].

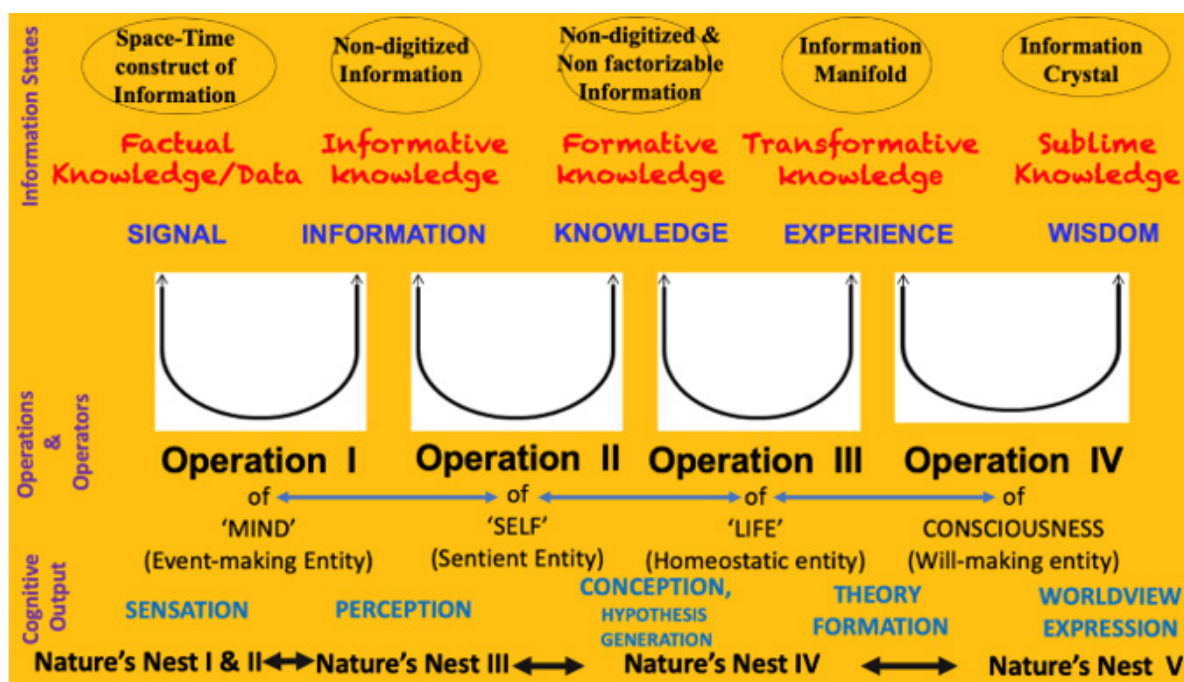
Whatever has been developed so far in the above twelve areas, we are in a phase to design a Model of *Coupling of the Brain with Consciousness* and another Model of *Coupling of Consciousness with the Brain*.

### Coupling of the Brain with Consciousness

Coupling of the brain, or to say of any other cognitive substrate, with consciousness could be explained along the *ladder of cognition* interrelating different *information states* in the external forum and involving *cognitive faculty* from the internal forum. The model describes the climbing of sensation to consciousness through four defined operations (Figure 9).



**Figure 8:** Information Holograph. The source of Information Hologram is the operative consciousness. The hologram shows how information on the conformity with the whole (conformon), ever-openness and perfection of the whole (neutrino), rhythm of the whole (phonon) and dynamicity of the whole (photon) are carried out at the material translational level. From the external forum, the hologram operates on the internal forum through the 'self' as the receptor within the system. In the structure and the dynamics of Information Holograph, there are both vertical and horizontal interactive oscillation gradients, which opens a connection between vertical scalar wave with horizontal electromagnetic wave.



**Figure 9:** Start your observation with the central horizontal axis of the figure, the words in blue. On the left, it begins with signal, followed by, Information, Knowledge, Experience, and at the extreme right ends with Wisdom. In terms of knowledge, these milestones have been represented by data/factual knowledge, informative knowledge, formative knowledge, transformative knowledge, and sublime knowledge. On the topmost line, the figure describes the defined milestones in the language of science of information, starting with space-time construct of information, followed by non-digitized information, non-digitized and non-factorizable information (where three folia of information, namely content, intent and the ability to reduce uncertainty, could not be separately identified, and several related information are in a combinatorial symmetry), information manifold, and information crystal. In the perspective of Neuroscience, signals lead to sensation, information to perception, knowledge to building up concepts and generation of hypotheses, experience to theory formation, and wisdom to Worldview expression. Stretched over the five landmarks/milestones, there are four operations expressed numerically from the left to right, as Operations I, II, III, and IV conducted by the non-observable but influential operators. In popular language of the formative world, Operator I of the natural world is known as 'Mind', Operator II of the natural world has been mystically labelled as 'Self' in the formal world, Operator III of the natural world in the language of science of the formative world is called 'Life' in the formal world, and the Operator IV in both scientific and spiritual terms of natural and formal worlds are labelled as Consciousness. Signals are in nature's nest II & I, as lifeless skeleton of information. Trifoliate Information is in nature's nest III. Non-digitized and non-factorizable information and Information manifold are in nature's nest IV, Crystallized Information is in nature's Nest V.

The sensation is caused within neurons. Perception is in the mind. Conceptualization is within the self. Experience is also by the self, but stored in the fabric of life. Wisdom is in consciousness. Cognitive Orchestra, therefore, offers a ladder for the operations of neurons to ascend sensation to the throne of consciousness. We were mistaking neurons as the emperor while consciousness is the Real one (Figure 9).

George Miller, the founder of the field of Cognitive Psychology, coined the name "cognitive neuroscience" in 1977. Michael Gazzaniga is considered the godfather of cognitive neuroscience.

With due regards to them let us begin with making a distinction between energy, a signal and an information. Energy appears as noise. Signal leads to sensation. Signal is a package of energy in a defined space per cycle of time. Signal is non-intentional, however can be digitized. Information is the unit of meaningful communication between two conscious systems. Information is intentional, and cannot be digitized. Information could be factorized as having some content, an intent, and an ability to reduce uncertainty both at mental or physical level. Basically, when

neuroscientists are considering encoding a given signal into a piece of information as semantic encoding, as in the paper [56], we are calling it operation I (Figure 9).

The mind is the final event-making entity, the event-manager, although sterile without consciousness, the Boss. Mind is promiscuous for its material connection across zero-point energy (ZPE). Mind also converts a signal into a piece of information across ZPE, and in reverse, delivers a signal out of information. For objectivity, we label the operation of mind as Operation I (Figure 9) that connects the external forum with the internal forum.

The self, on the other hand, is the representative of consciousness within the systems where it operates as Chief Executive Officer (CEO) for the system, looks after ethics, logic, and law-and-order issues, and therefore is responsible for harmony and peace of the systems. The self is which provokes the sense of 'I', 'me' and 'mine' within the system and takes decision (decision-making entity) for the systems as a representative of the Boss, i.e., consciousness. The self creates operational logic for the systems, and makes groupings of information according to their content, intent and the ability

to reduce uncertainty qualitatively or quantitatively, and thus creates different knowledge domains (Operation II in Figure 9). Self operates in coordination with its sister, 'life'.

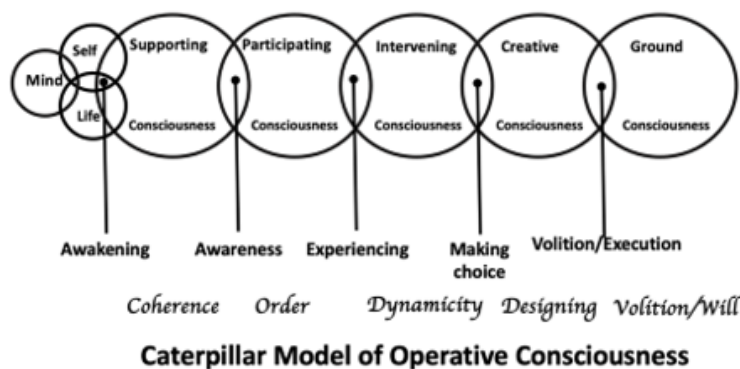
In contrast to masculine and mostly repetitive forms of organization by 'self', life-organization is feminine in character, looks after aesthetics, and the funding of the project. Its organization is non-repetitive in nature, and results in complexity. Life connects 'self' with the mind, and therefore, phenomenology with cognition. Life is the repertoire of feelings, emotions, and experiences. Life examines the symmetry of non-digitized and non-factorizable information (i.e., knowledge) in relation to its observation of real-time situations to build up experience (Operation III in Figure 9) by symmetry-breaking and symmetry-making processes. The experience is stored in its fabric as an information manifold. Life could be designated as a homeostasis manager, engaged in asymmetry-symmetry homeostasis, uncertainty-certainty homeostasis, and dark energy-visible energy homeostasis across ZPE. Within a single biological cell, life in its subtle form, operates

as the core principle of Supramolecular Organizing Center (SMOC) [57].

Consciousness is the Boss of the cognitive orchestra, a ground without any background, the sole and unique entity that can make "will"/"won't". Will, although absolutely free, once made gets bound to the rules of the systems, and subsequent causality matrix. Along the ladder of cognition, consciousness makes wisdom out of experience, breaks down information crystals into manifolds of experience (Operation IV in Figure 9). Consciousness is responsible for the quality management of information states within the system, although consciousness is independent of any force, field, energy, and information. Like a spider, consciousness weaves the net but itself is outside the snare of the net (Spider Model of Consciousness) (Figure 10). In fact, consciousness disarms all force, fields, energy, and information. Consciousness is reflected in the system as the conscience, the source for the ethics of self, and aesthetics of life, and the fertility of mind. Bereft of consciousness, the mind is sterile.



**Spider Model of Operative Consciousness**



**Figure 10:** Two Operative Models of Consciousness. In the Spider Model, Consciousness is compared with a spider, which weaves the net but itself is outside the snare of the net. In the Caterpillar Model, Consciousness advances like a caterpillar supporting, participating, intervening, making a choice for, and executing volition for the cognitive orchestra. The effect is observable by the senses as an event/signal. Traced from the front to the behind there is awakening, awareness, having experience, making choices, and execution of the "will"/ "won't".

Consciousness supports the members of the system psyche, participates with them, intervenes when necessary, takes the final call, and creates the Caterpillar Model of Consciousness (Figure 10).

### Coupling of Consciousness with the Brain

We have described how the Bottom can ascend to the Top. Having understood the two models of operative consciousness, we offer the model of how the Top catches up with the Bottom i.e., how consciousness couples with any cognitive substrate like the brain.

The following is a Top-Down model of how consciousness catches up with the cognitive substrate (Figure 11).

This coupling happens across ZPE. Information-split phenomenon makes the event.

### Clinical implications of the Model:

In the Model of Consciousness-Cognition-Behavior axis, as referred, the brain is meant for behavioral expression. Cognition is a nonlocal phenomenon managed by the cognitive orchestra, the

members of which make the brain their local home. Consciousness operates from the Top! There are two known clinical conditions when the brain fails to act as an organ of expression of behavior. The first is the well-known condition of Akinetic Mutism. The second has been reported recently [58] in a study where at least 25% of unconscious patients who are unresponsive in the existing conventional stimuli-response paradigm, are found to be responsive to verbal instructions as per the records of their fMRI and EEG data. There is complete execution deficit due to injury in the brain, although the immediate cognition-brain coupling seems unaffected.

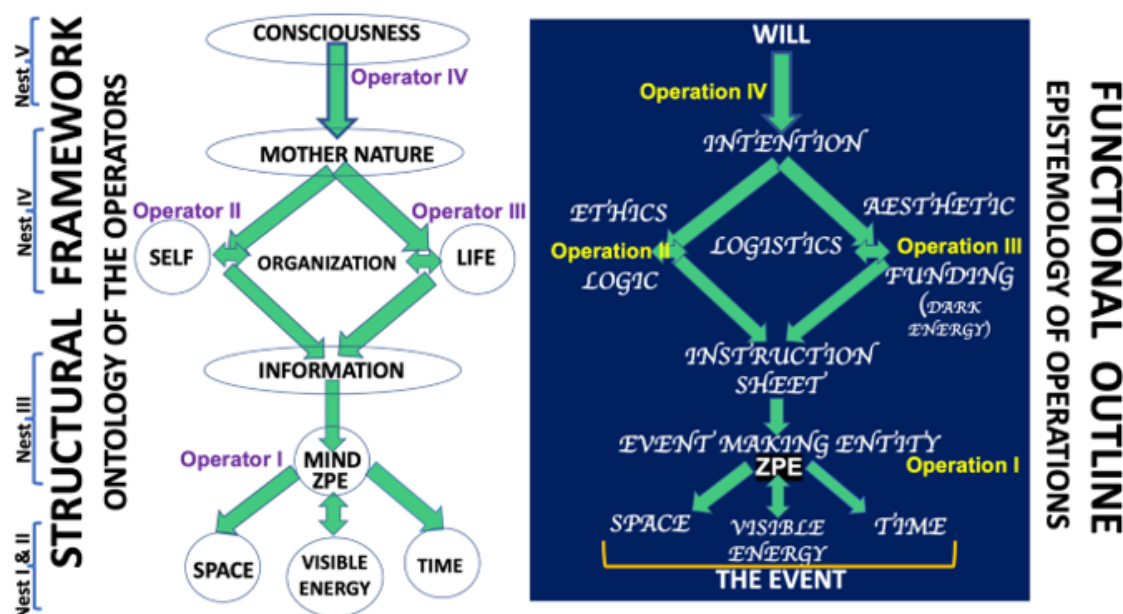
### What situations make Extracerebral Consciousness contextually Supracortical?

In the month of October in 1988, the author happened to have a long one hour discussion on *supracortical consciousness* with Sir John C Eccles (Mrs. Eccles accompanied him) in the canteen of National Physical Laboratory, Pusha Road, New Delhi, India over a cup of tea. Eccles maintained mostly silence while the author



kept on talking on his new book, *The dynamic web of supracortical consciousness*. Following this event, Eccles started using the term,

extracerebral consciousness more frequently.



**Figure 11:** The Organogram showing the pathway from Consciousness to Energy, and from the "Will" to the Event. The left side of the figure describes the structural framework of the ontological operators with their phase position. The right side shows the functional outline of the epistemology of the operations from the 'will' to the event. In absence of any known force, field or visible energy consciousness operates with only will and intention, executes a smooth Governance stepwise for the event to occur in the 4-D world. The result is creation of new space, new time, and their new relationship in the context of energy within the substrate of cognition.

Contextually what makes extracerebral consciousness supracortical i.e., operational "on the cortex"? In other words, what embodying mechanism makes disembodied consciousness and embodied cerebral consciousness to resonate? Since there is a brain-bound/brain-confined/brain-encased consciousness, both brain-consciousness coupling and consciousness-brain coupling could be explained within the realm of brain phenomena. Non-conscious experiences, which does not require this inside-out communication may be stored in memory. No invoking of circum-cerebral supracortical consciousness is necessary. This invoking is required in two situations. (i) During any conscious experience, which calls for the natures of the brain-bound and brain-independent consciousness(s) to concur, to resonate, to consummate, determining the depth of experience. (ii) When one's brain remains "transmissive" (William James) for a 'higher', (the so-called "supernatural", supra physical, supracosmic), transpersonal/multiversal "will"/"won't". In other words, this outside-inside communication is required when the brain makes the unknown imaginable, and the imagined intelligible! Intuition, Illumination and Revelations are testimonials for such transmissive "will", and a studied Silence is of a transmissive "won't". In the second situation,..... the question of preparedness of the brain with its multilevel axiological integrity namely, classical integrity, quantum integrity, phenomenological integrity, and integrity to remain conducive to Mother Nature, come into forefront. Supracortical consciousness biologized at the level of limbic nuclei (septal nuclei

and bilateral amygdala) generates what is called *Ananda* leading to regulated secretion of endogenous cannabinoid neurotransmitter, Anandamide (AEA).

In the internal forum, the values, ethics and aesthetics, conscience, at present, are considered *fringe* phenomena in mainstream psychology. However, these constitute the axiology of consciousness, and are central to the cognitive growth of humanity that add strength and richness to the forum interna. In the natural world too, in the external forum of the mainstream physics, some areas like ZPE, subtle energy, exotic matters, and scalar fields are considered *fringe* phenomena. However, these areas seem to be very central to the Multiversal cosmology, immersive neuroscience, and for a science of consciousness.

### Immersive Neuroscience

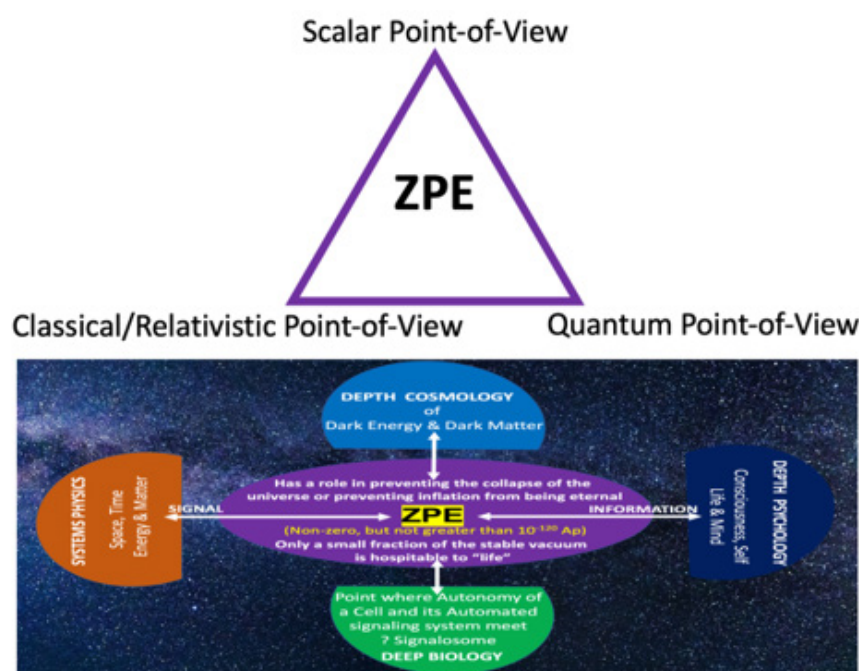
The disruptive inversion with the shift of the Governing Power from the brain to consciousness ushers a new dawn in neuroscience: a consciousness-centric neuroscience, the immersive neuroscience in which the *nature* of consciousness of the brain operates with the entire spectrum of *nature* around it. Using the rhyme of the Astonishing Hypothesis of Sir Francis Crick, it may be stated that we, our automated, autonomous and holonomic behaviors, our emotion and feelings of joy and sorrow, our memories and intelligence, our own sense of identity and life, and our free will are expressed through the complex biological, wireless, and deeper

natural connectivity of hundred billion nerve cells, two to ten times of glial cells, and the associated molecules within the brain. The science of immersive neuroscience is in how the spacetime worlds of different neuronal assemblies of the cerebral cortex resonate with the space-time worlds in nature around the brain, and the brain behaves as a transmissive organ for Mother Nature. Covering the missing links, the probable five steps in developmental lines of Immersive neuroscience are described below.

### The science of ZPE and the art of bringing own brain to ZPE state:

ZPE (Figure12) from the classical and Relativistic point of view is a cosmological constant, and consists of, or ends in dark energy. From a quantum point of view, ZPE represents non-zero fluctuating

states of energy quanta. From the scalar fields point of view, it is the door for infinite energy which is subtle, and informational. Each of the three points shown in triangular ZPE are related to respective electromagnetic fields; scalar, quantum and classical. Scalar electromagnetic fields (Thomas Bearden) make the mechanism individualistic. To investigate nature vertically from the depth of ZPE, the scientist's brain, as shown in figure seven, needs to be at the ZPE state. The ZPE state of the brain is very close to the default mode network (M-FPN, medial frontoparietal network). However, there is a difference. In addition to passive tasks in the internal forum as found in the default mode there is passive focused external attention too in the ZPE state of the brain. The person is awake in deep sleep state, when his mind is at complete rest.



**Figure 12:** At the Top is shown the triangular view of ZPE. Below, the ZPE is shown as the meeting ground of Systems Physics and Depth Psychology, Deep Biology and Depth Cosmology. The vertical axis shows how the Depth Cosmology of Dark Energy and Dark matter communicates with a cell at a point where the automated signalling centre meets the cell's autonomy. The communication requires the finest balance between Fluctuation of non-zero but not greater than  $10^{-120}$  Ap energy and a small fraction of the Stable vacuum. The horizontal axis shows how Space, Time, Matter, and Energy of Local Science is connected with the Nonlocal Science of Consciousness, Self, Life, and Mind through inter-conversion of Signal and Information at ZPE. The figure indicates possible opening for deep physics of dark energy, life and information, and depth psychology of the mind, self, life, and consciousness.

How to bring the Brain to ZPE State?

Very simple! Gather available knowledge on ZPE, ponder on the state, marinate the idea night after night, reflect on the situation regularly, and contemplate on ZPE routinely. You are at the fringe, preparing yourself for manifesting a great idea. It is through meditation on this void or vacuum, the door to the science of Infinity is likely to open up!

### Science of Scalar Fields:

Fields are non-observable areas of influence of energy. What

are the scalar fields of? Proposed to be of subtle energy! We have elaborated on this area earlier. Subtle energy and Scalar fields are interrelated.

### Science of Subtle Energy:

The ability of subtle cognition is mediated by subtle energy. We have elaborated on this area as well. Subtle energies as a whole, as Information holograph is contextually relevant here.

### Exotic Matters in the foregrounds of Consciousness:

At different stages of development of science different

background media are invoked as the conveyor of subtle energy and/or invisible fields. According to the author, these are exotic states of matter. This area has also been elaborated earlier, and more work out is necessary.

### The crucial resonance which can overtake the edge of Chaos:

Concurrence, resonance and consummation are always individualistic in dualistic interaction. What makes the cerebral and extracerebral facets of resonance individualistic? On the extracerebral side, the scalar electromagnetic fields are said to be individualistic (Thomas Bearden). The combination of four subtle energies as an information holograph acts on the individual self of the system psyche/cognitive orchestra. On the cerebral side, the self of the cognitive orchestra belongs to an individual. The brain, of course, is also of an individual. However, this individual brain to behave as transmissive organ of a 'greater' will has to attend multilevel integrity for experiencing concurrence/resonance/consummation! The frontier opens up the science of BioGeometry (of Ibrahim Karim)!

As stated earlier, extracerebral consciousness becomes contextually supracortical at least in two situations; (i) during conscious experiences and (ii) while making the unknown imaginable, and the imagined intelligible!

From Sweden, the paper of Jan Pilotti [59] carries the idea that consciousness is in Space-Time beyond the brain! On the brain side, the brain-states are now considered as wave-like motifs [60]. Stochastic neurodynamic is both spatial and temporal, consisting of both equilibrium and dissipative structures (Sungchul Ji, in email communication in the Forum, Biological Physics and Meaning, 24th of June 2024). In this resonance, the engagement happens between two spatiotemporal facets which is toroidal in nature. Does resonance occur because of chaos or after overtaking the chaos? Since 1995, there exists a relationship between chaos theory and the evolution of consciousness and mind activity with a possible attempt towards thermodynamic-holographic resolution to the mind-body problem [61]. "A warm, wet, noisy brain constantly creates random fractal neuronal activity. ... At the edge of chaos consciousness manifests itself through intermittent dynamics" [62]. The brain as a complex structure of dynamic equilibrium and dissipation, and as a transiently stable dynamic attractor is ever always in direct contact with the nature of consciousness around the head spread all over the universe and the multiverse. The question is, does order come out of chaos, or through chaos, or because of chaos? No conclusive evidence is available in favor!

At this stage, we might offer the hypothetical statements that the waves of conscious intention grounded on conscious subtle energy bring order in cognitive orchestration over the media of exotic states of matter, and carried to the receptive brain-states when the wave-like motifs within the brain overtake the edge of chaos. The consequence is a concurrence/resonance/consummation between the natural and formal worlds, between forum externa and forum interna. The result is a discovery, based on evidence, or a revelation with its impactful external implications. When the consummation could influence the limbic nuclei and the brainstem, there is

experience of *Ananda* with consciousness-centric entrainment of the brain and the heart.

### Conclusion and Perspectives

We have pointed out the fault lines in the assumption of the prevalent neuro-centric view of consciousness that states the brain is the source of consciousness. We have brought out a spectrum of evidence favoring a consciousness-centric neuroscience, citing evidence of conscious activities in brainless animals, sentience of plant-roots, and cognition, choice, intention, and decision at the level of a single cell.

During investigation of the brain-consciousness and consciousness-brain relationships, the scientists are suggested to adopt a disruptive approach like a Dionysian, and to look at the larger whole instead of focusing on individual neurons.

The models of brain-consciousness coupling and consciousness-brain coupling, although, have been offered, consciousness has been said to have no source! For working out the relationship between consciousness and the brain, twelve areas have been marked, where much more work is felt to be done.

Science **develops when the brain** makes the unknown imaginable, imagined possible, possible verifiable, and finally the verifiable verified. The innovative and thought provoking perspectives of the manuscript is at the intersection of science, humanity and spirit. The ideas in the paper are cross-disciplinary, inter-disciplinary and multidisciplinary in the true sense of the words. Wherever available, the author has supported his ideas by evidence. Whenever and wherever not, the construction is filled with statements of research questions and research hypotheses which do require experimental support.

Science requires Time. How much Time is it likely to take to make the imaginable verified? Once the fringe factors occupy the center of science, we will be more clear about how *consciousness couples with the cognitive faculty and the cognitive faculty couples with the brain!* Development of multilevel integrity of the human brain is the most important factor that might make us wait. We are, in fact, in the middle of five century's science. In the 19<sup>th</sup> century we did Classical Physics. In 20<sup>th</sup> century, we were engaged in Relativity and Quantum Physics. We are doing science of information in the present 21<sup>st</sup> Century. The 22<sup>nd</sup> century's science would be the science of Life. Science of Consciousness would flourish in 23<sup>rd</sup> century. It seems we are working three centuries ahead!

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### Conflict of Interest

No Conflict of interest.

### References

1. Szent-Gyorgyi A (1972) Letter to Science. Science 176: 966.
2. Mukhopadhyay AK (1985) States of Consciousness - A Holistic Hypothesis. Supracortical Consciousness - An Existing Reality. In, Frontiers of Research for Human Biologist for Next Hundred Years. New Delhi: Consensus Publications: 1-7.



3. Mukhopadhyay AK (1987) The Dynamic web of Supracortical Consciousness. New Delhi: Conscious Publications.
  4. Mukhopadhyay AK (1989) Consciousness-from Behavioral Neurologists' Horizon. Journal of Indian Council of Philosophical Research VI (3): 49-55.
  5. Mukhopadhyay AK (1995) Conquering the Brain. Towards the Essence of the Multiversity and the Akhanda Paradigm. New Delhi: Conscious Publications.
  6. Mukhopadhyay AK (2000) The Millennium Bridge. Towards the Mechanics of Consciousness and the Akhanda Paradigm. New Delhi: Conscious Publications.
  7. Mukhopadhyay AK (2006) Supracortical Consciousness. An Opening to Multiple new Doors of Science. In, The Enworlded Subjectivity. Its Three Worlds and Beyond. Project History of Indian Science, Philosophy and Culture (PHISPC). Vol. XI (4), Ed. R. Balasubramanian. New Delhi: Center for Studies in Civilization;. <https://www.akmukhopadhyayconsciousness.com/pdf/Supracortical-Consciousness.pdf>
  8. Kandel E R (2000) In, Principles of Neural Sciences. 4th Edition. Eds. ER Kandel, JH Schwartz, TM Jessell, SA Siegelbaum, AJ Hudspeth. New York: Mc Graw Gill 1224.
  9. Laureys S (2019) In: Conversation with Anouk Bercht. The Science of Consciousness. Scientific American. New York: 227.
  10. Libet B (1996) Neural processes in the production of conscious experience. In, The Science of Consciousness. Velmans M, editor. London and New York: Routledge.
  11. Libet B (1999) Do we have free will? J Conscious Stud 6(8-9): 47-57.
  12. Vuyk L (2018) Free Will Readiness Potential Ratios, the Key for a Multiverse Number Calculation. History and Philosophy of Physics; 2018. <https://vixra.org/abs/1803.0100>
  13. Nicoletis M (2011) Beyond boundaries: The new neuroscience of connecting brains with machines and how it will change our lives. USA: Times Book.
  14. Savage N (2019) Marriage of mind and machine. Nature 571: S15-S17. DOI:10.1038/d41586-019-02212-4.
  15. Neural WiFi (2019) A new form of communication in the brain by electric fields. Physiology News Magazine 116: (whole issue).
  16. Kulacz L, Kliks A (2021) Brain-Inspired Data Transmission in Dense Wireless Network. Sensors 21(2): 576.
  17. Wackermann J, Seiter C, Keibel H, Walach H (2003) Correlations between brain electrical activities of two spatially separated human subjects. Neurosci Lett 336(1):60-64.
  18. Robert Martone (2019) Scientists Demonstrate Direct Brain-to-Brain Communication in Humans Work on an "Internet of brains" takes another step. Scientific American, Oct. 29;. <https://www.scientificamerican.com/article/scientists-demonstrate-direct-brain-to-brain-communication-in-humans/>
  19. Aspect A, Dalibard J, Roger G (1982) Experimental test of Bell's inequalities using time-varying analyzers. Phys Rev Lett 49: 1804-1807.
  20. Gisin N (2015) Can relativity be considered complete? From Newtonian nonlocality to quantum nonlocality and beyond. The Message of Quantum Science, Lecture Notes in Physics, 899, Berlin Heidelberg: Springer-Verlag: 195.
  21. Hu H, Wu M (2007) Spin-mediated consciousness: Theory, Experimental Studies, Further Development and Related Topics. Quantum Physics arXiv:quant-ph/0208068.
  22. Grinberg-Zylberbaum J, Delaflor M, Attie L, Goswami A (1994) The EinsteinPodolsky-Rosen paradox in the brain: The transferred potential. Phys Essays 7: 422-428.
  23. Ellingsen DM, Isenburg K, Jung C, Lee J, Gerber J, et al. (2020) Dynamic brain-to-brain concordance and behavioral mirroring as a mechanism of the patient-clinician interaction. Sci. Adv 6: eabc1304.
  24. Feuille L, Dufour H, Pelletier J (2007) Lancet 370(9583):262.
  25. Ferris, C.F., Cai, X., Qiao, J. et al. (2019) Life without a brain: Neuroradiological and behavioral evidence of neuroplasticity necessary to sustain brain function in the face of severe hydrocephalus. Sci Rep 9, 16479. <https://doi.org/10.1038/s41598-019-53042-3>
  26. Meredith L, Biedrzycki, Harsh P (2010) Bais, Kin recognition in plants: a mysterious behaviour unsolved, Journal of Experimental Botany 61(15): 4123-4128, <https://doi.org/10.1093/jxb/erq250>
  27. Depuydt S (2014) Arguments for and against self and non-self root recognition in plants. Front. Plant Sci., Sec. Functional Plant Ecology. Volume 5 -. <https://doi.org/10.3389/fpls.2014.00614>
  28. Shapiro JA (2007) Bacteria are small but not stupid: Cognition, natural genetic engineering and socio-bacteriology. Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences 38(4): 807-819.
  29. Mukhopadhyay AK (2022) Underlying Humanities in a Molecular Cell. Journal of Pathology Research Reviews & Reports (4): 153. SRC/ JPR-167. DOI: [doi.org/10.47363/JPR/2022\(4\)153](https://doi.org/10.47363/JPR/2022(4)153)
  30. Beekman M, Latty T (2015) Brainless but multiheaded: decision making by the acellular slime mould Physarumpolycephalum J. Mol. Biol 427: 3734-3743.
  31. Tang SKY, Marshall WF (2018) Cell learning. Curr. Biol 28: R1180-R1184.
  32. Dexter JP, Prabakaran S, Gunawardena J (2019) A Complex Hierarchy of Avoidance Behaviors in a Single-Cell Eukaryote, A Complex Hierarchy of Avoidance Behaviors in a Single-Cell Eukaryote. Current Biology 29: 4323-4329.
  33. Schenz D, Nishigami Y, Sato K, Nakagaki T (2019) Uni-cellular integration of complex spatial information in slime moulds and ciliates. Curr. Opin. Genet Dev 57:78-83.
  34. Oh C, Koh D, Jeon HB, Kim KM (2022) The Role of Extracellular Vesicles in Senescence Mol. Cells 45: 603-609.
  35. Lanna A, Vaz B, D'Ambra C, Valvo S, Vuotto C et al. (2022) An intercellular transfer of telomeres rescues T cells from senescence and promotes long-term immunological memory. Nature Cell Biol 24: 1461-1474.
  36. Volzhenin K, Jean-Pierre Changeux J-P, Dumas G (2022) Multilevel development of cognitive abilities in an artificial neural network. PNAS: 119.
  37. Mukhopadhyay AK (2015) Systems Cell: a Testable Model for Systems Holism. International Archives of Medicine 8:1-10.
  38. Mukhopadhyay AK (2016) Systems Psyche: Its Structure, Operation and Possible Molecular Links. Psychol Behav Sci Int J. 1(3):555565.
  39. Mukhopadhyay AK (2021) Axiology of Nature Consciousness Reality: Relevance in Consciousness Study, Psychology and Psychiatry. World J Psychiatry Ment Health Res 5(1):1028.
  40. McGann M (2024) Facing life: the messy bodies of enactive cognitive science. Phenomenology and the Cognitive Sciences; <https://doi.org/10.1007/s11097-024-09958-x>
  41. Mukhopadhyay AK (2008) A Radical view of Information On its nature and science. Frontier Perspectives 16(2):19-29. <https://www.akmukhopadhyayconsciousness.com/pdf/A-Radical-View-of-Information-On-its-Nature-and-Science.pdf>
  42. Mukhopadhyay AK (2013) Setting the Agenda for a Science of Information 2013 (ppt presented in, Towards Science of Consciousness held at DEI, Agra, India). <https://www.akmukhopadhyayconsciousness.com/pdf/Setting-the-Agenda-for-a-Science-of-Information.pdf>
  43. Mukhopadhyay AK (2014) From Quantum to Consciousness: A long way to go! In, Brain, Mind, Cosmos. Sages and Scientist Series. Deepak Chopra, Ed: 202-229.
- <https://www.akmukhopadhyayconsciousness.com/pdf/FROM-QUANTUM-TO-CONSCIOUSNESS.pdf>

44. Mukhopadhyay AK, Mukhopadhyay AS (2019) Visualizing Information as a Dynamic Entity Roadmap of Deep Science, AI and Humanity. *Psychol Behav Sci Int J* 13(4): 555867.
45. Mukhopadhyay AK (2021) Science of Information. *Global Journal of Science Frontier Research: A Physics and Space Science* 21(1) version 1:14-30.
46. Mukhopadhyay AK (2020) Life-Form A Matters-Syncytium: DeepScience for Matter Correlates of Conscious States. *EC Psychology and Psychiatry* SI.02: 01-16.
47. Ji S (1991) Biocybernetics: Machine Theory of Biology. In: *Molecular Theories of Cell Life and Death* (S. Ji, ed.), 1991; New Brunswick, N.J., Rutgers University Press: 152-153.
48. Mukhopadhyay AK (2012) Information Holograph. The Structure, the Source and its Operation. *International Journal of BioEngineering, NeuroSciences and Technology* 2 (2):12-32.
49. Lee Tsung-Dao (1982) Is Vacuum a Physical Medium? *DSLS* 1981-1982. 5.  
[https://digitalcommons.bard.edu/dsls\\_1981\\_1982/5](https://digitalcommons.bard.edu/dsls_1981_1982/5)
50. Puthoff HE (2006) Physics and Metaphysics as Co-emergent Phenomena". In, *Life and Mind*, S. Savva, ed., Trafford Publ.
51. Mukhopadhyay AK (2020) Consciousness Cognition and Behavior. *J Neurosurg Imaging Techniques* 5(2): 278-299.
52. Mukhopadhyay AK (2017) The Ladder of Cognition: Abstract Operations, Molecular Biology, Systems Science. *Ann Psychiatry Ment Health* 5(4):1107.
53. Mukhopadhyay AK (2018) Cognitive Canvas: Molecular Embroidery, Fabric and the Base. *EC Psychology and Psychiatry* 7(7):428-439.
54. Mukhopadhyay AK (2022) Humanities and Spirit in Cell Science. A Cell Could Be Considered a Universe for Learning Behavior. *CPQ Neurology and Psychology* 5(3): 01-23.
55. Mukhopadhyay AK (2019) Communication of the "Objective Reality" as Signal to the Senses in Orchestrated Non-Reductive way. *Arch Neurol & Neurosci* 4(3): ANN.MS.ID.000586.
56. Jamali, M., Grannan, B., Cai, J. et al. (2024) Semantic encoding during language comprehension at single-cell resolution. *Nature*. <https://doi.org/10.1038/s41586-024-07643-2>
57. Qi Q, Hao W (2015) Supramolecular Organizing Centers (SMOCs) as signalling machines in innate immune activation. *Sci China Life Sci* 58:1067-1072.
58. Bodien YG, Allanson J, Cardone P, Bonhomme A, Carmona J, et al. (2024) Cognitive Motor Dissociation in Disorders of Consciousness. *N Engl J Med* 391(7): 598-608.
59. Pilotti J (2011) Consciousness and Physics: Towards a scientific proof that consciousness is in Space-Time beyond the brain. *Journal of Transpersonal Research* 3(2):123-134.
60. Foster M, Scheinost D (2024) Brain states as wave-like motifs. *Trends in Cognitive Sciences* 28 (6): 492-503.
61. Vandervert LR (1995) Chaos theory and the evolution of consciousness and mind: A thermodynamic-holographic resolution to the mind-body problem. *New Ideas in Psychology* 13(2): 107-127. [https://doi.org/10.1016/0732-118X\(94\)00047-7](https://doi.org/10.1016/0732-118X(94)00047-7)
62. Sbitnev V (2024) The edge of chaos is that where consciousness manifests itself through intermittent dynamics. *Academia Biology* 2. <https://doi.org/10.20935/AcadBiol6169>